

Smart INVESTMENTSSM

IN TRANSPORTATION FOR MINNESOTA

Driving Down Minnesota's Greenhouse Gas Emissions *Issues and Ideas for Reducing Vehicle Miles Traveled*

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GROWTH & JUSTICE

Growth & Justice is a non-profit, non-partisan organization that researches and recommends public policies to make Minnesota's economy simultaneously more prosperous and fair. We support fair taxation and smart public sector investment — fiscally responsible, accountable investment that advances prosperity for all Minnesotans. Growth & Justice is a leading progressive voice on state issues.

Executive Summary

The cars and light-duty trucks we drive make travel fast and convenient, but the greenhouse gases (GHG) that these vehicles emit contribute greatly to the broadest environmental challenge of our time: climate change.

Minnesota in 2007 enacted the Next Generation Energy Initiative, setting in place state goals for a reduction in GHG emissions of 30 percent from 2005 to 2025 and a reduction of 80 percent from 2005 to 2050. With the transportation sector accounting for one-fourth of all greenhouse gas emissions in Minnesota, strategies to reduce vehicle-related emissions will be critical to achieving those goals.

State and local governments can have a positive impact on transportation-related GHG emissions through policies that reduce the number of vehicle miles traveled (VMT) on Minnesota's roadways. Two other approaches — better fuel efficiency and cleaner fuels — also are important but more strongly influenced by federal policy, and the potential gains from these two strategies will be undermined unless we reverse our historical pattern of more and more roadway travel.

Policy makers hoping to address VMT challenges must be aware of four key findings that emerge from our research ([More](#)):

- 1. We drive a lot.** Minnesota drivers travel more miles than average compared to the nation as a whole and even to our neighboring states of Iowa and Wisconsin.
- 2. Land-use and transit strategies should be pursued together.** While Minnesota can modestly reduce its greenhouse gas emissions through increased transit service alone or through changes in land use patterns alone, bigger, significant impacts come from investments, policies and choices that link transit and land-use and encourage transit-oriented development.
- 3. Potential environmental gains from land use changes and transit will depend on increased density.** Because these changes take time and investment, it's smart to start now and focus on areas with existing concentrations of employment and housing — areas that already boast significant development.
- 4. Increased density may carry a price.** Concentrations of employment may make congestion worse on some streets and thoroughfares connecting to those areas. Roadway pricing initiatives, such as the Mn-PASS lanes on I-394 and I-35W, can mitigate this traffic congestion, as can transit.

As part of the Growth & Justice initiative on *Smart InvestmentsSM in Transportation for Minnesota*, this report explores three approaches to reducing Minnesota's vehicle miles traveled: land use and transit-oriented development, transit service, and pricing strategies.

Land Use and Transit-Oriented Development

To drive fewer miles, Minnesotans will need to change how we use land and how we structure our communities. Shorter and fewer car trips will require denser development and a greater mix of uses within those developed areas. Changes in land use – coupled with and driven in part by expanded transit service for the Twin Cities area in particular – hold promise for reduced environmental impacts from travel. ([More](#))

Key Points

- Efficient and transit-oriented land use can reduce the number and length of car trips through 1) more compact development; 2) a mix of uses such as office, retail and housing; 3) local streets that connect with one another; and 4) other transportation infrastructure improvements that boost travel efficiency and encourage walking, biking and transit use. ([More](#))
- Compact development reduces vehicle miles traveled and thus greenhouse gas emissions from the transportation sector. Gains from land use changes and transit will depend upon increased concentrations of jobs and housing in already-developed areas. ([More](#))
- While compact development reduces car trips and their resulting pollution, the full benefits are realized only slowly because existing residential and commercial structures will shape travel patterns for years to come. Consequently it is important to implement policies that encourage compact development sooner rather than later. ([More](#))
- Transit-oriented development boosts the environmental benefits of compact areas through land-use patterns that make transit a viable alternative to car trips. ([More](#))
- Local zoning regulations often are major barriers to the land-use changes and compact development that could curb driving and reduce greenhouse gas emissions – meaning that smart growth development benefits from less, not more, local zoning rules in many cases. ([More](#))

Potential Policies and Approaches

- Continue – and even strengthen – the strong focus for highway spending on the maintenance and improvement of existing roads. Emphasize travel improvements on routes serving compact, higher-density areas, including downtowns, town centers, regional centers and transit corridors. ([More](#))
- Foster increased population and employment densities in already developed areas and along transportation corridors. ([More](#))
- For a range of state programs, distribute funding to reward local planning, zoning and investment approaches aimed at increasing compact development and reducing vehicle miles traveled. ([More](#))
- Adopt statewide and municipal planning incentives and policies, establish a process for designating priority growth areas within the state, and offer planning tools and technical assistance from the state to communities throughout Greater Minnesota. ([More](#))
- Explore ways that the State of Minnesota and its metropolitan regions could use fees or incentives to limit the carbon impact of new development. ([More](#))
- Advance, fund and build upon existing state programs and initiatives that promote sensible land use and curb the need to drive, including Minnesota's 2010 Complete Streets law, state brownfields programs, the Livable Communities Demonstration Account, and the Metropolitan Livable Communities Program Tax Base Revitalization Account. ([More](#))
- Make transit investments – especially in the Twin Cities area – that can trigger transit-oriented, compact development and in this way reduce car use. ([More](#))

Transit

Transit use — especially when passengers riding transit would otherwise drive cars — can reduce emissions because, as a rule, transit vehicles in urban areas churn out fewer emissions per passenger mile than automobiles. A combination of increased transit use and smart growth land-use patterns will achieve greater reductions in GHG emissions than either transit initiatives or land-use changes on their own. ([More](#))

Key Points

- Public transit can cut transportation-related pollution in three important ways: 1) decrease the number of vehicle miles traveled in personal vehicles; 2) reduce traffic congestion, which cuts the amount of fuel burned by idling cars and trucks; and 3) prompt compact, transit-oriented development that diminishes the need for and length of trips in personal vehicles. ([More](#))
- Increases in transit use alone will produce modest decreases in vehicle miles traveled and greenhouse gas emissions, with the improvements growing somewhat over time. ([More](#))
- Based on emissions per passenger mile, transit vehicles on average generate less greenhouse gas than do personal vehicles, so greater transit use can reduce the adverse environmental impacts of travel. ([More](#))
- The environmental benefits of transit grow when more riders who otherwise would drive cars board the bus or train instead. ([More](#))
- Transit is more efficient, cost-effective and popular when a metro region has areas of compact development with concentrations of important destinations, especially job sites. ([More](#))

Potential Policies and Approaches

- Encourage greater concentrations of employment in Minnesota’s cities in order to create hubs or nodes for workplace destinations easily served by transit. ([More](#))
- Make transit more attractive to new riders who would otherwise drive on their own – by improving service speed and reliability, upgrading the comfort of the ride, providing better transit information, stepping up marketing efforts, and encouraging employers to move from parking subsidies toward transit incentives. ([More](#))
- Accelerate the Metropolitan Council’s plans for expanded transit service, infrastructure and passenger loads in order to double ridership by 2020 instead of the current target year of 2030. ([More](#))
- Secure increased and stable funding for transit to allow accelerated service expansion and other initiatives that will boost ridership. ([More](#))
- For Greater Minnesota transit outside of the state’s larger cities, the best strategy for potential environmental gains likely will be an expansion of those services that can reduce vehicle miles traveled and curb transportation emissions, notably vanpools and intercity bus service on well-traveled routes. ([More](#))

Pricing Strategies

Policies and arrangements that increase the obvious costs of driving can yield corresponding reductions in vehicle miles traveled and in greenhouse gas emissions, as well as other transportation-related pollutants. And roadway pricing initiatives can provide corollary benefits as well. For example, the MnPASS lanes on I-394 and I-35W, can mitigate traffic congestion problems that may plague the thoroughfares leading into and out of concentrated employment centers. Pricing policies have great potential for reducing GHG emissions, but many of them face significant opposition for the very reason they work – because they increase the costs directly tied to operating a car. ([More](#))

Key Points

- Transportation pricing strategies can reduce vehicle miles traveled because they raise the expense of driving – or of driving more – by linking the costs of driving to how much a vehicle travels, by making vehicle users cover a greater share of the costs associated with their driving, or by adding fees to deter driving. ([More](#))
- Individual drivers do not directly pay the full cost of vehicle travel, with some significant costs spread among drivers and non-drivers alike. For example, property taxes cover a larger share of roadway costs statewide than do gas taxes, and the costs of “free” or low-price parking is borne by owners and users of commercial and industrial property. ([More](#))
- Vehicle miles traveled will drop, as a rule, the more that the easy-to-see costs of owning and operating a vehicle correspond with the number of miles that the vehicle logs. ([More](#))
- Pricing initiatives that raise the easy-to-see costs of vehicle travel may have disproportionately adverse impacts on low-income Minnesotans who drive and on Minnesotans in rural areas where driving is often necessary and alternatives are very limited. ([More](#))
- Action at the national or at multi-state regional levels will work better than state-level initiatives for some pricing policies – for example, a very large increase in the gas tax, a broader carbon tax, or a cap-and-trade system to reduce greenhouse gas emissions. ([More](#))

Potential Policies and Approaches

- Charge drivers fees for access to free-flow travel on freeways at crowded, peak times in order to reduce greenhouse gases produced by cars idling in congested traffic. ([More](#))
- Ensure that pricing policies address equity problems for low-income drivers by including measures such as rebates, government payments, tax credits, and improved transit service. ([More](#))
- Encourage or require insurance companies to set rates for auto policies based at least in part on the mileage logged by the insured vehicle. ([More](#))
- Consider raising revenues in the future for state-funded transportation infrastructure through mileage-based user fees paid by Minnesota’s drivers. ([More](#))

Summing Up

Through our higher-than-average driving, Minnesotans contribute more to greenhouse gas emissions and climate change. We can reduce that impact by taking steps to reduce the number of vehicle miles traveled in the state. The best strategies focus on land use and transit-oriented development, transit service and pricing options. These approaches are more effective at curbing VMT and GHG levels when pursued in combination. ([More](#))

The Case for Reducing Vehicle Miles Traveled

Cars and light-duty trucks – the vehicles that carry most of us to work, school, home, shopping and other common destinations – make passenger travel fast and convenient but also inflict serious damage on the environment. As our vehicles burn gasoline and diesel fuel, they emit greenhouse gases (GHG) that cause climate change, which was identified in a recent report from the National Academies’ Transportation Research Board as “the broadest environmental challenge of the 21st century.”¹ Greater atmospheric concentrations of GHGs – primarily from human activity that releases carbon dioxide – are raising temperatures, increasing the intensity and occurrence of severe weather, and otherwise changing our climate worldwide. Adverse impacts include reduced crop yields, spreading drought conditions, rising sea levels, and circumstances and developments that threaten plant and animal species.² In recognition of these serious problems, Minnesota in 2007 enacted the Next Generation Energy Initiative, setting in place state goals for a reduction in GHG emissions of 30 percent from 2005 to 2025 and a reduction of 80 percent from 2005 to 2050.³

Transportation and land use has been identified as an important target for policies and approaches aimed at reaching those goals.⁴ This report focuses on emissions that are warming our planet. But needless to say, Minnesota’s environment is adversely affected as well by smog precursors, particulate air pollution, water pollution from roadway runoff, and other transportation-related pollution beyond greenhouse gases.

Reducing the number of vehicle miles traveled (VMT) on Minnesota’s roadways means declines in corresponding GHG emissions, mostly carbon dioxide. When it comes to global warming, this is important because the transportation sector accounts for about one-fourth of all greenhouse gas emissions in Minnesota.⁵ By one estimate from University of Minnesota researchers, every 1 percent decline in VMT results in a 0.8 percent reduction in the transportation sector’s GHG emissions.⁶

As a strategy, reducing vehicle miles traveled is not the only way to rein in greenhouse gases from the transportation sector, but it is a critical part of the equation. Experts who study how transportation affects global warming often talk about a “three-legged stool” of strategies aimed at curbing greenhouse gas emissions.

One leg of that stool is improved fuel efficiency for cars, with an emphasis on increased gas mileage, hybrid engines, electric vehicles and other technology changes. Another leg is a shift to alternative fuels for motor vehicles – cleaner fuels that do not produce as much GHG emissions per mile as do gasoline and diesel fuel. But the possible environmental gains from both these legs of the stool may be lost if the cars that emit less GHG pollution per mile are driven more miles. The more we drive the vehicles that produce GHG emissions, the more we emit greenhouse gases, even if the unwanted emissions are released at a reduced rate per mile. Historically vehicle miles traveled in Minnesota – and the United States overall – have increased at a faster rate than our population growth, only leveling off and dipping slightly in the last few years.

The third leg of the stool is to reduce VMT and in this way halt and even reverse the historical trend of rising levels of roadway travel. This approach also fits well with the broader Growth & Justice focus on *Smart Investments*SM in

1 Frank Gallivan and Michael Grant, *Current Practices in Greenhouse Gas Emissions from Transit: A Synthesis of Transit Practices*, TCRP Synthesis 84, Transportation Research Board of the National Academies, 2010, p. 1, available at http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_84.pdf.

2 Gallivan and Grant, p. 1.

3 For a brief summary of Minnesota’s Next Generation Energy Initiative, see http://www.state.mn.us/mn/externalDocs/Commerce/SummaryNext_Generation_Energy_Initiative_100807041804_MEP2.pdf.

4 Minnesota Climate Change Advisory Group, *Final Report: A Report to the Minnesota Legislature*, April 2008, State of Minnesota, pp. 5-1 to 5-8. Executive summary, chapters and appendices from the report are available at <http://www.mnclimatechange.us/MCCAG.cfm>.

5 Minnesota Climate Change Advisory Group, p. EX-2.

6 Adam Boies, et. al, *A Smaller Carbon Footprint*, Center for Transportation Studies, University of Minnesota, June 2008, p. 6, available via <http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=1628>.

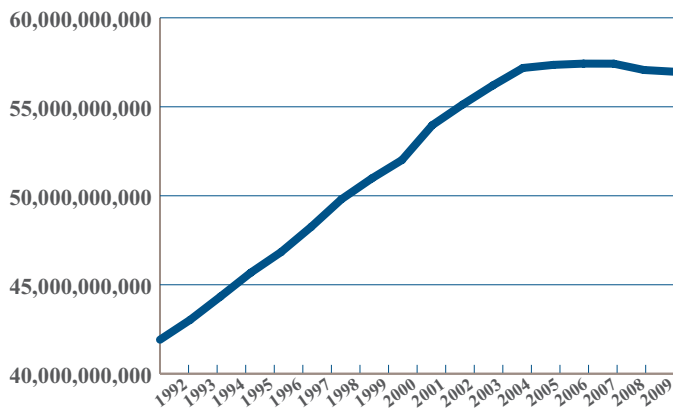
Transportation for Minnesota because the level of VMT in the state – already above the U.S. mark on a per capita basis – greatly influences transportation infrastructure policies and choices. The focus here on VMT, however, is not meant to downplay the importance of improved fuel efficiency or alternative, low-carbon fuels. Worth noting: Both those approaches likely will require action by the federal government.

This report focuses on reducing travel by cars and light-duty trucks because they account for almost 75 percent of all the carbon-based greenhouse gas emissions from U.S. roadway vehicles and 60 percent of the total for those same emissions from the overall U.S. transportation sector.⁷ Other transportation vehicles – airplanes, freight trucks, and commercial delivery trucks, for example – also spew greenhouse gases and therefore are an important part of the picture. Significant gains will be realized from changes to truck and air travel, including, for example, a shift to less carbon-intensive modes such as ships and railroads. VMT reductions for cars and light-duty trucks present a different set of challenges and stand out as a crucial policy pressure point.

The amount of vehicle miles traveled is certainly an important issue for Minnesota and for our environment. Consider the following:

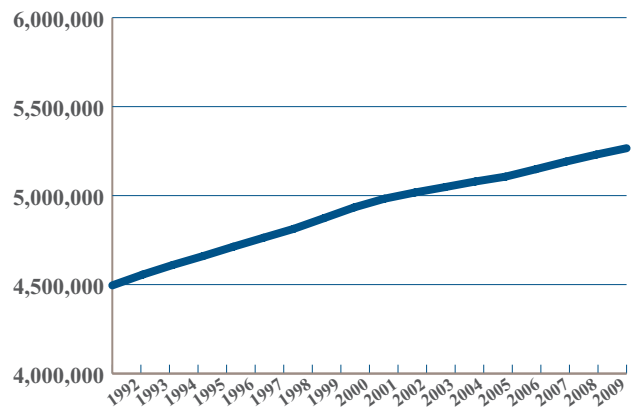
In recent decades, miles logged by vehicles in Minnesota have shot up. The vehicle miles traveled on Minnesota roadways rose by 36.0 percent to 57.0 billion in the years from 1992 to 2009, increasing at a rate more than twice that of the state’s population growth for the same period (14.5 percent). From 2006 to 2009, however, VMT dropped slightly (down 0.8 percent) even as the state’s population continued to grow (up 2.3 percent), according to data from the Minnesota Department of Transportation,⁸ perhaps signaling a shift in the state toward fewer miles traveled.

Minnesota’s VMT increase, 1992 - 2009



Source: Minnesota Department of Transportation

Minnesota’s population increase, 1992 - 2009



Source: U.S. Census Bureau

Federal data show that Minnesotans drive significantly more than the U.S. average. The 2008 totals for vehicle miles traveled in the state work out to about 11,100 miles per capita compared to 9,800 per capita for the United States as a whole. This puts the Minnesota per capita level at 12.8 percent above the U.S. level. And Minnesota’s per capita amount is 8.8 percent higher than Wisconsin’s, 8.6 percent higher than Iowa’s, and 35.1 percent higher than Illinois’.⁹

7 U.S. Department of Transportation, *Transportation’s Role in Reducing Greenhouse Gas Emissions, Volume 1: Synthesis Report*, April 2010, Table 2.3 on p. 2-28, available at http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf.

8 Calculations for vehicle miles traveled are based on unpublished data from the Minnesota Department of Transportation’s Office of Transportation Data and Analysis. The VMT tallies used here differ from other VMT totals because those other totals fail to adjust for VMT increases stemming not from an increase in driving but from the addition of new roads to the miles included in the VMT totals. The dataset used here offers comparable data for comparisons over time. The population calculations for this report are based on data from the U.S. Census Bureau.

9 Data for per capita VMT calculations comes from the Federal Highway Administration’s *Highway Statistics 2008*, Table VM-2 (U.S. Department of Transportation, available at <http://www.fhwa.dot.gov/policyinformation/statistics/2008/vm2.cfm>, and American Community Survey population estimates from the U.S. Census Bureau for July 2008 based on 2009 revisions, using for U.S. population the count of residents in the 50 states only.

Investments, policies and choices regarding both transportation and land use have the potential to reduce vehicle miles traveled in Minnesota. In its 2008 report to the legislature, the Minnesota Climate Change Advisory Group (MCCAG), appointed by Gov. Tim Pawlenty, estimated that if a range of transportation and land-use policies for the state were to be adopted, carbon dioxide emissions in 2015 would fall 2.2 million metric tons below the 2005 level and in 2025 would be 4.7 million metric tons below the 2005 mark. These amounts equal 5.9 percent and 12.6 percent, respectively, of the 37.2 million metric tons of carbon dioxide emitted by Minnesota’s transportation sector in 2005.¹⁰ These levels, of course, are estimates only because calculating the GHG emissions levels tied to VMT changes involves a significant degree of uncertainty, stemming from such factors as future gasoline prices, consumer responses to gas prices, changes in land use and transportation policy, and the outlook for improved fuel efficiency from cars and trucks.¹¹

The remainder of this report presents research findings and outlines a range of options for public-sector investments, policies and choices to reduce Minnesota’s vehicle miles traveled. The steering committee for Growth & Justice’s initiative on *Smart InvestmentsSM in Transportation for Minnesota* chose to focus on three important approaches – land use and transit-oriented development, transit service and pricing strategies – but it recognizes other approaches hold promise for reducing VMT and transportation-related greenhouse gases, as well.

The findings presented here will be incorporated into overarching transportation policy recommendations for the state as part of the *Smart InvestmentsSM in Transportation for Minnesota* initiative. A final investment proposal will also address issues relating to freight, transportation for Minnesotans with low incomes, and improvements in travel and travel choices. For research reports on those issues, see the Growth & Justice [website](#).

¹⁰ Minnesota Climate Change Advisory Group, p. 5-1 and H-3.

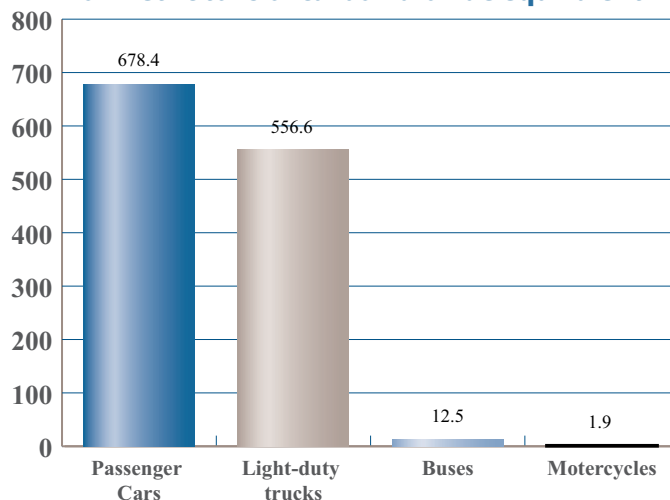
¹¹ U.S. Department of Transportation, pp. 3-3 to 3-5, available.

& Land Use and Transit-Oriented Development

The location of homes, jobs, schools, shopping and other important destinations determines where and how Minnesotans travel. In recent decades, these important destinations have sprawled out as cars, expanding roadway systems and cheap fuel have made long trips feasible and even easy. This diffuse land-use pattern is part of the reason that the rate of growth in vehicle miles traveled in Minnesota rose more than twice as fast as population growth from 1992 to 2007, before leveling off or dropping slightly in the last few years. Increased vehicle miles generally means increased emissions of the greenhouse gases that threaten to dramatically warm and alter the environment. With our current mix of vehicles and fuels, less driving means less greenhouse gas pollution.

To drive our cars and light-duty trucks less, we will need to change how we use land and how we structure our communities. Having shorter trips and fewer trips will require denser development and a greater mix of uses within those developed areas. And for Minnesota's metro areas, it will also require more transit service that both supports and spurs land-use changes and offers travelers an alternative way to reach desired destinations. Changes in land use hold promise for reduced environmental impacts from travel. Positive outcomes will build over time and will need commitments and coordination by Minnesota players at all levels, from local to state. But action is needed. A 2003 study from the University of Minnesota identified state and regional policies as the single greatest factor contributing to low-density, sprawling development in the Twin Cities metropolitan area.¹²

U.S. greenhouse gas by vehicle type, 2006 in millions of metric tons of carbon dioxide equivalent



Source: U.S. Department of Transportation, *Transportation's Role in Reducing Greenhouse Gas Emissions*, Vol. 1, April 2010.

Some Key Points about Land Use

Efficient and transit-oriented land use can reduce the number and length of car trips. The reduction is achieved through:

1. More compact development.
2. A mix of uses such as office, retail and housing.
3. Local streets that connect with one another.
4. Other transportation infrastructure improvements that boost travel efficiency and encourage walking, biking and transit use.

Smart growth approaches emphasize dense development and redevelopment in established communities – with central cities as a focal point – rather than sparse development in the fringe areas of metropolitan regions. Transit-oriented development shapes land use around transit, with denser settlement patterns and mixed uses within a 10-minute walk of transit stations, plus well-placed bikeways and walkways for easy access. While compact development concentrates travel destinations in small areas and in this way increases GHG at those sites, emissions per capita are lower because denser land-use patterns allow people to reach destinations without driving cars or without driving them for long distances.¹³

12 Center for Transportation Studies, "Study suggests ways to address congestion and sprawl," University of Minnesota, March 2003, website, <http://www.cts.umn.edu/trg/news/2003/synthesis.html>.

13 Transit for Livable Communities, the Minnesota Center for Environmental Advocacy and the Surface Transportation Policy Partnership, *Transportation Performance in the Twin Cities Region*, Transit for Livable Communities, August 1, 2008, p. 23, available at <http://www.tlcmnnesota.org/pdf/Transportation%20Performance%20Report%202009%20FINAL.pdf>.

Compact development reduces vehicle miles traveled and thus greenhouse gas emissions from the transportation sector. A University of Maryland study tracked travel activity in more than 80 of the largest metropolitan areas of the United States and found that “residents drove about 25 percent less in the more compact regions,” even when controlling for socioeconomic differences such as income. A separate analysis of multiple studies on the topic showed that people living in places with mixed-use development, interconnected streets, accessible destinations and twice the development density drive about one-third less than residents in low-density, sprawling areas.¹⁴ And estimates from the Center for Clean Air Policy regarding the impact of smart growth approaches in the Twin Cities indicate that vehicle miles traveled in the metro area would drop by 5 to 15 percent, depending upon how extensive the smart growth changes would be.¹⁵

A 2010 study by the Transportation Research Board of the National Academies suggests development that is significantly more compact and mixed-use in style might reduce climate-warming carbon dioxide emissions by 7 to 8 percent in 2030 from a 2000 baseline, with the drop growing to 8 to 11 percent by 2050. This would require that 75 percent of new and replacement housing be constructed in compact developments, and it assumes that residents of the compact communities would drive 25 percent less. The impacts on carbon dioxide emissions would be significantly lower for less aggressive scenarios.¹⁶ The potential environmental gains from land use changes and transit in Minnesota will depend upon increased concentrations of employment and housing within established areas that already boast significant development.

While compact development reduces car trips, the full benefits in terms of GHG emissions are realized only slowly because existing residential and commercial structures will shape travel patterns for years to come. Moves made now to implement smart growth approaches will yield modest improvements in GHG emissions in the short term, but those gains will grow over time and become significant as new and replacement construction is clustered more efficiently. A variety of unknown factors will help determine the magnitude of the GHG impacts in the long run – including future gasoline prices, the fuel efficiency of cars and other vehicles, and the degree of traffic congestion that might come from denser development patterns. “But given that the full energy and emissions benefits of land-use changes will take decades to realize and current development patterns will take years to reverse, it is important to start implementing these policies soon,” states the well-respected Transportation Research Board of the National Academies in its 2009 report on land use and transportation.¹⁷

Transit-oriented development boosts the energy savings and environmental benefits of compact areas through land-use patterns that make transit a viable alternative to car trips. Clusters of jobs, shopping, government services, housing and other destination points allow for cost-effective transit service. Land use that frames development around transit stations as the focal point generally yields significant reductions in vehicle emissions from transportation.¹⁸

Local zoning regulations often are major barriers to the land-use changes and compact development that could curb driving and reduce greenhouse gas emissions – meaning that smart growth development benefits from less, not more, local zoning rules in many cases.¹⁹ Zoning rules often require large lots sizes, long set-backs between buildings and from streets, big parking lots, and single types of land use for a given area. These requirements, among others, impede the dense settlement patterns and mixed uses that lead to compact development and less dependence on cars. A 2006 study by a University of Michigan professor found that 78 percent of developers surveyed cited regulation as the biggest impediment to new development and redevelopment in established areas of

14 Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters and Don Chen, *Growing Cooler: The Evidence on Urban Development and Climate Change*, Urban Land Institute, 2008, p. 6, overview chapter available at <http://www.tlcmnnesota.org/pdf/Transportation%20Performance%20Report%202009%20FINAL.pdf>.

15 Adam Boies, et al., *Reducing Greenhouse Gas Emissions from Transportation Sources in Minnesota*, University of Minnesota, June 2008, p. 24-25, available at <http://www.leg.state.mn.us/docs/2008/mandated/080588.pdf>.

16 Transportation Research Board, *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions*, Transportation Research Board of the National Academies, 2009, p. 116, available at <http://onlinepubs.trb.org/Onlinepubs/sr/sr298.pdf>.

17 Transportation Research Board, p. 6-7.

18 Sharon Feigon, et al., *Travel Matters: Mitigating Climate Change with Sustainable Surface Transportation*. (TCRP Report 93), Transportation Research Board of the National Academies, 2003, p. 30, available at http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_93.pdf.

19 Boies, *Reducing Greenhouse Gas Emissions*, p. 23.

cities.²⁰ Local governments set zoning restrictions, making difficult both regional coordination of land use and fast action on zoning modifications across a region.²¹

Potential Policies and Approaches for Land Use

Continue – and even strengthen – the strong focus for highway spending on the maintenance and improvement of existing roads and emphasize travel improvements on routes serving compact, higher-density areas, including downtowns, town centers, regional centers and transit corridors. The Minnesota Climate Change Advisory Group called for just such a fix-it-first approach in its 2008 report to the legislature, pushing for a significant reduction in dollars for new roads and for roadway expansions that encourage low-density development and longer trips.²²

In their recent transportation policy plans, both the Minnesota Department of Transportation (MnDOT) and the Metropolitan Council have set as their clear priority first fixing and improving the current roadway infrastructure. The MnDOT plan for 2009 through 2028 calls for spending more than 75 percent of the expected \$15 billion in available highway funds solely “to preserve pavements, bridges and other infrastructure,” with a significant chunk of the remaining dollars slated for enhancements of existing roadways. As noted in the MnDOT plan, a gap of \$50 billion exists between the expected \$15 billion in available funds and the \$65 billion in highway projects sought by the state’s nine transportation districts – much of that for roadway expansions.²³ Obviously the region cannot afford to fund a wish-list of roadway expansions. The fix-it-first emphasis makes good sense for both environmental and fiscal reasons.

Foster increased population and employment densities in already developed areas and along transportation corridors. Greater concentrations of residents, jobs and other important destinations open up options for travel by means other than a car – for example, transit, biking and walking – and in this way reduce vehicle miles traveled and transportation emissions. The Metropolitan Council’s 2030 transportation plan calls for greater density of development, noting that “increasing job concentrations and increasing integrated, mixed-use developments in the region can help maximize the effectiveness of the transportation network and transportation investments in highways, transit and other modes.”²⁴ However, the council’s plan does not spell out ways to reach this goal of increased density and mixed land use. As the state’s largest regional governing unit, the Metropolitan Council could follow the lead of the Puget Sound Regional Council in the Seattle area and direct funds for infrastructure to designated regional growth centers.²⁵

For a range of state government programs, distribute funding to reward local planning, zoning and investment approaches aimed at increasing compact development and reducing vehicle miles traveled. Land-use decisions and zoning regulations happen at the local level, but the state can encourage smart growth by linking state dollars for local governments to infrastructure and actions that reduce environmental impacts from the transportation sector and promote more livable communities.

The federal government in recent years has increasingly incorporated measures for compact development and sustainable communities into its criteria for federal grants that fund transportation, housing and environmental efforts.²⁶ Similarly, criteria for state and metro area funding programs could be linked to planning and zoning that allow for compact and mixed-use development, public investments that advance transit-oriented and pedestrian-oriented development, and plans and economic growth initiatives that spur development in the town centers of Minnesota’s smaller cities. Massachusetts’ Commonwealth Capital program uses such criteria to award state grants to local governments for spending on a range of public-sector challenges, including transportation, energy, economic development, water

20 Boies, *Reducing Greenhouse Gas Emissions*, p. 23, citing Jonathan Levine’s 2006 book *Zoned Out*.

21 Transportation Research Board, p. 5.

22 Minnesota Climate Change Advisory Group, p. 5-5.

23 Minnesota Department of Transportation, *Minnesota Statewide Transportation Policy Plan: 2009-2028 – Your Destination... Our Priority*, August 2009, p. 1-16 to 1-17, available at <http://www.dot.state.mn.us/planning/stateplan/download.html>.

24 Metropolitan Council, *2030 Transportation Policy Plan*, Chapter 4, May 26, 2010, pp. 39 and 46-47, available at <http://www.metrocouncil.org/planning/transportation/TPP/2008/index.htm>.

25 For more on the Puget Sound Regional Council’s Vision 2040 and its regional growth centers, see <http://psrc.org/growth/centers>.

26 For example, see information on the Partnership for Sustainable Communities among the federal Department of Transportation, Department of Housing and Urban Development and the Environmental Protection Agency, available at <http://www.epa.gov/smartgrowth/partnership/index.html>.

infrastructure, affordable housing and parking. The Massachusetts initiative awards 30 percent of the points for grant and loan applications to selected programs based on a wide range of criteria tied to municipal practices for smart growth and smart energy use.²⁷

Adopt statewide and municipal planning incentives and policies, establish a process for designating priority growth areas within the state, and offer planning tools and technical assistance from the state to communities throughout Greater Minnesota. The Minnesota Climate Change Advisory Group called for these actions at the state level to help reduce vehicle miles driven. MCCAG also recommended the creation of a development cabinet or other oversight group to guide state government investments in ways that will reduce driving and greenhouse gases.²⁸ The re-establishment of Minnesota's State Planning Agency, eliminated in the mid-2000s, would likely better equip the state for planning and technical assistance efforts. The revived agency would be well-suited to assess priority growth areas statewide and to consider municipal planning options. Coordinated planning in the Twin Cities area is handled primarily by the Metropolitan Council, but projections show that the biggest gains in vehicle miles traveled in the coming years will happen outside the seven-county metro area, making Greater Minnesota land-use planning an important issue for the state.

The MCCAG notes very significant savings to governments from more compact land use, citing a Met Council finding that compact, transit-oriented development in the Twin Cities area alone could save as much as \$3 billion in infrastructure costs over a 20-year period, depending in part on development located along public transit routes. The advisory group also notes that the annual costs to government could be \$10-20 million to set up planning programs, provide planning tools, offer technical assistance and align state funding criteria to encourage growth in priority areas.²⁹

Explore ways that the State of Minnesota and its metropolitan regions could use fees or incentives to limit the carbon impact of new development. The more that housing and commercial development sprawls to the outer edges of Minnesota's metropolitan areas, the more vehicle miles Minnesotans are likely to rack up. Fees based on the adverse carbon impacts of sprawling development would encourage more compact development in core, established areas of metropolitan regions.

Just as some governments have assessed fees on developers for impacts of new development on roads, sewer systems and other public infrastructure costs, they perhaps could impose carbon-impact fees based on how much additional GHG emissions a new development is expected to generate.³⁰ Any such effort, however, would need to recognize the legal constraints that apply to government-imposed development fees.³¹ Alternatively, incentives could foster the same result through significant tax credits for infill development – that is, development in cities and towns where nodes of development already exist.

Advance, fund and build upon existing state programs and initiatives that promote sensible land use and curb the need to drive. As a starting point, Minnesota already has a number of programs and initiatives that encourage development and redevelopment in settled areas and supports transportation modes other than cars. In 2010, the state passed a Complete Streets law that directs MnDOT to factor in the needs not only of motorists but of pedestrians, bicyclists and transit users when engaging in road construction, reconstruction or repaving. The year before, lawmakers revised acreage rules for schools to allow for more compact and centralized school locations that students can reach more easily by foot or bike.

The state's brownfields programs promote the clean-up and redevelopment of vacant or contaminated industrial and commercial sites, allowing more new development to take place in already-established, core areas. The state's Liv-

27 Commonwealth of Massachusetts, *Commonwealth Capital – 2010 Summary*, p. 1-2, available at http://www.mass.gov/Agov3/docs/smart_growth/com-mcap_summary_fy10.rtf.

28 Minnesota Climate Change Advisory Group, p. H-7.

29 Minnesota Climate Change Advisory Group, H-11 to H-12.

30 Ewing, et al., p. 15.

31 John S. Adams, et al., *Development Impact Fees for Minnesota? A Review of Principles and National Practices*, Center for Transportation Studies, University of Minnesota, October 1999, pp. 80-81, available at <http://www.cts.umn.edu/trg/publications/pdfreport/TRGrpt3.pdf>.

able Communities Act allows the Met Council to operate a Livable Communities Demonstration Account, funded by property tax dollars, to support Twin Cities area projects that link housing, jobs and services, and that maximize the development potential of existing infrastructure. The Minnesota Housing Finance Agency recently increased its emphasis on affordable housing near transit nodes. And the state's Metropolitan Livable Communities Program Tax Base Revitalization Account helps direct growth to central cities and older suburbs. These and other such initiatives to address land use issues are important to reducing the adverse environmental impacts of transportation.

Make transit investments – especially in the Twin Cities area – that can trigger transit-oriented, compact development. Efficient, cost-effective transit service both depends upon and creates denser development. Light rail transit stations and dedicated bus transitways in particular can attract real estate development that clusters housing, retail and office space, resulting in the compact, mixed-use patterns that reduce vehicle miles traveled.³² And recent research shows that the Hiawatha light rail line in the Twin Cities has attracted jobs in areas around transit stations.³³ All this means that carefully planned investments in the transit system can generate the very land-use patterns that make transit an attractive mode of travel and also allow for more walking and biking to destinations.

32 Feigon, p.

33 Yingling Fan, "Understanding the Impacts of Transitways: How Light-Rail Transit Improves Job Access for Low-Wage Workers," Center for Transportation Studies, University of Minnesota, March 2010, p. 1, available at <http://www.cts.umn.edu/Research/Featured/Transitways/documents/lowincome.pdf>.

Transit vehicles in urban areas produce fewer emissions per passenger mile than automobiles, as a rule, especially in the case of the increasingly common hybrid buses. While a bus spews out more pollution than a car, the bus carries more passengers. So to the extent that bus or transit train passengers would otherwise drive cars, they are reducing greenhouse gas emissions and other transportation-related pollution.

Transit and land use are complementary strategies for minimizing the environmental impacts of transportation. In fact, research shows that a combination of increased transit use and smart growth land-use patterns will achieve greater reductions in GHG emissions than either transit initiatives or land-use changes on their own.³⁴

Some Key Points about Transit

Public transit can cut transportation-related pollution. The reductions come because public transit can:

1. Decrease the number of vehicle miles traveled in personal vehicles.
2. Reduce traffic congestion, which cuts the amount of fuel burned by idling cars and trucks.
3. Prompt compact, transit-oriented development that diminishes the need for trips in personal vehicles.

Transit agencies can also curtail emissions by improving the fuel efficiency of their vehicles.³⁵ Positive environmental impacts will be greatest in larger metropolitan areas with the potential for significant transit ridership, transit-oriented development and congestion relief from transit use.

Increases in transit use alone will produce modest decreases in vehicle miles traveled and greenhouse gas emissions, with the improvements growing somewhat over time. A doubling of annual transit ridership in urban areas nationwide would reduce GHG emissions by up to 1 percent by 2030 and 1.5 percent by 2050, according to a 2010 U.S. Department of Transportation report to Congress.³⁶ The Minnesota Climate Change Advisory Group's report to the legislature estimates that almost doubling transit ridership in the Twin Cities area by adding 75 million new rides a year would reduce vehicle miles traveled for the state as a whole by 1.27 percent. Greater gains would result from more intense investments in transit.³⁷

34 Cambridge Systematics, *Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions*, Urban Land Institute, 2009, p. 5, executive summary available at <http://commerce.uli.org/misc/movingcoolerexecsum.pdf>.

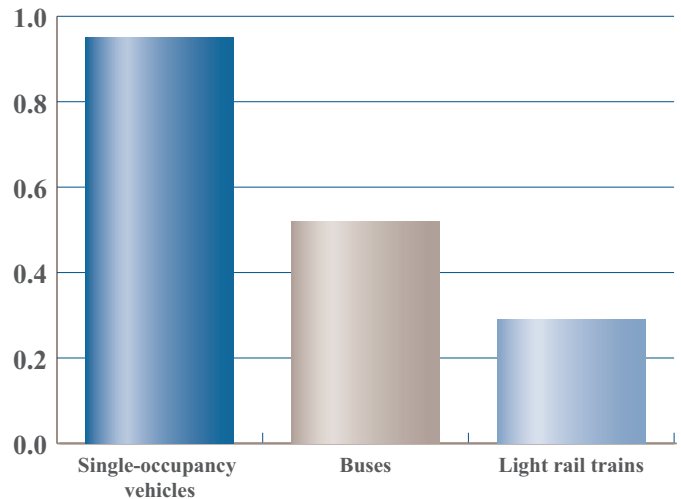
35 Gallivan and Grant, p. 1.

36 U.S. Department of Transportation, p. ES-18 to ES-19.

37 Minnesota Climate Change Advisory Group, p. H-14.

Based on emissions per passenger mile, transit vehicles on average generate less greenhouse gas than do personal vehicles, so greater transit use can reduce the adverse environmental impacts of travel. National data show that the average GHG emissions per passenger mile from buses and light rail transit are, respectively, 16 and 75 percent below the per passenger emissions from all personal vehicles, according to a 2008 report from the University of Minnesota.³⁸ And 2010 calculations from Metro Transit in the Twin Cities indicate that carbon dioxide emissions per passenger mile are 70 percent less for its light rail trains than for personal vehicles carrying a single occupant and 45 percent less for its buses – even factoring in all bus miles, including driver training sessions and empty bus runs to the Metro Transit garages.³⁹ With Metro Transit, the state’s largest transit service, using more hybrid buses as part of its Go Green initiative, the statistics for bus travel are likely to improve. However, potential environmental gains from transit ridership on well-used systems in urban areas are unlikely to be matched by limited systems with low ridership in small cities.

Estimated pounds of greenhouse gas emissions per traveler per mile for cars and Metro Transit vehicles



Source: Metro Transit, 2010. Bus miles include service runs without passengers.

The environmental benefits of transit grow when more riders who otherwise would drive cars board the bus or train instead. More riders mean less pollution per passenger mile from transit vehicles. In order to yield environmental benefits at all, transit must carry enough passengers so that the emissions avoided by the riders who otherwise would drive on their own is greater than the emissions caused by the transit bus or rail car.⁴⁰ A typical bus with seven riders is about twice as energy efficient as an average car, and a bus with 50 riders is about ten times as energy efficient.⁴¹ Actions taken to boost ridership for existing transit service reduce transportation-related pollution, assuming the new riders would have driven cars if they weren’t riding on transit. Of course, aside from the environmental impacts, transit service for those who don’t drive cars is important because it provides many transit-dependent Minnesotans with access to jobs and other critical destinations.

Transit is more efficient, cost-effective and popular when a metro region has areas of compact development with concentrations of important destinations, especially job sites. For this reason, land-use patterns greatly affect the success of transit systems. By way of example, downtown Minneapolis, with some 140,000 jobs, has by far the largest concentration of employment in the state, and surveys show between 36 and 40 percent of the commuters to downtown Minneapolis take transit to and from work there. By contrast, transit’s average share of work commutes in the Twin Cities metro area as a whole is about 5 percent.⁴² Differing degrees of residential and employment density are said to account for some 60 percent of the variation in transit ridership among U.S. cities.⁴³

38 Boies, et al., *A Smaller Carbon Footprint*, p. 9.

39 Unpublished Metro Transit data provided June 2010 by John Siqveland, estimating carbon dioxide emissions amounts using a limited methodology that misses any gains from congestion reductions and transit-driven changes to land-use patterns. The Metropolitan Council’s 2000 Travel Behavior Inventory for the Twin Cities area found the average vehicle occupancy for home-based trips to work to be 1.05, or just slightly above single occupancy.

40 Gallivan and Grant, pp. 1-2.

41 Todd Litman, *Evaluating Public Transit Benefits and Costs: Best Practices Guidebook*, Victoria Transport Policy Institute, January 10, 2008, p. 50, available at <http://www.vtpi.org/tranben.pdf>.

42 Transit for Livable Communities, et al., p. 16, citing a 2007 presentation by the Metropolitan Council’s Arlene McCarthy, and a 2000 Metropolitan Council report; Brian Lamb, general manager of Metro Transit, quoted in the Transit for Livable Communities newsletter *Let’s Go*, “Interview with Brian Lamb,” Summer 2010, p. 7, available at http://www.tlcmnnesota.org/pdf/TLCSpringSummerNews_FINAL.pdf.

43 Transportation Research Board, *Making Transit Work: Insight from Western Europe, Canada and the United States*, Special Report 257, National Academy Press, 2001, p. 37, available at <http://onlinepubs.trb.org/onlinepubs/sr/sr257.pdf>.

In its 2008 Transit Master Study for the region, the Metropolitan Council identified for transit service eight promising locations having more than 40,000 contiguous jobs with densities at more than ten jobs per acre:

- Downtown Minneapolis (139,500 jobs)
- Downtown St. Paul and the state capitol area (64,000 jobs)
- St. Paul Midway area and the University of Minnesota (64,000 jobs)
- The I-494 corridor near the airport and the Mall of America (71,000 jobs)
- The I-494 and Highway 100 area (73,500 jobs)
- The Golden Triangle area, generally bounded by I-494 and Highways 169 and 212 (49,000 jobs)
- The I-394 corridor (66,000 jobs),
- The area of Roseville and Northeast Minneapolis (44,000 jobs).⁴⁴

Potential Policies and Approaches for Transit

Encourage greater concentrations of employment in Minnesota’s cities in order to create hubs or nodes of workplace destinations easily served by transit. The policies and strategies for this recommendation are the same as those outlined in the preceding section on land use – fix-it-first approaches to infrastructure investment in established areas, a push for changes to zoning laws that will allow for or promote denser and more mixed-use development, technical assistance from the state to Greater Minnesota cities, and state grant and loan dollars tied to local policies that encourage the concentration of jobs. Worth noting, too, that improved transit service can increase the number of jobs located in an area,⁴⁵ meaning that transit itself helps drive employment concentrations.

Attract to transit new riders who would otherwise drive on their own. An increase in the number of these passengers using existing transit service reduces automobile emissions without significantly increasing emissions from transit vehicles. To make transit more attractive to these riders-by-choice, transit agencies can improve service speed and reliability, provide better transit information, step up marketing efforts, and upgrade the comfort of the ride.⁴⁶ Such improvements, of course, require more funding for transit.

Transit agencies also can attract new riders by working with private-sector employers, colleges and governments on packages of benefits that increase ridership for the transit system but also save those partners money they otherwise might have spent on the parking facilities and infrastructure needed to handle more cars. Municipal controls on parking can encourage transit use, as is evident from successful initiatives in Rochester. Already Minnesota employers qualify for a corporate income tax credit on the purchase of transit passes for employees (covering 30 percent of the cost, in effect), and Metro Transit in the Twin Cities offers passes to employers at a price discount. The Minnesota Climate Change Advisory Group’s report to the legislature recommended expansion of that transit tax credit program. MCCAG also called on the State of Minnesota to institute a commuter benefits program that would require non-rural employers with more than 200 employees to develop and implement transportation plans for reducing travel demand through transit strategies and other approaches.⁴⁷ State government should step up its limited participation in the transit-pass program.

Accelerate the Metropolitan Council’s plans for expanded transit service, infrastructure and passenger loads in order to double ridership by 2020 instead of the current target year of 2030. The Minnesota Climate Change Advisory Group included this recommendation in its report to the legislature. The proposed 2020 timeline would

44 Metropolitan Council, “Appendix A: Transit-supportive Land Use,” *2030 Transit Master Study: Twin Cities Metropolitan Area*, August 2008, available at <http://www.metrocouncil.org/planning/transportation/tpp/2008/TMSReportAppendices.pdf>.

45 Yingling Fan, p. 1.

46 Gallivan and Grant, p. 2.

47 Minnesota Climate Change Advisory Group, pp. H-50 and H-51.

involve faster action on the planned Southwest Corridor light rail line, dedicated bus ways for express commuter service, and an increase of 80 percent in regular route bus service. The MCCAG report also called for expanded transit service linking the Twin Cities area to nearby parts of Greater Minnesota. Costs for these improvements were estimated to be \$210 million a year for 13 years, or about \$2.7 billion total, but the MCCAG cites a 2002 study showing potential savings of about \$3 billion in 20 years' time on infrastructure from more compact development patterns and another \$575 million in savings to drivers, taxpayers and others from reduced automobile travel.⁴⁸ Interestingly, the aging of the population in the coming decades will likely make transit an increasingly important transportation option because older residents in the Twin Cities area use transit at higher percentages than other age groups.⁴⁹

Secure increased and stable funding for transit to allow for accelerated service expansion and other initiatives that boost ridership. Minnesota's transit agencies need dollars if they are to institute new transit initiatives and invest in infrastructure. But Minnesota's transit agencies, like their counterparts nationwide, are financially strapped and have been forced to raise fares and cut service in light of budget shortfalls. Transit funding got a boost in 2006 when Minnesota voters passed a constitutional amendment dedicating a portion of the state's motor vehicle sales tax to transit, and again in 2008 when the Minnesota legislature passed a transportation package that allows for local sales tax levies primarily aimed at covering capital spending for transit, especially transitways in the Twin Cities region. In 2009, a mix of state and federal funds helped transit agencies meet operating expenses. But a fall-off in farebox revenues during the recession, lower-than-expected motor vehicle sales tax dollars, and cuts in state funding in 2010 have made even existing service levels difficult to sustain. Transit advocates hope to win legislative support for an increased and stable revenue stream for transit in Minnesota.

For Greater Minnesota transit outside of the larger cities, the best strategy for potential environmental gains will be an expansion of those services that can reduce vehicle miles traveled and curb transportation emissions. In Greater Minnesota's larger cities, transit service can attract enough riders for trips to worksites or university campuses so that bus service reduces vehicle miles traveled and transportation pollution. Examples include Metro Bus service to St. Cloud State University and St. Cloud Technical College (student IDs work as bus passes), and city bus service for commuters to the Mayo Clinic in Rochester (Mayo funds the employee bus passes).

But while transit in smaller Minnesota communities is in high demand and is critically important to providing some rural-area residents with access to important destinations, the environmental payoffs from transit service in more sparsely populated areas are uncertain. Growth & Justice found no solid research addressing the question of potential environmental benefits from rural transit. What we do know is that many of the transit arrangements that work best for boosting the mobility of residents in smaller communities and rural areas, such as dial-a-ride service and volunteer-driver programs, likely produce as much or more emissions than personal car trips driven directly from the passenger's point of departure to the point of destination.⁵⁰

Some opportunities likely do exist, however, for emissions-reducing transit, including increased use of vanpools traveling from locations at the fringe of Minnesota's metro areas to worksites within those metro areas. One good example is the Metropolitan Council's Van-Go! program of subsidized lease arrangements for vans used by vanpoolers who travel into the seven-county metropolitan area for work. Intercity bus service between Minnesota's regional centers also may be beneficial. And while not transit per se, carpools, too, yield significant environmental benefits.

48 Minnesota Climate Change Advisory Group, pp. H-13 through H-15.

49 Metropolitan Council, *Twin Cities Transit System 2009 Performance Evaluation*, March 2010, p. 34.

50 Elizabeth Ellis and Brian McCollum, *TCRP Report 136: Guidebook for Rural Demand-Response Transportation: Measuring, Assessing, and Improving Performance*. Transportation Research Board, 2009, pp. 7-9, available at http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_136.pdf.

How much we drive is greatly influenced by the price we pay to travel by car. No surprise, then, that vehicle miles traveled in the United States fell markedly in 2008 as gas prices rose and peaked prior to the onset of the financial crisis that year. Nationwide, total VMTs dropped more than 12 billion miles, or about 5 percent, between June 2007 and June 2008.⁵¹

Policies and arrangements that increase, in obvious ways, the costs of driving can yield corresponding reductions in vehicle miles traveled and in greenhouse gas emissions, as well as other transportation-related pollutants. Roadway pricing can provide corollary benefits as well, including congestion mitigation on thoroughfares leading into and out of concentrated employment centers. But these pricing policies are controversial for the very reason they work – because they increase the cost that drivers (and voters) pay to operate their cars. So pricing policies have great potential for reducing GHG emissions and the projected long-term costs of coping with the impacts of global warming, but many pricing policies face significant opposition from the driving public. This is true even though pricing strategies often simply shift onto the drivers those costs that otherwise are hidden and paid by others.⁵²

Some Key Points about Pricing

Transportation pricing strategies can reduce vehicle miles traveled because they raise the expense of driving – or of driving more. Pricing typically links the costs of driving to how much a vehicle travels, makes vehicle users cover a greater share of the costs associated with their driving, or adds fees to deter driving. In all these cases, the increased cost of automobile use generally leads to fewer vehicle miles traveled and therefore to reduced transportation-related pollution as people travel less, drive more efficiently, or choose alternatives, such as transit.⁵³

Individual drivers do not directly pay the full cost of vehicle travel, with some significant costs spread among drivers and non-drivers alike.⁵⁴ For example, property taxes cover a larger share of the total costs statewide for roadway maintenance and construction than do motor-fuel taxes. Air pollution from vehicles inflicts costs on non-drivers and drivers alike. And the costs of “free” or low-cost parking are underwritten or subsidized by owners and users of commercial and industrial property, as well as the local taxpayers whose municipal governments build and operate such parking facilities. The costs of traffic congestion, in terms of time delays and aside from pollution, are borne by drivers but also by businesses in the form of lost efficiency and productivity from slower trips by workers and slower freight movement and deliveries. Because drivers do not pay the full costs for traveling in their vehicles, travel is relatively cheap and so drivers travel more than they would if they bore the full price.

Vehicle miles traveled will drop, as a rule, the more the easy-to-see costs of owning and operating a vehicle correspond with the number of miles the vehicle logs. If drivers face higher costs for more travel – and those higher costs are obvious – then they will likely reduce the distances that they travel, and hence the corresponding greenhouse gas emissions.⁵⁵ Examples of costs tied to VMTs include gas taxes, toll roads where the charge is based on distance, and insurance rates set according to how many miles the insured vehicle travels during the billing period.

Some have proposed that car owners pay transportation taxes based directly upon how many miles they travel both to better tie the taxes to travel and to provide a new funding stream for transportation spending in light of increased fuel efficiency for vehicles and a resulting slowdown in gas tax revenues. The University of Minnesota’s Center for Transportation Studies held a symposium on these mileage-based user fees in April 2010, and the University of Iowa

51 Office of Public Affairs, “American Driving Reaches Eighth Month of Steady Decline,” U.S. Department of Transportation, Aug. 13, 2008, website, <http://www.fhwa.dot.gov/pressroom/fhwa0817.htm>.

52 For more on internal versus external costs, see David Anderson and Gerard McCullough, *The Full Cost of Transportation in the Twin Cities Region*, Center for Transportation Studies, University of Minnesota, August 2000, available at <http://www.cts.umn.edu/trg/publications/pdfreport/TRGrpt5.pdf>.

53 Minnesota Climate Change Advisory Group, p. H-26.

54 Anderson and McCullough, p. iii.

55 Minnesota Climate Change Advisory Group, p. H-26.

is engaged in a national evaluation of mileage-based charges. Mileage-based approaches to tolling, insurance rates and transportation taxes are becoming more feasible because of technologies such as scanners and global positioning systems (GPS). However, challenges remain – and the use of these technologies raises privacy concerns.

Pricing initiatives that raise the easy-to-see costs of vehicle travel may have disproportionately adverse impacts on low-income Minnesotans who drive and on Minnesotans in rural areas. In rural areas – where driving is often necessary and alternatives are very limited – residents drive more, making transportation a significant expense.⁵⁶ And low-income workers spend a larger share of their incomes on transportation, so they often are hit harder by pricing strategies that increase transportation costs.⁵⁷ However, since low-income travelers tend to drive less, they can benefit from certain pricing approaches, such as when mileage-based fees replace fees assessed uniformly on all vehicles. And for low-income Minnesotans who don't drive or drive very little, road pricing puts the burden on those who use the roads and not on them.⁵⁸

Action at the national or multi-state regional levels will work better than state-level initiatives for some pricing policies. To reduce greenhouse gas emissions, some have proposed policies that would dramatically increase the cost of carbon-based fuels, such as a substantial increase in the gas tax. Another is a broader carbon tax or a cap-and-trade system for GHG emissions. These policies would raise the cost of gasoline and of driving, and in this way reduce driving and pollution. These policies – especially a cap and trade system – hold promise for cutting the greenhouse emissions that are rapidly warming the planet, but they require attention at the national level. If the State of Minnesota were to implement dramatic price hikes on carbon fuels on its own, Minnesota's businesses would face competitive disadvantages.

Potential Policies and Approaches for Pricing

Charge drivers fees for access to free-flow travel on freeways at crowded, peak times to reduce greenhouse gases produced by cars idling in congested traffic. The Minnesota Department of Transportation's MnPASS program uses pricing to relieve congestion on the I-394 and I-35W freeways in the Twin Cities. Vehicles containing more than one person can use the MnPASS lanes for free, which encourages carpooling arrangements and transit use. And drivers who wish to avoid congestion in the standard freeway lanes but who are traveling alone in their cars can purchase MnDOT transponders and then drive in the MnPASS lanes for a fee. That fee increases as the freeway becomes more congested. These fee-based relief valves for I-394 and I-35W ease congestion and in this way reduce greenhouse gas emissions from cars stuck idling in traffic on the freeway. A 2005 study for MnDOT estimated that a 144-mile MnPASS system in the Twin Cities area would have saved almost 32,000 hours of drive time by 2010 and more than 175,000 hours by 2030.⁵⁹

In the coming years, additional MnPASS lanes could be added to crowded sections of the Twin Cities area freeway system to relieve congestion and reduce emissions. In fact, a 2010 draft of the Metropolitan Council's revised transportation policy plan for the Twin Cities area calls for a reassessment of plans to add some un-tolled lane miles on Interstate 494 and to consider a MnPASS lane instead.⁶⁰ If widespread congestion pricing were applied to all the lanes of major freeways – not just to lanes otherwise reserved for high-occupancy vehicles – it could reduce vehicle miles traveled as well as congestion,⁶¹ but such a move would cause a political uproar.

56 Transportation for America, *Transportation, Small Towns, + Rural Communities*, May 2009, p. 2, available at http://t4america.org/policybriefs/t4_policy-brief_rural.pdf.

57 Cambridge Systematics, p. 8.

58 Brian D. Taylor, *How Fair is Road Pricing? Evaluating Equity in Transportation Pricing and Finance*, the Bipartisan Policy Center's National Transportation Policy Project, September 29, 2010, p. 1, available at <http://www.bipartisanpolicy.org/sites/default/files/BPC%20Pricing%20EquityFIN.pdf>.

59 Cambridge Systematics and URS Corporation, *MnPASS System Study: Final Report*, Minnesota Department of Transportation, April 7, 2005, p. ES-6, available at http://www.mnpass.org/pdfs/050407mnpass_system_exec.pdf.

60 Steve Berg, "A new normal: Putting the brakes on suburban freeway expansion," *MinnPost*, September 29, 2010, published online, originally at http://www.minnpost.com/steveberg/2010/09/29/21858/a_new_normal_putting_the_brakes_on_suburban_freeway_expansion.

61 U.S. Department of Transportation, p. ES-18.

Ensure that pricing policies address equity problems for low-income drivers by including measures such as rebates, government payments, tax credits, and improved transit service. The Minnesota Climate Change Advisory Group recommends this in their 2008 report to the legislature.⁶² Higher costs for travel will fall disproportionately hard on Minnesotans with low incomes because they spend a higher-than-average share of their incomes on transportation. To address this disparity, pricing policies could include provisions for rebates, government payments, or tax credits for low-income Minnesotans. And revenues from pricing policies could be tapped to better provide low-income Minnesotans with transportation alternatives, such as transit, or incentives or rebates for the purchase of more fuel-efficient vehicles.

Encourage or require insurance companies to offer rates for auto policies based at least in part on the mileage logged by the insured vehicle. This approach, dubbed pay-as-you-drive (PAYD) insurance, converts the fixed cost of insurance to a variable cost that goes down as vehicle miles traveled go down. Vehicle owners then have an incentive to reduce their driving and, in this way, the transportation-related pollution that they cause. As it stands, insurance fees paid by those who drive very little subsidize those who drive a lot. A 2009 report from the Midwest Governors Association on energy use and climate impacts recommends that states “eliminate regulatory barriers that prevent insurers from offering mileage-based insurance.”⁶³

Progressive Insurance and GMAC’s OnStar already offer mileage-based discounts on insurance in Minnesota. The State of Minnesota could speed the adoption of PAYD auto insurance through incentives for insurance companies or by requiring insurance companies to offer it. The Minnesota Climate Change Advisory Group said this approach to insurance could reduce vehicle miles traveled by 8 percent or more, based on the assumption that half of all Minnesota drivers would use PAYD insurance by 2025.⁶⁴ Others have estimated the impact to be significantly smaller.⁶⁵

Consider raising revenues in the future for state-funded transportation infrastructure through mileage-based user fees paid by Minnesota’s drivers. Linking transportation taxes directly to vehicle miles traveled provides an incentive for Minnesotans to drive less. And it addresses the fairness issue that exists now when high-mileage drivers of very fuel-efficient cars pay less in gas taxes to support roadway infrastructure than do drivers who travel less but drive less fuel-efficient vehicles.

MnDOT is engaged in a pilot program to study the impacts of mileage-based sales taxes and registration fees on leased vehicles. The pilot uses GPS technology to collect information about mileage and to communicate information to the car owners regarding mileage-based fees. Pre-pilot estimates of the impacts indicate potential reductions of VMTs in the range of 2 to 4 percent. (Additionally, the pilot is exploring the impact of mileage-based lease fees imposed by the leasing companies.)⁶⁶ An Oregon pilot program tested mileage-based, road-user fees as a replacement for motor-fuel taxes. Based on that pilot, Oregon’s Department of Transportation concluded that road user fees are a viable approach, involving relatively low implementation and administrative costs, but officials also found that more “needs to be done prior to broad scale implementation,” in part because of the technology needed to make road-user fees workable.⁶⁷

Currently Minnesotans pay transportation taxes based somewhat on miles traveled because they pay more in gas taxes the more they drive their gas-powered cars. Shifting to more direct mileage-based taxes, as called for in this report, will reduce vehicle miles traveled and, therefore, reduce gas-tax revenues as well. Throw in more fuel-efficient vehicles that lower overall gas consumption, and the state will likely see less revenue from motor-fuel taxes if tax rates remain constant.

62 Minnesota Climate Change Advisory Group, p. H-27.

63 Midwest Governors Association, *Energy Security and Climate Stewardship Platform for the Midwest*, 2009, p. xiii, available at <http://www.midwestern-governors.org/Publications/Roadmap.pdf>.

64 Minnesota Climate Change Advisory Group, p. H-27-30.

65 Boies, et al., *A Smaller Carbon Footprint*, p. 6., Table 1 estimates the percentage reduction in vehicle miles traveled statewide from the adoption of pay-as-you-drive insurance at an estimated 1.0 percent – with a market penetration rate of 10 percent – relative to a “do-nothing” alternative. However the Cambridge Systematics report on *Moving Cooler*, p. 71, estimates significant gains in greenhouse gas reductions from use of pay-as-you-drive insurance by 75 percent of policy holders.

66 Humphrey Institute of Public Affairs, *Value Pricing: Mileage-Based Automotive Leasing and Vehicle Taxation*, University of Minnesota, website, http://www.hhh.umn.edu/centers/slp/vp/vp_org/vehiclepricing.html.

67 James M. Whitty, *Oregon’s Mileage Fee Concept and Road User Fee Pilot Program: Final Report*, Oregon Department of Transportation, November 2007, pp. vi-vii, 55 and 68, available at http://www.oregon.gov/ODOT/HWY/RUFPP/docs/RUFPP_finalreport.pdf.



Summing Up

The vehicle miles traveled on Minnesota's roadways account for a significant share of the state's total greenhouse gas emissions. Minnesota should take steps to reduce VMTs in order to cut down on corresponding greenhouse gas emissions and on our contributions to global climate change.

One approach is to move toward land-use patterns of greater density and mixed uses so that we make fewer and shorter trips by car. Greater use of transit in Minnesota's cities will lead to modest decreases in vehicle miles traveled and GHG emissions because transit vehicles in urban areas produce fewer emissions per passenger mile. And pricing strategies that increase the costs of driving – for example, congestion pricing on crowded freeways, insurance rates tied to miles driven, and tax and registration fees based on travel levels – reduce the number of miles logged. However, these pricing measures also may hit low-income and rural Minnesotans disproportionately hard.

Land use, transit use and pricing are more effective for curbing VMT levels when pursued in combination.⁶⁸

A number of important findings and conclusions emerge from the research carried out for this report:

- Minnesotans drive a lot, significantly more (12.8 percent) than the national average and more than residents of nearby Wisconsin and Iowa.
- Minnesota can reduce its transportation-related greenhouse gas emissions through increased transit service and changes in land use patterns, but the greatest gains will come over time from investments, policies and choices that directly link land use changes to increased transit and transit-oriented development. Changes in transit and land-use policies combined have the potential to reduce Minnesota's GHG emissions from transportation by more than 10 percent by 2025 when compared to 2005. Investments in transit must be supported by land use strategies.
- The potential environmental gains from land use changes and transit will depend upon increased concentrations of employment and housing within areas that already boast significant development. These concentrations – particularly of employment – make frequent, convenient and efficient transit service possible. And a mix of office, residential, and retail development within these areas of concentration increases the ability of travelers to reach these destinations by foot or on bikes.
- Roadway pricing initiatives, such as the MnPASS lanes on I-394 and I-35W, can mitigate traffic congestion problems that may plague the thoroughfares leading into and out of concentrated employment centers. Roadway advantages for transit riders and carpoolers – another element of the MnPASS program – further ease congestion.

⁶⁸ U.S. Department of Transportation, p. 3-20.



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