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Transportation and Land Use Technical Work Group

Summary List of Pending Priority Policy Options for Analysis

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2025 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2015	2025	Total 2008–2025			
TLU Area 1: Reduce VMT		2.72	8.12	66.4			
TLU-1	Improved Land Use Planning and Development Strategies	.3	1.0	7.7	Net savings	Net savings	Pending
TLU-2	Expand Transit, Bicycle, and Pedestrian Infrastructure	.1	.2	2.2	$0	$0	Pending
TLU-5	Climate-Friendly Transportation Pricing						Pending
TLU-7	"Fix-it-First" Transportation Investment Policy and Practice						Pending
TLU-9	Workplace Tools to Encourage Carpooling, Bicycling, and Transit Ridership	.5	.9	7.5			Pending
TLU-14	Freight Mode Shifts: Intermodal and Rail						Pending
TLU Area 2: Reduce carbon per unit of fuel							
TLU-3	Low GHG Fuel Standard (Potential Overlap With AFW-7)	2.0	4.4	24.3	NA	NA	Pending
TLU Area 3: Reduce carbon per mile / per hour							
TLU-4	Infrastructure Management						Pending
TLU-6	Adopt California Clean Car Standards	2.3	7.0	56.0	–$1,244	–$18	Pending
TLU-11	Truck Stop Electrification						Pending
TLU-12	Mobile Source Emissions Reduction						Pending
TLU-13	Reduce Maximum Speed Limits						Pending
	Sector Total After Adjusting for Overlaps						
	Reductions From Recent Actions						
	Sector Total Plus Recent Actions						

Note: Negative numbers represent cost savings.

Overall TLU Analysis Framework

- Transportation carbon emissions = **Miles driven** × carbon per mile.
- Carbon per mile = **vehicle emissions per unit** × **carbon per unit of fuel**.

So, to reduce green house gas emissions requires:

TLU Area 1: Reduce the number of **miles driven**

TLU Area 2: Reduce **carbon per unit of fuel** [Cleaner Fuels]

TLU Area 3. Reduce per vehicle energy consumption [Improved **Vehicle Efficiency**]

This "Overall TLU Analysis Framework" section summarizes for the MCCAG the most important policy option changes since the last MCCAG meeting, organized by TLU Area.

TLU Area 1: Reduce the number of **miles driven**

The following policies will all contribute to reducing miles driven:

- TLU-1 Land Use Planning & Development
- TLU-2 Transit, Bike & Pedestrian Infrastructure
- TLU-5 Climate-Friendly Transportation Pricing [in part]
- TLU-7 Fix-It-First
- TLU-9 Commuter Choice
- TLU-14 Freight Mode Shifts: Intermodal and Rail **[NEW]**

An overview of options for statewide VMT goals:

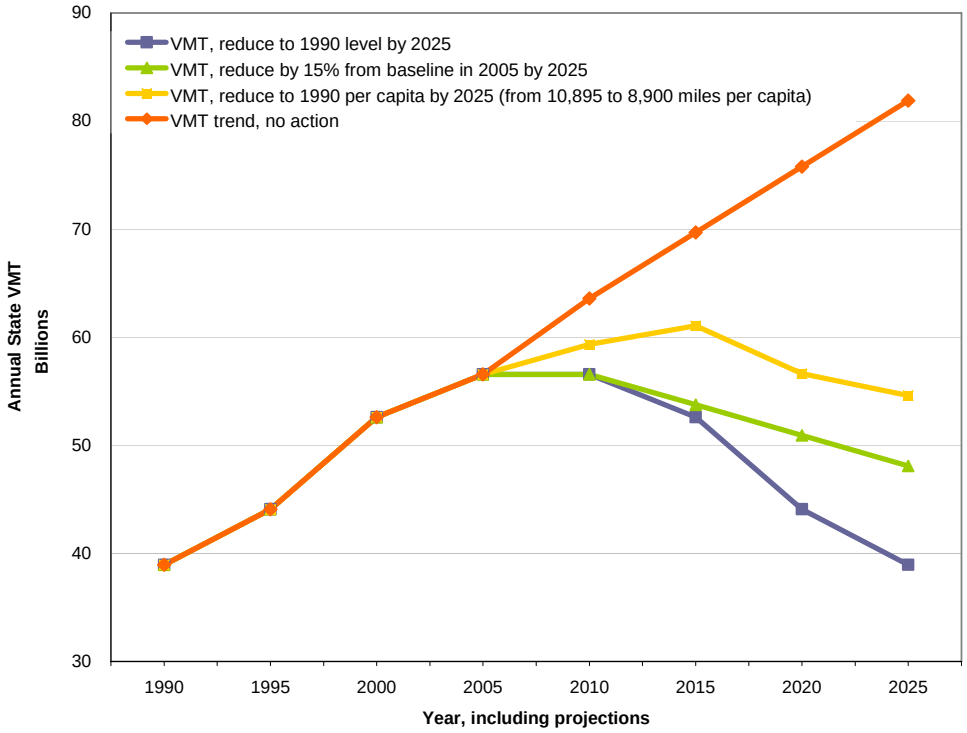
At the last MCCAG, the TLU TWG reported on two possible statewide VMT goals:

1. Returning total state VMT to 1990 levels by 2025, and
2. returning per capita VMT to 1990 levels by 2025.

These options, together with the baseline and with an arbitrary 15% reduction, are shown here for reference:

Figure 1:

Minnesota Vehicle Miles Traveled (VMT) Reduction Proposals



Vehicle Miles Traveled in Minnesota - Goal Comparison

Summary Chart

	1990	1995	2000	2005	2010	2015	2020	**2025**	% change: 1990-2025	% change: 2005-2025
Population	4,375,099	4,626,500	4,919,479	5,192,122	5,446,530	5,709,700	5,943,240	6,135,060	40%	18%
VMT trend, no action	38,940,000,000	44,072,000,000	52,601,000,000	56,570,000,000	63,582,000,000	69,681,000,000	75,780,000,000	**81,880,000,000**	110%	**45%**
Annual VMT Per Capita	8,900	9,526	10,692	10,895	11,674	12,204	12,751	13,346	50%	22%
VMT, reduce to 1990 level by 2025	38,940,000,000	44,072,000,000	52,601,000,000	56,570,000,000	56,570,000,000	52,601,000,000	44,072,000,000	**38,940,000,000**	0%	**-31%**
Annual VMT Per Capita	8,900	9,526	10,692	10,895	10,386	9,213	7,415	6,347	-29%	-42%
VMT, reduce by 15% from baseline (2005) by 2025	38,940,000,000	44,072,000,000	52,601,000,000	56,570,000,000	56,570,000,000	53,741,500,000	50,913,000,000	**48,084,500,000**	23%	**-15%**
Annual VMT Per Capita	8,900	9,526	10,692	10,895	10,386	9,412	8,567	7,838	-12%	-28%
VMT, reduce to 1990 *per capita* by 2025 (from 10,895 to 8,900 miles per capita)	38,940,000,000	44,072,000,000	52,601,000,000	56,570,000,000	59,341,864,868	61,048,112,400	56,615,304,240	**54,602,034,000**	40%	**-3%**
Annual VMT Per Capita	*8,900*	9,526	10,692	10,895	10,895	10,692	9,526	*8,900*	0%	-18%

Population sources: 2000 U.S. Census Bureau, 2005 estimates from U.S. Census Bureau. Modified by Minnesota Housing Finance Agency
VMT sources: Federal Highway Administration

Two issues: metro & outstate, and passenger & freight

The last MCCAG raised some questions about the feasibility of these goals. In response, the TWG took a closer look at VMT trends, and decided to break VMT goals out as follows:

- A policy option of reducing *Passenger VMT* only to either 1990 total or 1990 per capita
- A new *Freight-specific* policy option to address growing freight VMT. This is now TLU-14, for the MCCAG's consideration. TLU-14 does not yet set specific goals for freight VMT.

Further, the TWG observed that Outstate requires policy attention, as VMT there is growing faster than in the Metro area:

Table 1. Metro and non-metro existing trend data, per capita index

State*	**1990**	**1995**	**2000**	**2005**	**2025**
Population	4,375,099	4,626,500	4,919,479	5,197,200	6,135,060
VMT trend, no action	38,940,000,000	44,072,000,000	52,601,000,000	56,570,000,000	81,880,000,000
Annual VMT per capita	8,900	9,526	10,692	10,885	13,346
Seven-County Metro Area†	**1990**	**2005**	**2025**	**% change 1992–2005**	**% change 2005–2025**
Population	2,288,721	2,810,179	3,579,750	22.78%	27.39%
% of state population	52%	54%	58%		
VMT trend, no action	17,710,006,902	22,598,182,950	29,233,300,775	27.60%	29.36%
% of state total VMT	45%	40%	36%		
Annual VMT per capita	7,738	8,042	8,166	3.92%	1.55%
Non-Metro Area	**1990**	**2005**	**2025†**	**% change 1992–2005**	**% change 2005–2025**
Population	2,086,378	2,387,021	2,555,310	14.41%	7.05%
	48%	46%	42%		
VMT trend, no action	21,229,993,098	33,971,817,050	52,646,699,225	60.02%	54.97%
% of state total	55%	60%	64%		
Annual VMT per capita	10,176	14,232	20,603	39.86%	44.77%

VMT = vehicle miles traveled.

* Population sources: 2000 U.S. Census Bureau, 2005 estimates from U.S. Census Bureau, modified by Minnesota Housing Finance Agency; VMT source: Federal Highway Administration.

† Population sources: 2000 U.S. Census Bureau, Metropolitan Council; VMT source: Federal Highway Administration, http://www.fhwa.dot.gov/ohim/hs92/roads.pdf, Metropolitan Council Transportation Planning; Source: Minnesota Department of Administration, Office of Geographic & Demographic Analysis, Minnesota Population Projections: 2000–2030, http://www.demography.state.mn.us/resource.html?Id=19332

Level per capita metro-area VMT is already a Met Council goal, and is currently being met, at 25.9 VMT/capita/day. (http://www.metrocouncil.org/planning/framework/benchmarks.pdf). With increasing fuel prices, level Metro-area VMT/capita is probably not an aggressive goal.

Implications:

1. The TWG is further developing the Options to add, where possible, a focus on outstate passenger VMT.

2. Outstate in particular, decreases in VMT may need to come especially from mode shifts, not just shorter trip distances.

TLU Area 2: Reduce **carbon per unit of fuel** [Cleaner Fuels]

- TLU-3 Low Greenhouse Gas Fuel Standard

The last MCCAG meeting raised significant questions about the feasibility of the TWG-proposed 50% reduction in carbon content by 2025. As a result, the TWG has replaced that goal with 10% by 202, and 12% by 2025.

Important question has arisen that the MCCAG should be aware of:

The TLU sector baseline includes the biodiesel mandate, but does NOT include the state 20% ethanol by 2012 goal. Should it?

> For forecasting GHG emissions, growth in fuel consumption is also needed along with VMT. Onroad gasoline and diesel fuel consumption were forecasted by developing a set of growth factors that adjusted the VMT projections to account for improvements in fuel efficiency. Fuel efficiency projections were taken from AEO2006. The 2005-2006 growth factors for onroad diesel were also adjusted to account for increased consumption of biodiesel. The recent biodiesel mandate, which requires that 2% of diesel fuel sold at filling stations is blended with biodiesel, took effect in late September of 2005. Since the 2% mandate was in effect for approximately one quarter of the year, 2005 consumption of biodiesel was assumed to be 0.5% of diesel consumption. Biodiesel consumption was assumed to increase to 2% in 2006 and to remain at this level through 2030.
>
> The Minnesota Legislature also recently passed an ethanol mandate that would require the state's gasoline supplies to contain 20% ethanol (E-20). This standard, which is to take effect in 2013, would double the current ethanol consumption. *Since Minnesota must obtain federal approval to use E-20 blends, and this approval has not yet been granted, increased ethanol consumption was not included in the business as usual projection.* [emphasis added] If, following further review of these draft emission estimates, the standards are determined to be likely to take effect, the resulting emission reductions should be incorporated into the BAU projection.[1]

[1] CCS, "DRAFT Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2020" http://www.mnclimatechange.us/ewebeditpro/items/O3F13507.pdf

TLU Area 3. Reducing per vehicle energy consumption [Improved **Vehicle Efficiency**]

- TLU-4 Infrastructure Management
- TLU-5 Climate-Friendly Transportation Pricing [in part]
- TLU-6 Adopt CA Clean Car Standards
- TLU-8 Update Road Standards [in part]
- TLU-11 Anti-Idling
- TLU-12 Mobile Source Emissions Reduction
- TLU-13 Reduced Speed Limits

The TWG has further developed these options, but has not changed recommended goals in any of them.

Summary discussion of emissions reductions by TLU Area

Context Question:

If GHG reductions required by MN law come from the transportation sector in same percentage as they are generated today, what is our target amount?

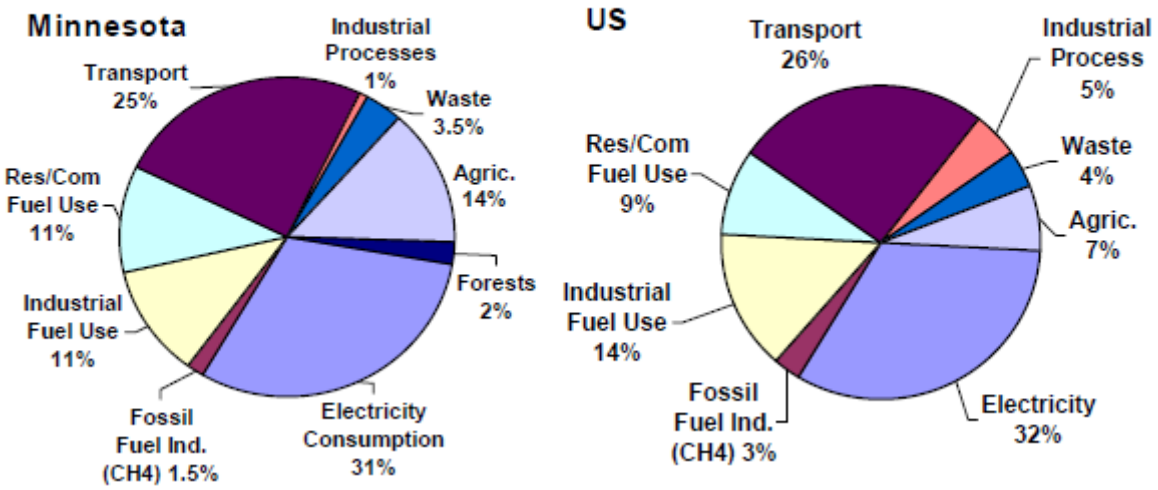
Answer: Keeping in mind that the MCCAG process does not require or assume proportional emissions reductions contributions from each sector:

1. "Statewide greenhouse gas emission reduction goals of15 percent by 2015, 30 percent by 2025, and 80 percent by 2050, using 2005 emissions as a benchmark."

2. "In 2005, activities in Minnesota accounted for approximately 151 million metric tons (MMt) of CO2e emissions."

3. Transportation is 25% of MN emissions.

Figure 2. Gross GHG Emissions by Sector, 2000: Minnesota and US



So:

151,000,000	MMtCO2e in 2005
* 30%	reduction by 2025
45,300,000	MMtCO2e reduction in 2025
* 25%	Transportation share
11,325,000	**MMtCO2e reduction from T in 2025**

The current reductions estimates form each TLU area are:

TLU Area 1: Reduce the number of **miles driven**

Reduce to 1990 VMT: (Used in Policy Option Summary)

	MMtCO$_2$e		
	2007	**2015**	**2025**
No action—trend (light-duty only)	22.97	24.10	25.44
Proposed overall action—Reduce to 1990 VMT		21.38	17.32
Reduction		**2.72**	**8.12**

Reduce to 1990 per capita VMT:

	MMtCO$_2$e		
	2007	**2015**	**2025**
Proposed action—reduce to 1990 levels of VMT per person	22.97	23.35	21.05
Reduction		**0.75**	**4.39**

TLU Area 2: Reduce **carbon per unit of fuel** [Cleaner Fuels]

TLU Area 3. Reducing per vehicle energy consumption [Improved **Vehicle Efficiency**]

	MMtCO2e		
	2007	**2015**	**2025**
No action— trend (light-duty)	22.97	24.10	25.44
Proposed action: TLU-6, CA Clean Car		Not estimated: phase-in unclear	18.44
Reduction			**7.0**

TLU-1 Improved Land Use Planning and Development Strategies

Policy Description

Improve land use planning and development and investment practices to target growth in ways that reduce the number and length of vehicle trips, thus reducing greenhouse gas emissions.

(Part of VMT reduction goal along with TLU strategies 1, 2, 5, 7, 8, 9,10,14)

Policy Design

Goals:

Establish land use and development requirements and incentives that will encourage higher density, mixed-use, pedestrian-friendly development across Minnesota.

Note: TLU-1 group is working to establish a measurable goal. This requires further discussion including more economic incentives in the goal that address state-wide growth, not simply metro-area growth. Goals below need further discussion to set the percentages and how it might apply to non-metro-area growth. (The Met Council has done research on this, see Table below.) Issues/decision points include whether to set goals for the 7-county metro area only or for the entire state, and whether to have separate goals for non-metro area.]

Target X percent (50%, 60%, 70%) of the Minnesota's new residential growth and X percent (60%, 70%) of new job growth into priority growth areas where walking, bicycling, and/or transit can become viable transportation options and where vehicle trip length will be reduced.

Metro Council Growth Policy Goals[2]:

	Historic Trend	New Policy
Central Cities	3.5%	8.0%
Fully Developed Suburbs	9.8%	12.0%
Developing Suburbs	70.3%	67.0%
Rural Area	7.9%	5.0%
Cities & Rural Centers in Rural Area	8.6%	8.0%

Identify lands for preservation as open space, natural areas, parks, and agricultural areas.

Timing: Statewide and regional planning goals developed in 2008–2009. Best practices technical assistance to be prepared in 2008–2009. To achieve VMT goals, policy implementation should commence as soon as possible.

[2] From Blueprint 2030: http://www.metrocouncil.org/planning/transportation/TPP/2004/summary.htm

Parties Involved: All levels of government including local, county, school districts, regional, state; developers and contractors; employers; homeowners.

Other: None.

Implementation Mechanisms

1. Priority Areas Designated For Planned Growth

Establish a process to designate types of priority growth areas within the state such as town centers, downtowns, regional centers, transit corridors, and transit station areas. Establish a process to encourage higher density housing and employment growth, mixed-use and mixed-income development, and bicycle, pedestrian, and transit-friendly development within these areas. Priority growth areas could include brownfields (old commercial or industrial sites). Development would be promoted through incentives and/or regulation.

2. Transit- and Pedestrian-Oriented Development

Encourage transit- and pedestrian-oriented development (higher density, mixed-use development) along bus corridors and at rail station locations.

3. Targeted open space protection

Establish programs and/or requirements to preserve key forestlands, natural areas, agricultural land, and parkland, which will help to guide development and redevelopment into targeted growth areas.

[Needs more discussion: TLU-1 group does not all agree on or has not discussed all of these implementation mechanisms yet.]

4. Smart Growth Planning, Modeling and Tools

Institute statewide and municipal planning requirements and/or incentives to implement this strategy. Require state and municipal plans to include goals and strategies for reducing GHG emissions.

Provide technical assistance to communities on best practices in zoning, parking, and street design to increase walking, bicycling and transit use; to encourage higher density, transit- and walking-oriented development; and to balance regional residential, commercial and industrial needs.

5. Jobs-Housing Balance

Target new housing development near existing jobs and target new commercial development near existing housing. Implement financial incentives and/or regulation to encourage a range of housing types that supports a community's local work force to create a stronger jobs-housing balance and reduce the length of vehicle trips.

5. Complete Streets and Well Connected Streets

Improve street connectivity statewide to shorten trip distances, to make walking, and walking to transit, safer and more convenient, to reduce the need for overly large urban arterial roads, and to encourage higher density development.

6. School Siting

Review and revise school siting laws in Minnesota to encourage the development or rehabilitation of schools in priority growth areas and to make it easier for children, teachers, and parents to get to school on foot, bicycle, and transit.

7. Funding

Target new and existing transportation, housing, regional, state, and federal dollars to those projects that help meet these land use and development goals.

Achieving the given VMT goal depends on a vigorous implementation of the policy initiatives at all levels of government.

Related Policies/Programs in Place

Relevant Actions in Minnesota:
Note: An outstanding issue is recommendations on how much money over what time period is needed to support desired goals through each of these existing policies/programs.

- Metropolitan Livable Communities Program Tax Base Revitalization Account grants have funded projects in the metropolitan area to clean up polluted land and buildings for redevelopment, creating new jobs and affordable housing, and directing growth to central cities and older suburbs.
- Metropolitan Council provides Livable Communities Demonstration Account grants to metropolitan area communities for projects that result in connected development patterns that link housing, jobs and services, and use regional infrastructure efficiently
- Minnesota Housing has a priority for housing development located near regional and interregional transportation corridors and transit-ways, in proximity to existing development and services. Minnesota Housing also supports new development that is not located near wetlands, steep slopes, critical habitat, or on prime farmland or parkland.
- Some counties have sold bonds to protect open spaces. The Metropolitan Council plans to increase the regional park and open space system from 53,000 acres to 80,000 acres. (Estimates are need on the potential GHG Reductions of this increase.)

Primarily CO_2.

Estimated GHG Reductions and Net Costs or Cost Savings

GHG impacts

This Option is part of the group of options that will contribute to fulfilling the broad VMT reduction goal. The TWG has not yet established an independent sub-goal for the VMT reductions under this option.

As an illustration, we assume that TLU-1, together with TLU-2, produce land use (TLU-1) and transportation (TLU-2) changes that together approximate the impacts modeled for Blueprint 2030 for the Twin Cities region. Because we are not re-proposing the Blueprint as such, we conservatively scale back the impacts, and assume that TLU-1 + TLU-2 together reduce the 7-county region's 2025 VMT to 10% below the baseline, for a reduction of 2,923,330,077 VMT in 2025. That is 7.3% of the state's 2025 light duty urban VMT, and 3.8% of all light duty VMT, which is then converted to CO_2 for use in the reductions table.

Costs/cost savings:

All else being equal, buildings cost somewhat more to construct in urban areas than in suburban or exurban areas. The preponderance of the evidence and of the academic review of that evidence finds that

a) increased private construction costs are more than paid for through initial higher sales prices, and higher resale value over time, and

b) through substantial savings in reduced infrastructure costs.

Under a compact, transit-oriented development scenario such as would be produced under this Option, the Twin Cities metropolitan area would save $3 billion in infrastructure costs over 20 years.[3]

Unless and until the TWG establishes a VMT goal for this Option, it is not possible to calculate a value for cost-effectiveness per ton of CO_2. Because a portion of the benefits would come from the transit use that improved land use patterns would make possible, we propose to analyze the costs and benefits of TLU-1 together with TLU-2.

As a stand-alone option, there would be net cost savings, as the more compact development pattern by itself would save substantial portions of the $3 billion estimated by the Met Council. A wide variety of literature supports the Met Council's finding: integrated transportation and land use planning produces net savings on total costs of buildings + land + infrastructure + transportation. Some portions of that total cost of may be higher. Preponderance of literature suggests net savings overall.[4] A National Academy of Sciences / Transportation Research Board review found substantial regional and state-level infrastructure cost savings from more compact development, as shown in Table 2.

Table 2. Burchell findings of savings of compact growth versus trend development[5]

Area of Impact	Lexington, KY, and Delaware Estuary	Michigan	South Carolina	New Jersey
Public–Private Capital and Operating Costs				
Infrastructure roads (local)	14.8%–19.7%	12.4%	12%	26%
Utilities (water/sewer)	6.7%–8.2%	13.7%	13%	8%
Housing costs	2.5%–8.4%	6.8%	7%	6%
Cost-revenue impacts	6.9%	3.5%	5%	2%
Land/Natural Habitat Preservation				
Developable land	20.5%–24.2%	15.5%	15%	6%
Agricultural land	18%–29%	17.4%	18%	39%
Frail land	20%–27%	20.9%	22%	17%

[3] Metropolitan Council, *Blueprint 2030*, Appendix E, page 9.

[4] Literature reviews include US EPA, *Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality*, 2001; and Burchell et al. in footnote 8.

[5] Robert Burchell, et al., *The Costs of Sprawl—Revisited (TCRP Report 39)*, Transportation Research Board/National Research Council/National Academy Press, Washington, DC, 1998.

Data Sources:

Metropolitan Council, *Blueprint 2030*.

Quantification Methods:

Vehicle Miles Traveled (VMT) impacts: A wide variety of literature finds that integrated transportation and land use planning can substantially reduce VMT[6] and its attendant emissions. The appropriate percentage reduction depends on the scale at which policies are applied.[7]

Key Assumptions: None cited.

Key Uncertainties

Vehicle miles traveled since 1990 have increased statewide by 45 percent, one of the fastest growth rates in the nation, far outpacing the state population growth of 19 percent in the same time period. The regions outside the Seven-County Metro area are responsible for much of the immense increase in vehicle miles traveled.

Reducing the number of miles that a vehicle travels through more strategic land use planning and development is a policy approach that works primarily in urban areas where jobs and commercial services are more likely to be closer to residential growth areas. While the Seven-County Metro area held 52% of the state population in 1990, it produced only 45% of the annual state Vehicle Miles Traveled (VMT). In 2005, the Seven-County Metro area had 54% of the statewide population and 40% of the state VMT. By 2025, the percentages only continue to diverge to 58% of the statewide population in the metro area, yet only 36% of the state VMT. Per capita VMT is expected to grow very little in the metro area by 2025, yet it is projected to increase dramatically statewide.

Reducing the number of miles traveled is a crucial component to reducing harmful greenhouse gas emissions, even with increased clean fuel and efficiency. The burden of reducing the number and lengths of trips taken will be concentrated on the Seven-County Metro area and the population growth centers in greater Minnesota and should be considered when recommending policies. Whether we strive to achieve the number of annual vehicle miles traveled overall or based on per capita as we did in 1990, policies for reducing the number and length of travel trips will be targeted to the metro area and greater Minnesota growth centers.

This issue needs more analysis and is a key uncertainty to pursue.

Additional Benefits and Costs

1. Makes transit service more feasible and cost effective (need a minimum of 8 residential units per acre for minimum level bus service, 15 units per acre for frequent bus service, and 30 units per acre for rail service).
2. Improves public health by making it easier and safer for people to walk.

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[6] US EPA, *Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality*, 2001. http://www.epa.gov/dced/built.htm

[7] US EPA, *Guidance: Improving Air Quality Through Land Use Activities* (EPA 420-R-01-001, January 2001), and US EPA, *Comparing Methodologies to Assess Transportation and Air Quality Impacts of Brownfields and Infill Development* (EPA-231-R-01-001, August 2001).

3. Reduces the number and severity of vehicle crashes by reducing the number of high-speed, high-traffic arterial streets and by making walking and bicycling safer.
4. Supports social interaction with more people walking, bicycling, and riding public transit.

Feasibility Issues

None cited.

Status of Group Approval

Pending – [until MCCAG moves to final agreement at #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD

TLU-2. Expand Transit, Bicycle, and Pedestrian Infrastructure

Policy Description

Expand infrastructure and programs to increase transit ridership, carpooling, bicycling and walking. This strategy will reduce GHG emissions by reducing vehicle miles traveled (fewer vehicle trips and shorter trip distances).

(Part of VMT reduction goal along with TLU strategies 1, 5, 7, 8, 9, 10)

Policy Design

Goals:

- Implement the Metropolitan Council's transit plan to double transit ridership by 2020 (from 75 million rides annually to 150 million), ten years sooner than the current target date of 2030. The Council's transit plan calls for investment in light rail, commuter rail, bus rapid transit and expanded bus service.
- Improve/expand transit (rail and bus) service between regional centers in Greater Minnesota and the Twin Cities region including Rochester, Marshall, Moorhead, Winona, Bemidji, Duluth, Detroit Lakes, Mankato, Grand Rapids, East Grand Forks, and other regional centers. Provide/ensure adequate service between these communities and the Twin Cities region (both MSP airport/and or downtown Minneapolis and downtown St. Paul).
- Increase bike and pedestrian infrastructure in cities across Minnesota including sidewalks, trails, bike lanes, and other amenities that make walking and bicycling safer and more convenient.

Timing: Begin implementation by 2008 and complete implementation by 2020.

Parties Involved: Legislature, Metropolitan Council, MNDOT, Metropolitan Transitways Development Board, counties, cities, freight rail, private sector businesses.

Other: TBD

Implementation Mechanisms

Expand Transit Service

- The Metropolitan Council transit plan calls for adding light rail, commuter rail, dedicated busways and increasing regular route bus service by 80% (more routes and more frequent service) This expansion would also include additional marketing, promotion, and pricing incentives (including tax incentives for nonprofits).
- Expand transit service between Greater MN and the TC Metropolitan Area. Improve connections with Amtrak throughout the state.

Expand Bike and Pedestrian Infrastructure

- Add and improve sidewalks, trails, bike lanes, and other amenities including lighting, landscaping, bike parking, lockers, etc.

Related Policies/Programs in Place

Recent Actions in Minnesota:

- MC/TAB programmed $95.6 million in Enhancement and STP funds (starting in 1992) for public transit, and bicycling. Transit for Livable Communities is implementing a four-year $25 million federal pilot program to increase rates of bicycling/walking targeted to Minneapolis.
- In 2006, Minnesota voters approved a constitutional amendment requiring dedication of motor vehicle sales tax funds to transit which will result in increased finding.
- Twin Cities region has two HOV lanes (I-394 and I-35W). I-394 is a HOT lane which allows single occupant vehicles to use the HOV lane for a fee. A MOU between Metropolitan Council and MNDOT provides for consideration additional HOT lanes in future highway improvements.

Type(s) of GHG Reductions

Primarily CO_2

Estimated GHG Reductions and Net Costs or Cost Savings

This Option is part of the group of options that *contributes* to the broad VMT reduction goal.

This analysis focuses, so far, on the transit portion of the Option.

Emissions impacts

Note that these estimates are based on a very narrow definition of emissions benefit: the replacement of a mile of auto travel with a seat-mile of transit. The much broader VMT reductions in the TLU-1 analysis capture some bit probably not all of the benefits from the bike and ped investments. And these estimates are only for the Metro region.

2015: .1 MMtCO2e

2025: .2 MMtCO2e

Costs and savings

Costs: The additional cost to implement the Met Council transit plan on an accelerated time-frame is estimated to be $210 million per year for 13 years or nearly $3 billion.

Savings: Supports the $3 billion in total infrastructure savings cited in TLU-1.

Net: Infrastructure costs and savings net out, leaving the CO_2 reductions and other benefits (below) essentially no-cost.

Data Sources:

Costs: Transit economics literature[8], TDM literature[9], and transit cost/benefit analysis guidance.[10]

Quantification Methods:

Current transit ridership: 72 million/year

Goal: Additional 72 million/year

Average transit trip length: 4.85 miles[11]

VMT reduced:

72,000,000 trips * 4.85 miles / trip = 392,850,000 miles.

Convert to CO_2 using a percentage of decrease in statewide VMT.

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

Benefits:

Greater use of transit will result in a reduced need for parking, lower household costs for transportation, reduced traffic congestion, improved air quality, reduced need and cost for roadway expansion, and improved heath for new transit riders who walk or bicycle to transit.

[8] See Brian E. McCollom and Richard Pratt. 2004. "Transit Pricing and Fares." TCRP Report 95. Washington, DC: Transportation Review Board; and Robert Cervero, 1990. "Transit Pricing Research." Transportation 17(2):117–140; and Victoria Transport Policy Institute, "Public Transit Improvements," in *TDM Encyclopedia*, 2005.

[9] Including ICF Consulting, "Strategies for Increasing the Effectiveness of Commuter Benefits Programs: Transit Cooperative Research Program Report 87," Transportation Research Board, Washington, DC, 2003; ICF Consulting, "Analyzing the Effectiveness of Commuter Benefits Programs: Transit Cooperative Research Program Report 107," Transportation Research Board, Washington, DC, 2005; and ICF Consulting, "Commuter Connections Strategic Review," report to the Maryland Department of Transportation Office of Planning and Capital Programming, November 7, 2004.

[10] "ECONorthwest, Estimating the Benefits and Costs of Public Transit Projects: A Guidebook for Practitioners," Transit Cooperative Research Program Report 78, Transportation Research Board/National Research Council/ National Academy Press, Washington, DC, 2002.

[11] American Public Transportation Association, National Service And Operating Data, 2007 (for 2005): http://www.apta.com/research/stats/factbook/documents/section_06_passengers_pages_11_to_14.pdf . The APTA figure may be low; The Transportation Research Board's "Characteristics of Urban Travel Demand" gave the figure as 6.25 miles in 2005. gulliver.trb.org/publications/tcrp/CUTD_Chapter_6.xls

Greatly reduce infrastructure costs. A report prepared in 2002 by a consultant to the Metropolitan Council hired to study regional growth development options showed a $3 billion savings in infrastructure costs over 20 years under a compact development scenario focused to some degree along pubic transit routes for the TC metropolitan area. (Blueprint 2030 Appendices, item E, page 9.)

Substantial ancillary health benefits from reduced air pollution. [Analysis to be performed with MPCA.]

Feasibility Issues

None cited

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeging #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by final decision/vote of MCCAG]

TLU-3. Low GHG Fuel Standard

Policy Description

Implement a low greenhouse gas fuel standard (LGFS) that would create a market-based program to reduce the GHG emissions from transportation fuels and diversify transport fuel options for consumers.

The LGFS would be designed to require fuel providers to reduce the greenhouse gas (GHG) intensity of the fuels they sell in Minnesota. "Fuel providers" are identified as producers, importers, refiners, and blenders. The GHG intensity is specified as a CO_2 equivalent[12] per BTU. The LGFS would not be designed to encourage the use of any particular fuel: it would include fossil and renewable fuels.[13]

The LGFS is not a tailpipe standard for GHGs as it considers GHG emissions on a full fuel cycle basis, which includes not only tailpipe emissions, but also emissions associated with the production and distribution of fuels. This will result in varying carbon impact values for fuels that would ostensibly be the same to customers.[14] This would have a significant impact to Minnesota in that E10, the current maximum ethanol blend percentage for non flex-fuel vehicles, is the state mandated standard for all gasoline blends.

Policy Design

Goals: Implement policy that requires the average carbon intensity of on-road transportation fuel to be reduced 10% by 2020 and 12% by 2025 from 2007 levels. (Note that California's LCFS requires a 10% reduction by 2020.) Other policies seek to reduce consumption of motor fuels, while this approach changes the fuel mix to reduce GHGs.

Timing: As above

Parties Involved: All layers of government, fuel providers

Implementation Mechanisms

- Partnership with the University of Minnesota and the Department of Transportation to create the framework for the LCFS.

[12] Each GHG has a global warming potential that allows it to be expressed in terms of CO_2. This notation is referred to as carbon dioxide equivalent (CO_2e). For example, methane, CH_4, has a GWP of 23. Therefore, 1 Mt of CH_4 can be expressed as 23 $MtCO_2e$.

[13] Alternative fuels are defined in the Energy Policy Act of 1992 and include biodiesel, electricity, ethanol, hydrogen, natural gas, and propane.

[14] For example, E10 where the ethanol is derived from cellulose has the potential to reduce the full fuel cycle carbon impact as compared to E10 where the ethanol is derived from corn. How the ethanol is made affects its life-cycle GHG profile and not all corn ethanol is exactly the same. Cellulosic while potentially better in its GHG profile than sugar based (corn) ethanol, will also vary depending on feedstock(s) and thermal heat input source(s).

- Market-based mechanisms for fuel providers to choose how they wish to meet LGFS.
- Full life cycle basis of measuring GHG impact of transportation fuels. Implemented by a cap and trade system for fuel providers.
- Financial incentives for refueling station creation and retrofitting based on LGFS.
- Certification process

Related Policies/Programs in Place

Recent Actions in Minnesota:

- Current state policy for fossil diesel displacement is 2% biodiesel blend. For gasoline displacement, current policy is 20% ethanol displacement by 2013; with a carve-out goal for 5% derived from cellulosic material. Current petroleum displacement goal is 20% of the liquid fuel sold in the State will come from renewable sources by the year 2015 and 25% by 2025.
- Metro Mobility uses the highest level of biofuel allowable by operating conditions and vehicle manufacturers.
- B5 (5% biodiesel) used by Metro Transit and Metro Transit is testing B20 (20% biodiesel). Metro Transit is considering use of B10 (10% biodiesel) by mid-2007 pending B20 test results. The agency is also looking for other engine technology that uses other types of renewable fuels.
- Formation of the NextGen Energy Board to determine how state can invest most efficiently to achieve energy independence—$90 million from 2010 to 2020.
- Ethanol: Minnesota established an ethanol production incentive to provide payment to producers to help develop a new market for Minnesota's agricultural products. On the market side, Minnesota requires that all gasoline sold in the state be blended with a 10% ethanol mix. In addition, Minnesota began efforts in 1997 to develop a network of fueling stations for flex fuel vehicles that could run on an 85% ethanol blend. Today Minnesota has over three hundred E85 fueling stations around the state that together sold a total of $18,160,000 gallons of E85 blended gasoline during 2006. http://www.pca.state.mn.us/programs/ethanol.html; http://www.pca.state.mn.us/programs/ethanol.html#links
- Biodiesel: According the US DOE, biodiesel has the most favorable energy balance of any transportation fuel. For every unit of energy needed to produce a gallon of biodiesel, 3.2 units of energy are gained. As of September 29, 2005, Minnesota requires nearly all diesel fuel sold in the state to contain at least a 2% biodiesel blend. It is estimated that the 2% fuels use requirement for Minnesota will replace 16 million gallons of diesel fuel. Minn. Stat. § 239.77
- Electricity: According to recent information provided by the PCA, electricity as used in a hybrid gas/electric vehicle is a very low GHG fuel source. Compared to conventional gasoline and reformulated gasoline, electric/gas hybrids show a 37.2% reduction in GHG emissions in grams per mile. This is compared with a 1.5% reduction for E10, a 15.6% reduction for E85 flex fuel, and a 25.5% reduction for conventional and low sulfur diesel.

  Recognizing the potential benefits of hybrids, plug-in hybrids, and electric vehicles for reducing greenhouse gas emissions, Minnesota has taken a number of steps to encourage their development, including an appropriation of over $2 million for the 2008-9 biennium to for study and testing of plug in hybrid electric vehicles.

Type(s) of GHG Reductions

All GHG types in the fuel life cycle.

Estimated GHG Reductions and Net Costs or Cost Savings

	MMtCO$_2$e		
	2007	**2015**	**2025**
No action— continue according to trends	30.04	32.92	36.78
Proposed action— 10% by 2020, and 12% by 2025 (5% by 2015 interpolated, but not part of the formal goal): reduction		**1.65**	**3.68**

Data Sources:

David Crane and Brian Prusnek, "The Role of a Low Carbon Fuel Standard in Reducing Greenhouse Gas Emissions and Protecting Our Economy," California Air Resources Board, January 8, 2007.

Quantification Methods:

Because the LGFS would mandate a 10% decrease in carbon content, the high-level analysis is relatively straightforward: a straight 10% decrease in the baseline on-road carbon emissions in 2020.

The LGFS would take into account the full fuel cycle when calculating that carbon content. Because the current Inventory and Forecast is not on a full fuel cycle basis, that analysis is not done here either.

Key Assumptions:

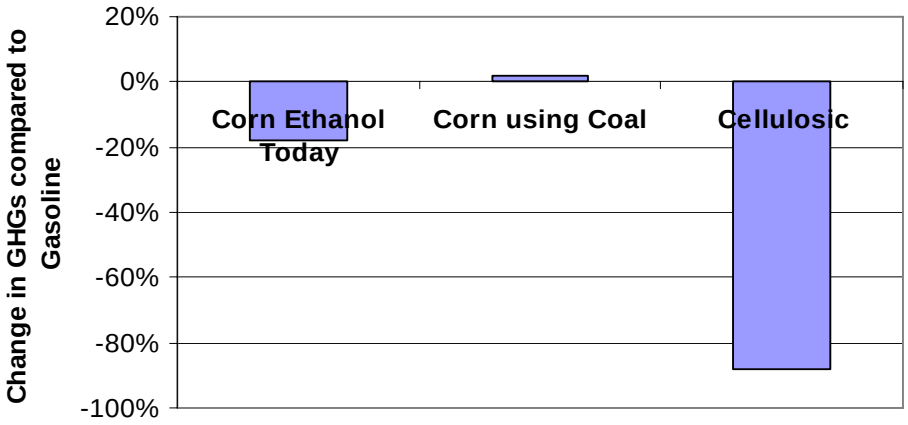
That fuels technologies advance sufficiently to allow these goals to be met. Research by the University of California on the achievability of the CA LCFS finds:

> "On the basis of a study of a wide range of vehicle fuel options, we find a 10 percent reduction in the carbon intensity of transportation fuels by 2020 to be an ambitious but attainable target. With some vehicle and fuel combinations, a reduction of 15 percent may be possible."[15]

To give just one example, these goals assume that the ethanol portion of the total fuel mixture will not, on average, be "corn using coal":

[15] Alexander E. Farrell, Daniel Sperling, *et al*. A Low-Carbon Fuel Standard for California, Part 1: Technical Analysis, May 29, 2007. Executive Summary, p. 8. Available through www.its.berkeley.edu/sustainabilitycenter, www.its.ucdavis.edu, and http://www.arb.ca.gov/fuels/lcfs/lcfs.htm.

Figure 3. Low-Carbon Fuel Standard necessary to ensure greenhouse gas reductions from the use of biofuels



Source: Farrell et al., "Ethanol Can Contribute to Energy and Environmental Goals," *Science* , Jan 27, 2006.

Key Uncertainties

See extensive analysis and discussion by both the California Air Resources Board (CARB) and related research by the University of California. Those studies review the technical challenges and uncertainties facing this type of policy:

Alexander E. Farrell, Daniel Sperling, *et al*. A Low-Carbon Fuel Standard for California. Part 1: Technical Analysis, May 29, 2007. Part 2: Policy Analysis, August 1, 2007. Available at http://www.arb.ca.gov/fuels/lcfs/lcfs.htm.

Additional Benefits and Costs

Benefits: Additional farm income, with attendant benefits for rural families and communities.

Costs:

Environmental: There is extensive debate about the non-emissions environmental impacts of biofuel production. In Minnesota, demand for additional biofuels would have substantial effect on demand for water and for acreage, with subsequent impacts on water supplies and marginal and/or Conservation Reserve Program acreage. There is also extensive debate over the environmental impacts of a move to grass-based fuel feedstocks. Research at the U of Minnesota suggests that a return to (for example) a harvestable prairie-type ecosystem would not support extensive prairie-like biodiversity.

Those debates are too extensive to summarize here, other than to conclude that a LGFS would almost certainly increase the demand for MN-based biofuels to some extent, and that that increased demand would likely have some negative environmental impact. Until the economics of an LGFS are clearer, it is not possible to forecast the extent to which an LGFS would produce

additional demand for MN-based biofuels, versus other types of fossil (natural gas) or renewable (wind, hydro) fuelstocks, or the resulting impacts.

Economic: Minnesota farmers are realizing that higher grain prices are not necessarily beneficial; they raise input prices for a range of other farm products.

Feasibility Issues

See "Key Uncertainties".

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by final vote of the MCCAG]

TLU-4. Infrastructure Management

Policy Description

With the state as a coordinator, build on current efforts to create a seamless multi-modal system, to serve all modes, and improve traffic flow and decrease vehicle idling and congestion (where it will not negatively impact bicycling and walking or induce additional vehicle trips).

This strategy is designed to reduce carbon emissions by reducing the number and length of motor vehicle trips; increasing walking, bicycling, and transit use; and supporting development patterns that use these modes.

Policy Design

1. Manage to reduce congestion

State, regional, and local transportation agencies will build on current efforts to:

- synchronize traffic signals to improve traffic flow,
- provide priority signaling on key transit corridors,
- improve incident management (vehicle crashes and breakdowns),
- provide real-time information about for commuters about congestion, transit, and parking,
- install round-a-bouts where appropriate
- test state of the art parking strategies
- convert HOV or general lanes to HOT lanes with revenue to transit alternatives

2. Manage to accommodate all modes

Change rules and policies at the state, regional, and local level to ensure that the needs of all users are taken into account in the design of new and rebuilt roads.

1) Adopt a Complete Streets policy in Minnesota for all new and reconstructed roads. Ensure, through an inclusive process, that roads are designed to better serve all users including vehicle drivers, transit users, pedestrians, freight and truck traffic, and bicyclists. (Exceptions can be made for rural roads between communities, etc.) Develop and apply an "Urban Preservation Route" street classification, similar to the "Natural Preservation Route" that exists today.
2) Require and support cities and counties to develop bicycle and pedestrian plans to identify needs and priorities.
3) Develop policies and guidelines for municipalities regarding street connectivity.

Goals: Use infrastructure management to reduce urban-area emissions by transportation emissions by ½ percent by 2025 relative to 2005.

Timing: 2008-9 adoption and then ongoing implementation.

Parties Involved: Legislature, all state, regional, and local agencies that deal with transportation, local elected officials, bike, transit, and pedestrian interests, Minnesota Trucking Association, others.

Other: None cited.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Recent Actions in Minnesota:

- With CMAQ funds, Minneapolis has implemented computerized traffic signals for better traffic flow. The 2007 CMAQ solicitation contains a funding program for TSM. Freeway on-ramp metering program.

Type(s) of GHG Reductions

Primarily CO_2.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by final vote of MCCAG]

TLU-5. Climate-Friendly Transportation Pricing

Policy Description

Implement policies so that drivers pay taxes and fees that more closely estimate the full costs of driving – making it more likely for them to choose transportation alternatives, purchase more efficient vehicles, drive less, or drive more efficiently (combining trips). Where possible enable some of the fixed costs of driving to become variable costs.

In certain highway corridors and/or within a selected area of the metropolitan area, institute congestion pricing (e.g., tolls)—charging single occupant vehicles (SOVs) a variable fee relative to travel demand—to price motor vehicle use more in line with real costs, and to provide revenue for less CO_2-intensive travel options (e.g., public transit, vanpooling).

Policy Design

Short-term:

- Increase the state's fuel tax and vehicle registration fees to expand transportation infrastructure and reduce bottlenecks/congestion.
- To encourage purchase of low-GHG emitting passenger vehicles, institute a "greenhouse gas emission fee" with higher fees charged for higher emitting vehicles. Revenue collected should be dedicated to transportation alternatives.
- Provide an incentive for auto insurance companies to institute a "pay as you drive" system for policyholders. This should be voluntary, but assumes X% market penetration by 2015.
- Encourage lower-cost highway expansion projects to eliminate bottlenecks that result in delay and vehicle idling.
- Establish a network of lanes that allow public transit vehicles, carpools, and SOVs willing to pay a fee, congestion-free travel. The electronically charged toll for use of these HOT lanes would vary by time of day and traffic conditions to ensure free-flowing conditions at posted highway speeds. The network should consist of the existing HOT lanes on I-394, the HOT lanes proposed for I-35W (selected for a US DOT Urban Partnership Agreement), and other highway corridors that exhibit the highest level of traffic congestion and the ability to cost-effectively turn bus-only shoulder lanes into a HOT lane. Assume the toll proceeds are used in the following manner: 1) pay back the trunk highway fund and any other funding source for monies spent to establish each lane, 2) pay all the costs of implementing and administering the toll collection system for that lane, and 3) the remainder, if any, for the expansion and improvement of transit services within the HOT lane corridor.

Long-term:

- In conjunction with other state or national efforts, Minnesota should consider instituting a mileage tax, in place of the current funding system (gax tax, license tab fees, motor vehicle sales tax) for roads. For purposes of this exercise, we assume that happens in 2015.

- Establish a cordon pricing system similar to that used in Stockholm and Oslo. All vehicles other than public transit should be charged a fee when entering the Twin Cities' urbanized core on a principal arterial at the I-494/I-694 beltway. The fee should be collected electronically and vary by time of day, but in peak periods be at least twice the peak period transit fare then in effect. All proceeds should be used to support the transit element of the Metropolitan Council's 2030 Transportation Policy Plan.

Anytime:

- Provide income tax incentives to encourage the purchase of low-GHG emitting vehicles and technologies.
- Policy design for all components of this package should take into account and mitigate equity impacts, through, for example, life-line policies.

Timing: Passage of a comprehensive transportation funding package, GHG emission fees and tax incentives during the 2008 Legislative Session, effective July 1, 2008. Mileage tax replacement would be enacted in 2015.

The HOT network should be phased in over time and completely operational by 2015. Assume that highway expansions identified in the Metro District's fiscally constrained Transportation System Plan will follow the timing set out by MNDOT.

The cordon pricing system should be phased in over time but be completely operational by 2015. The phase-in should be by principal arterial based on highest traffic count.

Parties involved: Highway and transit users, automobile manufacturers, insurance companies, state departments of commerce, transportation, public safety, revenue, finance, and pollution control, Metropolitan Council, Minnesota Department of Transportation.

Other: Since Minnesota' motor fuel tax, registration fees, and motor vehicle sales tax are constitutionally dedicated to "highways purposes," significant use of these monies for transit, bicycling, or pedestrian projects may invite a lawsuit or may require amending the state's constitution. In addition, offering exemptions/reductions in any of these funding mechanisms to encourage the purchase of low-GHG vehicles would decrease the amount of transportation dollars for roadways and counter TLU strategies 2, 7, and 8.

Implementation Mechanisms

CO_2-Based Registration Fees

- The state could adopt a variety of programs to increase purchase of fuel-efficient or low-GHG vehicles (including pure electric, hybrid, plug-in hybrid, and other alternative fuel vehicles). State incentives could include lower registration fees, feebates, and/or tax credits. Higher vehicle registration fees could be charged for vehicles that have lower fuel economy. Vehicle licensing fees could be based upon vehicle weight, with use of a dollar per vehicle-ton multiplier instead of the present broad categories of vehicle weight.

VMT Tax

- The state would charge a tax reflective of miles traveled by passenger vehicles and could vary the fee by the fuel economy achieved by the model type (per EPA estimated mph). In addition,

revenues could be used to fund transit and other transportation alternatives within a corridor or region.

Pay-as-You-Drive Automobile Insurance

- The state would encourage and support the provision of pay-as-you-drive auto insurance, possibly including state support for additional pilot programs. This would also require the state commission to conduct an active review of possibilities.

Increase Motor Fuel Taxes

- Increasing the state tax on conventional fuels can reduce consumption and travel while encouraging the use of lower emissions vehicles, alternative fuels, and public transit. (*Note: The working group will get and estimate for % increase in price and expected decrease in driving*).

Related Policies/Programs in Place

I-394 is HOT lane. MOU between MC and MNDOT to consider additional HOT lanes in future highway improvements.

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by MCCAG]

TLU-6. Adopt California Clean Car Standards

Policy Description

Reduce greenhouse gas emissions from new motor vehicles (cars and light trucks) sold in Minnesota by adopting legislation equivalent to the California Clean Car Standards (Assembly Bill 1493 also known as "Pavley" the name of the California lawmaker who sponsored the legislation).

California adopted legislation in 2002 (and regulations in 2004) requiring a reduction in greenhouse gas emissions from new cars and light trucks sold in that state beginning with model year 2009. California plans an eight-year phase-in. The California standards incorporate the four main global warming emissions including carbon dioxide, methane, and nitrous oxide resulting directly from the operation of the vehicle (tailpipe emissions) as well as hydroflurocarbon emissions resulting from leakage from or operation of the air conditioning system.

Policy Design

Goals: Adopt California's Clean Car program

Timing: If adopted, the standards would take effect no earlier than the 2011 model year and be phased in over a specified period of time (assuming the legislature would act in 2008).

Parties Involved: Legislature, state, MN auto dealers.

Other: California standards constrain the sale of E85 vehicles. See "Feasibility".

Implementation Mechanisms

TBD

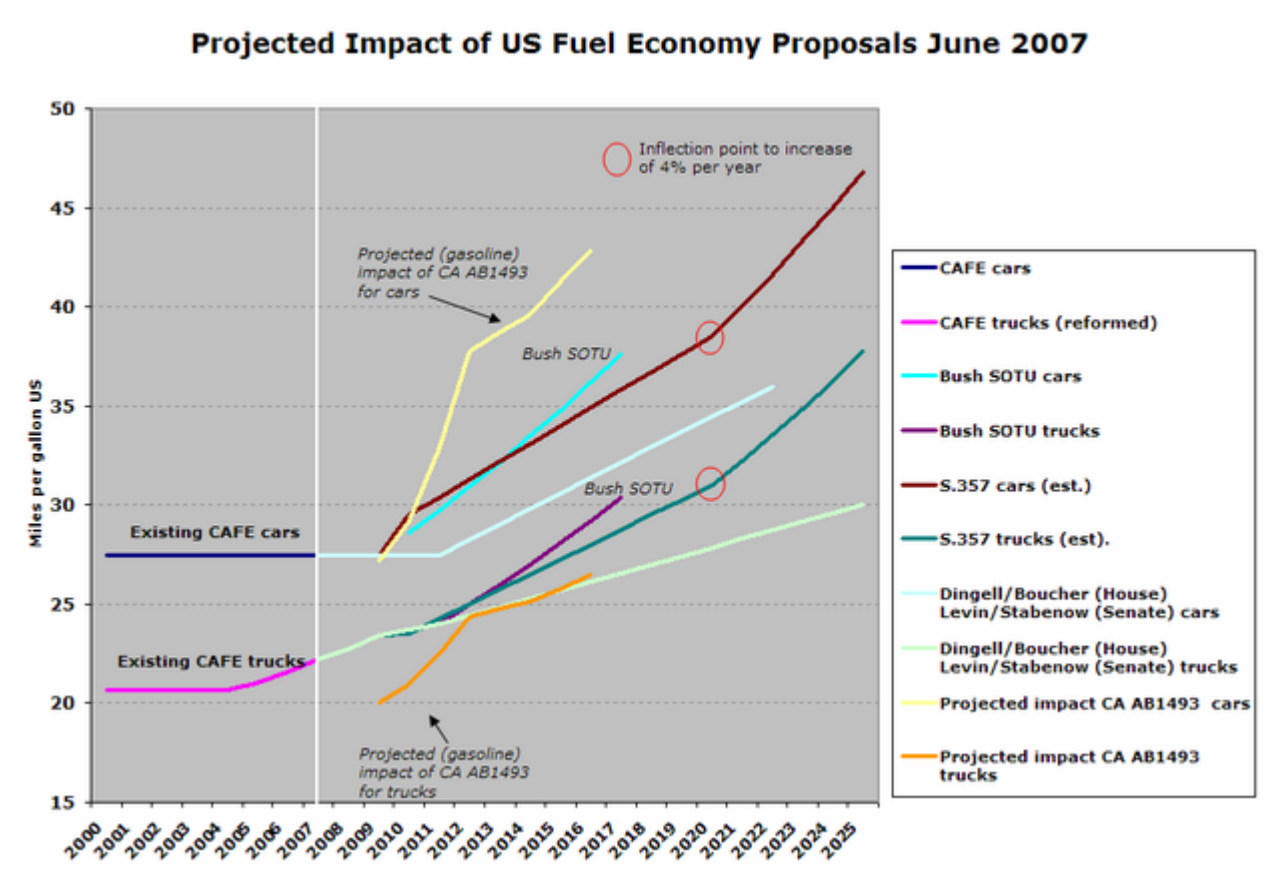
Related Policies/Programs in Place

Since California's adoption of the Clean Car Standards, 12 additional states have adopted similar standards. EPA is developing GHG standards for motor vehicles because of a recent Supreme Court ruling.

Congress is debating various bills which may result in higher CAFE standards for the industry.

For comparison information, the California (AB 1493) standard is shown together with other proposals below:[16]

[16] http://www.greencarcongress.com/2007/06/pending_fuel_ec.html. See also Brent D. Yacobucci, "Corporate Average Fuel Economy (CAFE): A Comparison of Selected Legislation in the 110th Congress," Congressional Research Service, May 1, 2007, http://fpc.state.gov/documents/organization/84917.pdf.



Type(s) of GHG Reductions

Carbon dioxide, methane, and nitrous oxide resulting directly from the operation of the vehicle (tailpipe emissions) as well as hydroflurocarbon emissions resulting from leakage from or operation of the air conditioning system.

Estimated GHG Reductions and Net Costs or Cost Savings

GHG reductions

	MMtCO_2e		
	2007	**2015**	**2025**
No action—trend (light-duty)	22.97	24.10	25.44
Proposed action: CA Clean Car		Not estimated: phase-in unclear	18.44
Reduction		**–**	**7.0**

Costs/savings summary

The California Air Resources Board estimates that the ultimate GHG standards will add an average cost of $1,064 per vehicle, and that the fuel savings will more than offset those additional costs. CARB further estimates that the fuel savings, by starting immediately, will immediately begin offsetting the higher costs of a leased or financed vehicle.

The auto industry estimates the cost per vehicle will be, on average, $3,000 for complying with these requirements, and that the fuel savings will not offset that higher cost. The auto industry estimates that the higher initial cost will delay the turnover of the fleet to cleaner, safer vehicles.

Data Sources: / Quantification Methods: / Key Assumptions:

Issue: The California Air Resources Board (CARB) and automakers disagree on the cost of compliance with California's new Clean Car standards (AB 1493). CARB estimates that the additional cost of compliance for a new car in model year 2016 will be approximately $1,000. The net benefit to consumers, accounting for reduced fuel consumption, will be slightly positive. Automakers contend that the price will be in the vicinity of $3,000 and that the net benefit to consumers will be negative.

CCS's conclusion: CARB's estimates are more rigorously produced and are likely to be closer to actual values.

Evaluation

CARB's cost estimates are based on existing and emerging technologies that can improve fuel economy in passenger vehicles. CARB included a number of conservative elements in its methodology:

- Standards were based on the heaviest manufacturer fleet
- Multiple feasible technology packages were ensured for each vehicle class
- Emissions reductions from hybridization were excluded
- Fuel price was assumed to be $1.74 per gallon[17]

CARB's analysis estimates that the additional cost of compliance in a new vehicle in model year 2016 will be approximately $1,000. To determine the net impact on consumers, CARB calculated the increase in monthly loan payments versus the savings from reduced fuel consumption. Consumers would achieve a net savings of approximately $3.50 to $7.00 / month.

An analysis by Sierra Research commissioned by the Alliance of Automobile Manufacturers estimates that the average cost of compliance with AB 1493 would be around $3,000 per vehicle. Savings on fuel would offset less than half of that cost for consumers.

The Sierra Research finding is largely a result of their assumption that greater fuel economy would encourage consumers to drive significantly more (the "rebound effect"). The CARB analysis also takes this effect into account, but estimates its impact to be smaller.

Sierra also expects more expensive technologies and options to be used where CARB anticipates simpler, less costly technologies. More than $2,000 of the cost increase estimated by Sierra results from the use of expensive lightweight aluminum body structures typically found in sport

[17] California Environmental Protection Agency Air Resources Board. ARB Staff Reponses to Comments Raising Significant Environmental Issues Regarding the Proposed Regulations to Control Greenhouse Gas Emissions from Motor Vehicles. August 4, 2005. http://www.arb.ca.gov/regact/grnhsgas/att3.pdf. page 1

luxury cars. Such structures are not feasible for use in typical passenger vehicles. In addition, AB 1493 prohibits the use of such weight reduction approaches.[18]

Finally, the Sierra Research analysis appears internally inconsistent. If consumers do not see net savings from the purchase of a Pavley car, then there is no extra money for them to spend on additional driving.[19] The CARB analysis acknowledges the rebound effect from its savings, but does not expect (nor does any study of the rebound effect show) that consumers would use up all their savings in additional driving.

Getting away from the debate over CARB analyses, several academic studies of likely California standard costs also find net consumer saving. For example:

Vehicle Lifetime Savings to Consumers: Pavley[20]

	Car	Van	Pickup	SUV	Market
Lifetime Fuel Cost	–$2,432	–$3,090)	–$3,712	–$3,786	–$2,928
Retail Price	$1,253	$989	$1,367	$1,242	$1,275
Total Change	–$1,178	–$2,100	–$2,344)	-$2,544)	–$1,652

Note: Negative numbers (in red) are cost savings.

There is substantial empirical basis to expect that both CARB and the industry have overestimated compliance costs. A review by the Natural Resources Defense Council (NRDC) found that the auto industry has typically overestimated the compliance costs of pollution standards for passenger vehicles by a multiple between 2 and 10. Factors that contribute to overestimation include unanticipated innovation and overly conservative estimates. Regulators have also overestimated compliance costs in the past, by as much as a factor of 2. [21]

Conclusion

Although it is possible that the CARB estimates of compliance cost are too low, CCS finds that the CARB analysis is more thorough and overall more credible. In the analysis of the costs of compliance with a State Clean Car standard, CCS thus shows the CARB cost of compliance.

[18] California Environmental Protection Agency Air Resources Board. Regulations to Control Greenhouse Gas Emissions from Motor Vehicles: Final Statement of Reasons. August 4, 2005. http://www.arb.ca.gov/regact/grnhsgas/fsor.pdf. page 169

[19] See Meszler Engineering Services, "Response to Sierra Massachusetts Pavley Comments, November 22, 2005. At http://www.mass.gov/dep/air/laws/meszler.pdf.

[20] Walter S. Mcmanus, "Economic Analysis of Feebates to Reduce Greenhouse Gas Emissions from Light Vehicles for California," University of Michigan Transportation Research Institute, Ann Arbor, Michigan, UMTRI-2007-19-2, May 2007. http://www.umtri.umich.edu/content/UMTRI-2007-19-2.pdf

[21] National Resources Defense Council. Comments on the Proposed Adoption of Regulations by the California Air Resources Board (CARB) to Control Greenhouse Gas Emissions from Motor Vehicles. September 23, 2004. http://www.nrdc.org/globalWarming/crh0904.pdf. page 6.

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National Resources Defense Council. Comments on the Proposed Adoption of Regulations by the California Air Resources Board (CARB) to Control Greenhouse Gas Emissions from Motor Vehicles. September 23, 2004. http://www.nrdc.org/globalWarming/crh0904.pdf

Sperling, Daniel, *et al*. Analysis of Auto Industry and Consumer Response to Regulations and Technological Change, and Customization of Consumer Response Models in Support of AB 1493 Rulemaking. Institute of Transportation Studies, University of California, Davis. June 1, 2004. http://www.its.ucdavis.edu/publications/2004/UCD-ITS-RR-04-17.pdf

California Environmental Protection Agency Air Resources Board. ARB Staff Reponses to Comments Raising Significant Environmental Issues Regarding the Proposed Regulations to Control Greenhouse Gas Emissions from Motor Vehicles. August 4, 2005. http://www.arb.ca.gov/regact/grnhsgas/att3.pdf.

Cost summary

A review of $/ton estimates prepared for the Pavley-type regulation for California Air Resources Board (CARB), Northeast States for Coordinated Air Use Management (NESCAUM), and CCS produces an estimate of between $117 saved for each metric ton of CO_2e reduced at the high end, and roughly a third of that (~$39 saved for each ton) at the low end. To be conservative, we used $39 saved per ton reduced.

Key Uncertainties

- The auto industry has sued CA and other states, arguing that there is federal preemption over fuel economy requirements. Regardless of the outcome of these trials, the losing party is likely to appeal, resulting in delays. It may be 3–4 years before the courts resolve this issue delaying any possible adoption of these rules. Implementation of these rules is also dependent on the granting of a waiver to California by EPA. It is unclear what decision EPA will make. This decision is expected by the end of 2007.
- Cars for the 2011 model year are already being designed. A new engine lines take 6-7 years to develop. Because of the timelines and requirements in the CA GHG standards that occur in the 2010-2013 timeframe, the auto industry says that the only way to meet the standards in the early years would be to drop models.

Additional Benefits and Costs

None cited.

Feasibility Issues

Manufacturers have stated under oath that they cannot meet the CA GHG standards using their current mix of models. They would attempt to comply by severely restricting model availability.

California standards constrain the sale of E85 vehicles. See "Feasibility" This is due to the PZEV standard and the testing on worst case blend of fuel (E10). This is likely to require switching back to metal fuel tanks, which add weight and packaging issues. Also, SULEV tailpipe emissions are difficult at cold temperatures required by CARB. HC emissions exceed the standard before the catalyst is warmed up. The increasing level of PZEV and SULEV vehicles in CA conflict with the sale of E85 vehicles.

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by final vote of the MCCAG]

TLU-7. "Fix-it-First" Transportation Investment Policy and Practice

Policy Description

Prioritize state and federal transportation investments in

1) maintenance of existing roads, and in

2) new and expanded roads designed to serve higher density, more compact, pedestrian friendly development in priority growth areas (examples might include downtowns, town centers, regional centers, transit corridors, transit station areas, and others).

Significantly reduce investment in new roads and roadway expansion that accommodates/encourages low-density development and more and longer vehicle trips.

This strategy will increase trips by bicycling and walking and reduce the number and length of vehicle trips thus reducing emissions of GHGs. (Part of VMT reduction goal along with TLU strategies 1, 2, 5, 8, 9, 10)

Policy Design

Goals: Place a much higher priority on maintenance of existing roads. Strategically target roadway expansion dollars as described above. Expansion projects comprise approximately 40% (approx. $600 million) of $1.6 billion in transportation investments planned for 2008–2011 in the Twin Cities metropolitan area. (See metro Transportation Improvement Plan [TIP] document page 48).

[Review Statewide Transportation Improvement plan (STIP) to get dollar amounts and percentages for Greater Minnesota.]

Timing: Legislation drafted in 2008–2009 and adopted in 2009; changes in investments starting 2011 (federally required Transportation Improvement Program document with listed projects is already in place for 2008–2011). Need legislation adopted by 2009 that identifies goals, investments policies including targeted growth areas, implementation steps, etc.

Parties Involved: MNDOT, Local Units of Government, Metropolitan Council, Legislature, Developers, Business Community

Other: TBD

Related Policies/Programs in Place

Recent Actions in Minnesota:

- Regional highway plan in Metropolitan Council Transportation Policy Plan states that highway expansion investments are only considered after preservation and management investments have been funded.

Type(s) of GHG Reductions

Mostly CO_2

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by final vote of the MCCAG]

TLU-9. Workplace Tools to Encourage Carpooling, Bicycling, and Transit Ridership

Policy Description

Reduce emissions by offering commuter benefits at the workplace to increase the use of transit, ride-sharing and non-motorized transportation. Commuter benefits include: reducing the amount of free or subsidized parking; providing paid or pre-tax transit passes or mode-neutral transportation allowances, guaranteeing rides home for non-drive alones; providing bicycle parking and employee lockers, telecommuting programs, and converting employee ID cards to transit passes. Also, reduce emissions by requiring large employers (over 200 employees) to develop and implement "transit demand management" plans ("TDM") that customize commuter benefits and transit-supportive building design to specific building locations.

Policy Design

Goals:

Commuter Benefits

- All Minnesota non-rural employers over 200 employees located within an incorporated municipality offer Commuter Benefits (CB) programs
- All colleges and universities offer Commuter Benefits
- All government units offer Commuter Benefits, especially the state of Minnesota
- State adopts employee parking management and incentive programs to promote alternatives to drive alone (SOV) commuting.

Commuter Choice

- State establishes a public/private partnership to develop and run telecommuting centers that offer office-type services in locations close to commuters' residences.
- State would establish best practices in TDM, and assist employers of over 200 employees in developing and implementing TDM plans. (State is already committed to doing this in the Twin Cities Metro through Metro Transit and five transportation management organizations).

State Tax Credits for Employer-provided Commuter Benefits

- Expand the current Minnesota Employer Transit Pass tax credit to include more employers and more commuters (i.e. non-profit organizations and commuters that bike, carpool, or telecommute).

Timing: Implement by 2010.

Parties Involved: Metropolitan Council, Minnesota State College and University, University of Minnesota, other colleges, municipalities, transit providers, Transportation Management Organizations, employers, state legislature.

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Employee Discount Transit Passes: Metro Transit offers passes for regular route bus

service for sale to employers at a 30% special discount rate for their employees to promote mass transit and reduce both congestion and emissions in the Metro area. http://www.metrotransit.org/groupDiscProg/metroPass.asp

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [at MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [by the MCCAG]

TLU-11. Truck Stop Electrification and Other Anti-Idling Policies

Policy Description

Reduce idling-induced emissions from heavy-duty diesel trucks and buses by providing electrical hook-ups to power heating, cooling, and other needs while stopped.

- Reducing idling through education, access to loans to speed technology adoption, and other policies.

Policy Design

Currently available technologies, such as anti-idle equipment, newer and more efficient locomotive engines, and hybrid equipment can add significantly to engine owners' capital improvement costs. Smaller locomotive operators may lack capital to invest in these technologies even though future fuel savings would make them cost effective. Other added costs may not contribute to increased return on capital and thus may only be weighed as public priorities to the extent they are valued for their emission reduction potential. Likewise, investments in future technologies such as fully-electric equipment and electrified switch yards, require a distinct public commitment to funding emission reductions from hydrocarbon-based fuels.

Goals:

- Standardize the use of anti-idle equipment and best practices for locomotives. Increase the number of modern, more fuel efficient locomotives in service. Develop electrified rail support systems and hybrid or fully-electric locomotives.
    - Through the use of anti-idle equipment, reduce switcher locomotive idling by XX% and line-haul locomotive idling by XX%. *(Analysis/determination of percentages pending.)*

Timing: TBD

Parties Involved: TBD

Other: TBD

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Idle Reduction Program: The MPCA, in cooperation with the U.S. EPA, offers loans to help small trucking companies pay for idle reduction devices such as auxiliary power units. This equipment can reduce fuel consumption by 75%, which conserves resources, helps achieve energy independence, and reduces the emissions that contribute to soot and smog. During 2006,

30 loans were issued ranging from $7,500 to a maximum of $50,000. http://www.pca.state.mn.us/programs/sbomb_loan.html

Type(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [blank until MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

TLU-12. Voluntary Mobile Source Emissions Reduction programs

Policy Description

Support ongoing and new voluntary reduction options to achieve immediate and direct emissions reduction from mobile sources that can be done without legislation or regulation (e.g., Project Green Fleet school bus retrofit). This will bolster prior investments of local, state and federal governments in Minnesota and leverage significant federal, private and foundation support.

Mobile source emission-reduction options gained greater relevance to climate change with the release of a study recently in the journal *Nature.* The study points out the significance of ground-level ozone levels to climate change improvement activities. Mobile sources are one of the primary sources of ground-level ozone precursors. According to the study, "Ozone could be twice as important as we previously thought as a driver of climate change." The study reports that "ozone near the ground damages plants, reducing their ability to mop up carbon dioxide from the atmosphere."

From a health-risk perspective, the MPCA calculates that more than half of the elevated risk of cancer from toxic air pollutants comes from mobile sources.

Policy Design

Goals: *Double,* at a minimum, the quantifiable emission reductions from voluntary projects, relative to the baseline; increase the number of partners and funders for projects.

Timing: Immediate; many of these projects are ongoing and will be expanded in the near future.

Parties Involved: Minnesota Environmental Initiative (Project Green Fleet and Clean Air Minnesota) and multiple public and private funders and partners; Minnesota Trucking Association; Minnesota Chamber of Commerce; Minnesota Center for Environmental Advocacy; GE Fleet Services; MPCA; US EPA; Hennepin County

Other: None cited.

Implementation Mechanisms

1. For existing programs (for example, Project Green Fleet), develop additional funding sources.

2. For new programs (to expand into climate-targeted investments) create a methodology, a source of funds, and identify a state-sponsored liaison organization for business fleet operators implementing voluntary mobile source emission reduction programs.[22] This program would include projects that focus on passenger cars as well as light, medium, and heavy-duty trucks.

[22] Due to the nature of mobile combustion, this will include both GHG emissions as well as criteria pollutants.

Methodology: Create a standard methodology to establish baseline processes (CO2e modeling), selection criteria, emissions reporting standards, and additionality requirements for mobile source emission reduction plans.

Use of funds: These programs would help fund the purchase of lower-emitting fleet vehicles, such as HEVs, as well as investments in aftermarket technology such as diesel retrofits, PHEV conversions, and APUs.

State Liaison: Create a set of standards to administer funding program. Management would include application and selection process for grants as well as recognition programs and best practices.

Related Policies/Programs in Place

Project Green Fleet (PGF) is the primary Minnesota collaborative for voluntary, diesel and mobile source emission-reduction projects. PGF currently works with dozens of school districts, the Minnesota Pollution Control Agency (MPCA), the Minnesota Departments of Health and Education, Laidlaw, First Student, bus operator associations, tribes, private school bus and diesel fleet owners, and units of local government.

PGF will have done the following retrofits by the end of 2007:
-more than 500 school buses statewide
-41 heavy-duty trucks
-10 transit buses

PGF uses only EPA and/or CARB verified technology. Depending upon the combination, each retrofit will guarantee a minimum emission reduction of between 25% and 50%, depending upon the pollutant.

Type(s) of GHG Reductions

With the equipment used in PGF, for every 100 buses retrofitted the estimated emission reductions are: CO 860 lbs., PM2.5 120 lbs., and VOCs 620 lbs. The emission and exposure reductions will be tracked over at least a five-year period. (Source: Minnesota Environmental Initiative)

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

Key Uncertainties

None cited.

Additional Benefits and Costs

Estimates indicate that PGF's early efforts will directly reduce emissions exposure for approximately 30,000 school children statewide. Given the goal in this Option of doubling current programs, would reduce direct emissions exposure for another 30,000 school children.

If Minnesota continues to experience poor air quality, it could be designated as a non-attainment area for ground-level ozone or fine particulate matter. A 1998 Minnesota Chamber of Commerce study estimates that it would cost Minnesota businesses $189 to $266 million annually to comply with regulatory requirements associated with non-attainment for ground level ozone. Other significant restrictions, such as loss of federal transportation funding and limits on expansion, affect businesses in non-attainment regions. This program will help Minnesota avoid that designation.

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [blank until MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

TLU-13. Reduce Maximum Speed Limits

Policy Description

Reduce maximum speed limits on highways in Minnesota to improve fuel economy and reduce GHG emissions per mile traveled.

Policy Design

Goals: Reduce maximum speed limit on urban interstates to 55 mph (from 65 mph today) and to 60 mph on rural interstates (from 70 mph today). Speed limits will be 55 on highways not specified by statute (same as today). This strategy reduces GHG emissions per mile traveled but does not reduce vehicle miles traveled.

Timing: Change law during 2008 legislative session with an effective date of January 1, 2009 so that there is enough time to educate the public about the change.

Parties Involved: Highway users, Minnesota Department of Transportation, Minnesota State Patrol, local law enforcement

Other: TBD

Notes: The speed a vehicle is driven has a major impact on fuel economy. While each vehicle reaches its optimal fuel economy at a different speed (or range of speeds), gas mileage usually decreases rapidly at speeds above 55-60 mph.

Implementation Mechanisms

[Note: Enforcement may be better to discuss under "Implementation Mechanisms".]

Related Policies/Programs in Place

TBD

Type(s) of GHG Reductions

Primarily CO_2.

Estimated GHG Reductions and Net Costs or Cost Savings

Quantification Methods:

Calculate difference in fuel and time from:

Diesels:	70 mph at ~6 mpg to	60 mph at ~7 mpg.
Gasoline vehicles:	70 mph at ~26 mpg to	60 mph at ~30 mpg.

Value for the cost of time:

Diesels: $25.53

Gasoline vehicles: $14.76/hr

Basis: National after-tax wage rate.

Data Sources:

U.S. Department of Labor, Bureau of Labor Statistics, "Establishment Data; Hours and Earnings," Table B-14 and "Employer Costs for Employee Compensation-December 2005," Table 10.

U.S. Environmental Protection Agency, Office of Transportation and Air Quality, Smartway Transport Partnership, "A Glance at Clean Freight Strategies: Reducing Highway Speed," EPA420-F-04-007, February 2004.

U.S. Environmental Protection Agency, Office of Transportation and Air Quality, MOBILE6 model, documented in "User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model," EPA420-R-03-010, August 2003.

Ang-Olson, Jeffrey and William Schroeer, "Energy Efficiency Strategies for Freight Trucking: Potential Impact on Fuel Use and Greenhouse Gas Emissions," *Transportation Research Record 1815*, Transportation Research Board of the National Academy of Sciences, Washington, DC, 2002.

Quantification Methods:

Fuel Savings: The diesel fuel consumption from Class 8 diesel trucks was multiplied by 60 (low) or 80 (high) percent to account for the amount of fuel consumed at speeds above 60 mph from 2008 through 2014. Starting in 2015, the speed for Class 8 trucks was reduced to 55 mph. This fuel consumption was then multiplied by 50 percent to account for the expected penetration rate of this measure. This quantity was then multiplied by the percentage increase in fuel economy. The ratio of reduction in fuel consumption was then multiplied by the baseline CO2 emissions to estimate the reduction in CO2 from this measure. Fuel cost savings were calculated by multiplying the per unit fuel cost by the number of gallons reduced.

Increased Driving Time: This was estimated as the product of the increased time required for traveling the same distances at 60 mph (prior to 2015) or 55 mph (2015 and later) rather than 70 mph multiplied by the hourly trucking industry cost.

Same process for automobiles.

Key Assumptions: 60 to 80 percent of Class 8 diesel truck travel (fuel consumption) is spent at speeds above 60 mph, assumed to be at 70 mph on average. 50 percent of this truck travel is assumed to be reduced to 60 mph or 55 mph (Ang-Olson and Schroeer).

Each one mile per hour reduction of speed from 70 mph to 55 mph yields a fuel economy increase of 0.1 miles per gallon (EPA) for heavy-duty diesel trucks.

Average hourly truck transportation wage is $17.22/hour (BLS), with an industry average overhead rate of 1.48 (BLS).

Base fuel economy assumed to be 6.42 mpg (EPA MOBILE6 model); assumed to increase to 7.42 mph with this measure.

Key Uncertainties

The ability to enforce a speed limit significantly lower than current policy is uncertain.

Additional Benefits and Costs

A significant additional benefit of lowering speed limits is reduced injuries and fatalities. The Canada Safety Council writes on its web site, that "As speed increases over 100 km/h,(60 mph) the fatality rate of vehicle occupants goes up exponentially. For example, the chances of being killed in a vehicle traveling at 120 km/h (72 mph) are four times higher than at 100 km/h." (60 mph).

The same web site also notes that "A recent study examined the impact of higher travel speeds on US rural interstates after the repeal in November 1995 of the national speed limit. Researchers found states that had increased their speed limits to 75 mph (120 km/h) experienced a shocking 38 per cent increase in deaths per million vehicle miles than expected, compared to deaths in those states that did not change their speed limits. States that increased speed limits to 70 mph (112 km/h) showed a 35% increase in fatalities."

Feasibility Issues

TBD

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

Level of Group Support

TBD – [blank until MCCAG meeting #6 or #7]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

TLU-14 Freight Mode Shifts: Intermodal and Rail

Policy Description

Develop public/private partnerships to support mode shifts to rail, and decrease truck VMT relative to the baseline.

Transportation of freight by railroad generally results in less fuel use and GHG emissions than transportation by truck. This option would support the expansion of intermodal rail service for Minnesota shippers through public/private partnerships. In addition, the state would strive to increase the competitiveness of rail rates for all Minnesota shippers.

Policy Design

Improved rail service and the ability of the rail system to meet future demand *implicitly* leads to system-wide greenhouse gas reductions by shifting projected freight and passengers to rail or by preventing a shift to a less efficient mode. Improvements to the rail system or associated equipment can also have *direct* impacts on greenhouse gas emissions. Locomotive idling produces significant emissions and can be mitigated by reducing system congestion and choke points and by using improved technology.

Goals

- Decrease inefficiencies and limitations in the existing MN rail network and increase overall capacity by reducing system congestion, bottlenecks, and chokepoints.
- Prevent modal shift of freight from rail to truck due to lack of capacity. Maximize the amount of freight that can be moved by rail in order to sustain projected growth in domestic and international goods movement in the State.

Timing: See goals above.

Parties Involved: MnDOT, railroads, private freight companies

Implementation Mechanisms

- Incentivize trucks to get involved in EPA's SmartWay Transport Partnerhsip: http://www.epa.gov/smartway/

- Incentivize increased freight on trucks to reduce emissions without serious cost impacts on freight.

Related Policies/Programs in Place

Minnesota has a Freight Advisory Committee.

Types(s) of GHG Reductions

By reducing heavy-duty truck travel, this option would primarily reduce CO_2 emissions.

Estimated GHG Savings and Costs per $MtCO_2e$

TBD

Key Uncertainties

The success of this strategy depends on sufficient shipper demand and willingness of the railroads to provide intermodal service.

Additional Benefits and Costs

By shifting freight from truck to rail, this option could result in small additional benefits related to highway congestion and highway safety.

Feasibility Issues

As noted above, the success of this strategy depends on sufficient shipper demand and willingness of the railroads to provide intermodal service. These factors are largely outside government control.

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD