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**DRAFT**

**Transportation and Land Use Sector**

**Brief Descriptions of Potential State Actions**

**TLU-1 PASSENGER VEHICLE GHG EMISSION RATES**

**TLU-1.1 VEHICLE TECHNOLOGY**

**1.1.1 Tailpipe GHG Emission Standards**

Tailpipe emissions standards are also known as the “Pavley” standards or the California GHG Emissions Standards. These standards can be adopted to reduce GHG emissions from new light-duty vehicles. New cars and light trucks in all states must comply with federal emission standards, and, generally speaking, states have the choice of adopting a stronger set of standards applicable in California. The standards require manufacturers to meet a declining fleet-wide average standard for GHG emissions per mile. A state can also include other smog- and soot-forming pollutants in this plan. If the California standards are made more stringent, Minnesota could adopt these as well.

This option could also involve state action to encourage an increase in the federal Corporate Average Fuel Economy (CAFE) standards for light duty vehicles. King County’s “Cool Counties” recommendation for the National Association of Counties recommends a 35 mpg standard for CAFE. The state could adopt a similar recommendation.

Adopting the California standards could potentially conflict with Minnesota’s ethanol policy. Flex fuel (E85) vehicles are more of a problem because they have not been certified for the California standard, but with the number of other states adopting this standard, certification will likely be completed before the standards roll in. Fourteen states (WA, OR, CA, AZ, NM, PA, NY, VT, ME, MA, RI, CT, NJ, MD) are poised to adopt the California tailpipe greenhouse gas standard, representing 25% of the national fleet.

This option has been a top recommendation in many other states because of high greenhouse gas reductions and the payback to consumers with the reduction in fuel use. There was discussion about a high impact ranking and low cost ranking, in part due to the costs of new technology and purchasing the vehicles.

### 1.1.2 ZEV/LEV-2 Implementation

California's Low Emissions Vehicle (LEV) II regulations set fleet average emissions standards to be achieved by 2010 and establish testing procedures for vehicles. The program extends passenger car emissions standards to sport utility vehicles and pickup trucks and tightens overall emissions standards. The program regulates smog and ozone-forming air pollutants.

LEV II requires manufacturers to produce a minimum percentage of Zero Emissions Vehicles (ZEV), or a commensurate amount of near-zero emissions vehicles, per year. These vehicle types include electric, hybrid-electric, and alternative fuel vehicles, which have lower GHG emissions than traditional vehicle types.

Other states have the option of adopting and implementing California's LEV II standards, which are stricter than federal emissions standards. If Minnesota adopts the LEV II standards, it could also adopt the ZEV requirement.

There is the potential for fuel economy benefits, but the impact can vary depending on how the emissions reduction is met. It is likely to have a minor impact on greenhouse gas emissions.

### 1.1.3 R&D on Low-GHG Vehicle Technology (e.g., fuel cell)

The state could support research and development of low-GHG vehicle technology to encourage technological innovation in the field.

Research and development could help bring alternative technology into mass production, even if the technology currently exists. Could support 1.1.1.

**MN Action:** University of Minnesota and Council (Transit) research on auxiliary power options to minimize idling.

### 1.1.4 Add-on Technologies

Add on technologies can be made to passenger vehicles to improve fuel efficiency, such as low friction oil or low-resistance tires (fuel efficient tires). Fuel-efficient tires may also be referred to as low rolling resistance tires. Fuel economy can be improved on light-duty vehicles by setting minimum energy efficiency standards for replacement tires. Typically, energy efficient tires are used on new models. But lower rolling resistant replacement tires may not be readily available to consumers and there is little information regarding the fuel economy of replacement tires.

Retrofit technologies are options for the current fleet, in contrast to the options that aim at new vehicles only.

## **TLU-1.2 VEHICLE OPERATION**

### **1.2.1 Lower and/or Enforce Speed Limits**

Reduced vehicle speeds improve fuel economy, reduce CO<sub>2</sub> emissions, and improve safety. Would require significant enforcement resources.

Efficiency benefits from higher speed limits are lost by an increase in traffic, due to ease of driving. Option title was changed from “enforce speed limits.”

**MN Action:** Stricter enforcement of traffic ordinances is a strategy in the adopted regional Transportation Control Plan for controlling CO emissions.

### **1.2.2 Vehicle Maintenance and Driver Training**

Better consumer information and education can lead to a gain in fuel efficiency. Consumer education could promote the use of “best in class” vehicle guides that provide comparative fuel efficiency information and associated vehicle GHG emissions. Drivers also need to be aware of maintenance issues (tire inflation, etc.) that cause an increase in pollution and vehicle operating cost. Education to encourage energy-efficient driving.

### **1.2.3 Transportation System Management**

The transportation system can be managed to increase soft capacity by increasing efficiency of the system.

Transportation system management improves vehicle flow on the roadway system, which can reduce fuel use and GHG emissions. Coordinated operation of the regional transportation network can improve system efficiency, reliability, and safety. Tools to reduce traffic congestion include HOV lanes, roundabouts at intersections, synchronized signals, incident management, variable message signs, and other forms of intelligent transportation systems (ITS).

**MN Action:** Minnesota has taken extensive action to manage the metro transportation system and will begin using satellite technology. 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.

## **T-1.3 INCENTIVES & DISINCENTIVES**

### **1.3.1 Procurement of Efficient Fleet Vehicles**

Governments can mandate that public and private vehicle fleets include alternative fuel vehicles, typically targeting a certain percentage of penetration within a certain period of time. These mandates could be used to require pure electric vehicles and/or plug-in electric vehicles for fleets.

Depending on option definition, could include taxis.

Business fleets may have incentives to bring alternative technology into the fleet, following quantification and monitoring protocols from The Climate Registry, or similar programs.

### **1.3.2 Feebates (state specific or regional)**

Feebates offer financial incentives to purchase efficient vehicles with a rebate and disincentives to purchase inefficient vehicles with a fee.

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 registration fees, feebates, and/or tax credits. “Feebates” would provide incentives for reduced GHG emissions by creating: (1) fees on relatively high emissions/lower fuel economy vehicles and (2) rebates or tax credits on low emissions/higher fuel economy vehicles.

### **1.3.3 CO<sub>2</sub>-Based Registration Fees**

The state could adopt a variety of programs to increase purchase of low-GHG vehicles. State incentives could include registration fees, feebates, and/or tax credits. Higher vehicle registration fees can be charged for vehicles that have lower GHG emissions.

### **1.3.4 Tax Credits for Efficient Vehicles**

Tax credits can be offered for the first time purchase of low-GHG emission vehicles.

### **1.3.5 Vehicle Scrappage**

Emissions can be reduced from vehicles by developing and implementing an incentives program to accelerate the replacement and/or retirement of passenger vehicles with poor fuel economy. Scrappage can increase the turnover rate of the fleet, speeding the penetration of more new, and efficient vehicles. Because of the energy input required for manufacture of new vehicles, keeping low-GHG emitters in the fleet longer will provide benefits if well maintained. The cost of scrappage is high; however, the impacts may be greater on criteria pollutants than greenhouse

gas emissions. Scrappage needs to be defined to ensure that vehicles are not sent to other places, but removed from the system. Minnesota has a higher turnover rate than many states because of our weather, but we also drive older cars.

### 1.3.6 Pupil Transportation

Primarily school buses. This option may overlap with heavy-duty vehicle policies. Retrofits have been done for criteria pollutants, but have carbon dioxide co-benefits.

## TLU-2 LAND USE AND LOCATION EFFICIENCY

### TLU-2.1 GENERAL

#### 2.1.1 Infill and Brownfield Development

Residential and commercial development on infill typically results in less vehicle travel and emission as compared to development on lower density exurban or “greenfield” locations. Households and workers in areas with higher density and mixed uses typically take shorter trips and have more alternatives to automobile travel. “Brownfields” are one type of infill location – commercial or industrial properties that are abandoned or are not being fully used because of actual or perceived environmental contamination.

**MN Action:** Metropolitan Livable Communities Program Tax Base Revitalization Account grants have funded projects throughout 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 where costly infrastructure is already in place.

#### 2.1.2 Transit-Oriented Development

Transit oriented development enables shifts to lower emitting transportation modes by building compact, mixed-use development clustered around transit stops. This option would promote transit oriented development through incentives and/or regulation. Governments could require that planning/zoning for transit oriented development accompany new high capacity transit investments.

**MN Action:** Metropolitan Livable Communities Program 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. Many projects served by bus and LRT infrastructure have been funded.

Minnesota Housing has a priority for housing development located near transportation, including regional and interregional transportation corridors and transit-ways.

### 2.1.3 Smart Growth Planning, Modeling and Tools

Plan for the orderly and economical development of the metropolitan region and manage growth in a way that ensures efficient delivery of regional services. Under state law all metropolitan area communities must prepare local comprehensive plans that are consistent with regional plans.

**MN Action:** The MC's *2030 Regional Development Framework* and the policy plans that implement it are intended to help accommodate the region's growth in an orderly, efficient manner and guide the expansion of four regional systems: transportation; aviation; water resources (inc. wastewater collection and treatment) and regional parks and open space.

Minnesota Housing has a priority for housing development in proximity to existing development and services, protecting environmental resources and promoting compact development.

### 2.1.4 Targeted Open Space Protection

Targeted open space protection includes programs designed to protect and conserve State lands and other open spaces, and develop and improve neighborhood, community, and regional parks in ways that encourage location-efficient growth and broader mode choice. This option could also include policies to discourage the expansion of urban growth areas or urban growth boundaries. Policies that increase the value of rural resource lands for agricultural or forestry uses to serve local markets can promote these objectives.

Open space protection complements infill, but also may contribute to pushing developments further out; this is difficult to quantify.

**MN Action:** Some counties have sold bonds to protect open spaces. MC plans to increase regional park and open space system from 53,000 acres to 80,000 acres.

Minnesota Housing supports new development that is not located near wetlands, steep slopes, critical habitat, or on prime farmland or park land.

### 2.1.5 Priority Areas Designated for Planned Growth

The State of Minnesota could designate planned growth areas that will receive priority in all forms of state funding programs. In order to qualify, the areas must have land use plans and regulations in effect that provide for certain levels of compact, mixed use forms of development, adequate transit choices, and natural area protection. More efficient development patterns reduce VMT and help conserve natural resource land and natural areas. This strategy aims to limit the urban growth areas while increasing residential density. Residents living in neighborhoods with higher population density tend to drive less than those living in lower density neighborhoods. This is a result of both shorter trips (because housing and commercial uses are in closer proximity to one another in higher density neighborhoods) and use of alternative travel models (because higher density neighborhoods tend to offer better walking, bicycling, and transit

options). Governments can promote increases in residential density through a number of planning activities, incentives, and/or regulatory changes.

### **2.1.6 Comprehensive Planning to Include Emissions Inventory**

The state would require local governments to adopt a schedule for VMT and/or GHG emission reductions as part of the comprehensive planning process. In preparing comprehensive plans, communities should be required to inventory their existing greenhouse gas emissions, account for additions or reductions in greenhouse gas emissions resulting from the changes proposed in the plans, and identify strategies to offset additional emissions and/or to meet emission reduction goals. Local governments would be provided with guidance for achieving these goals. This option would ensure that local government planning decisions are consistent with VMT and/or GHGs reductions to which they have committed. This option would complement a state VMT reduction plan, which would commit the state to development of a plan/schedule to gradually reduce per capita VMT.

### **2.1.7 Environmental Review**

In all levels of environmental review, the party charged with assessing the potential for substantial adverse environmental impacts should be required to inventory the changes to greenhouse gas emissions that will result from the project or plan and identify strategies that will be undertaken to offset all net new emissions or to help meet state or regional goals.

### **2.1.8 Affordable Housing**

Meet State and Regional needs for Affordable Housing by increased housing and employment density and location near transportation systems and jobs available to low and moderate income workers. The state could encourage or require local governments to designate centers for employment and housing, and then encourage or require that new infrastructure planning and investments reflect these growth nodes. This option would need to account for the fact that people are living farther from places of employment, which can lead to an increase in VMT per capita. Promoting employment centers near residential growth, as well as company-sponsored transit options, are strategies for responding to the job/housing imbalance.

Estimated Climate Change Emission Reductions (in Million Metric Tons CO<sub>2</sub> Equivalent) for Land Use and Transportation: California: 2010: 5.5 and 2020: 18, Arizona: 2010: 3.1 and 2020: 14.5. These examples are based on a Minnesota Housing Staff review of the Center for Climate Strategies website.

The California Climate Change Emission Reductions are estimates and determined for a broader land use and transportation category. Such strategies incorporate promoting jobs/housing proximity and transit oriented development; encouraging high-density residential/commercial development along transit/rail corridor and implementing intelligent transportation systems.

California estimates Smart Land Use and Intelligent Transportation “would minimize the need for major capital improvements and can provide a host of benefits including more livable communities, transportation energy efficiency, lower emissions from mobile sources, and a lower-cost provision of public services (e.g. water, sewer).” California Environmental Protection Agency, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006 (pages 57-59).

The Arizona Green house Gases reductions are estimates and determined for a broader land use and transportation category. Arizona recommends a smart growth bundle of options to reduce green house gases emissions driven by land use practices and policies. The options include: infill, increased density and Brownfield development; transit oriented development; smart growth, and targeted open space protection. The Arizona policy recommendations “result not only in the significant emissions and cost savings, but offer a host of additional benefits as well,” including: reduced local air pollution, more livable healthy communities and economic development and job growth from in-state bio-fuel production. Arizona Department of Environmental Quality, Arizona Climate Change Advisory Group, Climate Change Action Plan, Report to Governor Napolitano, August 2006 (pages 67-76).

By 2020 vehicle miles traveled are forecasted by the EPA to grow by 30% if current growth trends continue. The annual costs of air pollution in the 19 county Twin Cities area were estimated at slightly less than \$1000 per vehicle by the University of Minnesota’s Center for Transportation Studies. If current development trends continue, Minnesotans for an Energy Efficient Economy (ME3) estimate that the increased environmental costs from more vehicle miles traveled will reach over \$106 million annually. Metropolitan Council Directions Newsletter, “Region meets many benchmarks for growth, environment,” November, 2006 and The Full Cost of Transportation in the Twin Cities Region, Transportation and Regional Growth Study, Center for Transportation Studies, University of Minnesota , August 2000.

## **TLU-2.2 INCREASING LOW-GHG TRAVEL OPTIONS**

### **2.2.1 Make Full Use of CMAQ Funds**

Congestion Mitigation and Air Quality (CMAQ) funds could be prioritized for greenhouse gas reduction projects. Funds are limited in amount and the regions where they may be used. Flex dollars may be an alternative option.

**MN Action:** The Met Council has fully allocated all CMAQ funding since 1991. The MC/TAB programmed \$181 million in CMAQ funds for transit expansion projects and \$53 million for transportation demand and system management since the beginning of the program, which are prioritized based on CO, NOx and VOC reduction. The MC expects to program \$52 million in CMAQ funding in the 2007 solicitation.

### **2.2.2 Improve Existing Transit Service**

Greater use of public transit and reduction in automobile travel can be achieved by improving existing transit service (e.g., expanded hours or coverage of bus service, higher frequency bus

routes. This option also could include expansion of intercity bus service. Use of MNDOT data on travel origins and destinations could help determine if there are intercity regional routes that need prioritization.

### 2.2.3 Transit Marketing, Promotion, and Pricing Incentives

Greater use of public transit and reduction in automobile travel can be achieved by enhanced promotion and marking of transit, or through reduction in transit fares.

### 2.2.4 Bike and Pedestrian Infrastructure Improvements

Improving, adding, and promoting sidewalks and bikeways can increase the pedestrian and bicycle activity and reduce automobile use. Infrastructure improvements could include bicycle parking and shower/locker amenities at places of employment. Local government “complete streets” policies would help to achieve these improvements.

**MN Action:** The DNR trails and waterways program is expanding metro trails. Consideration to Minnesota’s climate may be important. Met Council has fully allocated most Enhancement funds to bicycle/pedestrian infrastructure and has a stand-alone STP funding category for infrastructure for bicycle commuting. MC/TAB programmed \$95.6 million in Enhancement and STP funds since 1992. Transit for Livable Communities is implementing a \$25 million federal pilot program for bicycling/walking. This year the MC expects to program \$16 million in Enhancements funding and \$92 million in STP funding, a portion of which will go toward bicycle commute infrastructure in the 2007 solicitation.

### 2.2.5 Expand Transit Infrastructure

Greater use of public transit and reduction in automobile travel can be achieved by expanding public transit infrastructure (e.g., rail lines, bus rapid transit routes). This option also could include expansion of intercity bus service. Use of MNDOT data on travel origins and destinations could help determine if there are intercity regional routes that need prioritization.

This option could be broken into two section – endorsing the commitment to transit and making funding available.

**MN Action:** MC has a goal of doubling transit capacity by 2030 and increasing it by 50% by 2020. Improvements in clued additions of LRT, commuter rail, BRT and increased regular bus route service to reach this goal. In 2006 Minnesota voters approved a constitutional amendment requiring dedication of motor vehicle sales tax funds to transit which will result in increased funding.

### 2.2.6 HOV Lanes

High Occupancy vehicle (HOV) lanes can be added. They may also be opened to low greenhouse gas emissions vehicles.

**MN Action:** MC region has 2 HOV lanes (I-394 and I-35W). I-394 is a HOT lane which allows SOV's to use the HOV lane for a fee. MC and MNDOT are working on a HOT lane study; construction of I-35W/62 Crosstown commons section beginning this year. MOU between MC and MNDOT to consider additional HOT lanes in future highway improvements.

### 2.2.7 "Fix it First"

Fix-it-first is a policy that funds expansion only after existing infrastructure has been repaired and maintained.

**MN Action:** Regional highway plan in MC Transportation Policy Plan states that highway expansion investments are only considered after preservation and management investments have been funded.

### 2.2.8 Transit Prioritization

Improve transit travel time through prioritization measures such as signal prioritization or HOV lanes.

**MN Action:** Minnesota has an extensive bus shoulder system and the Hiawatha Line has signal prioritization. Buses travel in HOV/HOT lanes on I-394 and I-35W. The region has 358.46 miles of bus shoulder lanes allowing buses to bypass congestion.

### 2.2.9 Telecommute and Live-Near-Your-Work

The state could encourage employers to provide options such as telecommuting to reduce automobile commutes. The telecommuting option includes the development and utilization of neighborhood telecommuting centers that offer office-type services in locations close to commuters' residences. As an incentive to develop and provide such services, a tax credit can be offered to companies. The state could also ensure adequate telecommunications infrastructure is in place to allow for telecommuting.

Surveys of residents in counties surrounding the metro area show that high speed internet is needed and desired. Considering the growth of these areas, expanding internet will give the option to telecommute and decrease long commutes.

### 2.2.10 Car sharing

Car sharing provides financial incentives to minimize driving and encourages the use of alternative travel modes.

**MN Action:** The metro area has two car sharing programs (HourCar and ZipCar), but they could be expanded or otherwise promoted.

### 2.2.12 E-Commerce

Light-duty vehicle trip reductions may be achieved through the use of e-commerce instead of traditional means of shopping involving passenger vehicle travel.

Data mixed on whether there is a benefit from the tradeoff from multiple vehicle trips to multiple truck deliveries.

### 2.2.13 Road Standards

The standards for roads should be changed to reduce stop-and-start movements and to improve the multimodal use of rights-of-way. This would entail reducing some speeds, the use of roundabouts, and aspects of the ‘Complete Streets’ campaign.

### 2.2.14 Surface Transportation Program

In addition to making full use of CMAQ, MNDOT and the Metropolitan Council should flex a substantial portion of the funding they receive through the Surface Transportation Program from highways to transit.

### 2.2.15 Expand Transit Use

For-profit corporations are eligible for a 30% income tax credit for funds expended to subsidize transit fares for their employees through marketing plans such as the Metropolitan Council’s Metropass Program. Non-profits should be allowed to similarly benefit for helping to subsidize their employees’ use of transit.

## TLU-2.3 INCENTIVE AND DISINCENTIVES

### 2.3.1 Commuter Choice Programs / Parking Cash Out

Commuter Choice Programs encourage employers to provide options such as telecommuting, transit subsidies, pre-tax transit fare program, parking cash-out, and guaranteed ride-home service in order to reduce automobile commutes. The telecommuting option includes the development and utilization of neighborhood telecommuting centers that offer office-type

services in locations close to commuters' residences. As an incentive to develop and provide such services, a tax credit can be offered to companies. Government spending to encourage commuter choice can stimulate a large private-sector match (17 dollars of private incentives per dollar of public incentive, according to one source).

### 2.3.3 VMT Tax

The state would charge a tax reflective of miles traveled by passenger vehicles. In addition, revenues could be used to fund transit and other transportation alternatives within a corridor or region.

**MN Action:** MNDOT currently studying this finance mechanism.

### 2.3.3 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 regulatory barriers. King County has a significant demonstration underway, and if the pilot will have any meaning for how it can be replicated, it will need support from the state.

### 2.3.4 Increase Motor Fuel Taxes

Increasing the state tax on conventional fuels can reduce fuel consumption and GHG emissions. In addition, revenues could be used to fund transit and other transportation alternatives within a corridor or region. Currently funds, must be for a highway purpose, but could be redefined in law.

### 2.3.5 Location-Efficient Mortgages

The state could encourage and support mortgage providers to establish a lending program that reflects transportation cost savings of living near transportation oriented developments (from not owning or frequently using a car) in what potential homeowners can borrow.

### 2.3.6 Congestion Pricing

Roadway tolling can be used to manage congestion and provide revenue for alternative modes. Various forms of VMT-based user fees can also help to discourage unnecessary automobile use. Roadway pricing revenues can help fund needed highway improvements and help manage system-wide demand. In addition, pricing revenues can be used to fund transit and other transportation alternatives within a corridor or region.

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

### 2.3.7 Parking Pricing or Supply Management

Automobile use is strongly influenced by the location, supply, and pricing of parking. Local governments can encourage reduction in automobile use by eliminating minimum parking supply requirements, establishing parking supply caps, encouraging higher parking prices, and other mechanisms. Parking ratios for the maximum number of spaces allowed can be set based on the level of transit service an area has. Smart parking ID systems can help inform drivers of parking availability and reduce excessive circling and searching.

**MN Action:** MC studied these 5 years ago.

### 2.3.8 Transit Repositioning

Greater use of public transit and reduction in automobile travel can be achieved by improving public opinion of transit service and repositioning it as an attractive transportation option.

### 2.3.9 Transit Pricing Incentives

This option would include various incentives that give discretionary travelers reasons to choose transit. This could include reduced fares (for populations, like seniors, or time-based, such as off-peak) or offer discounts.

**MN Action:** Metropass program is an employer-based transit incentive program.

### 2.3.10 VMT/GHG Offset Requirements for Large Developments

This option would require the identification of GHG emissions and mitigation measures as part of the environmental review process for large developments. In all levels of environmental review, the party charged with assessing the potential for substantial adverse environmental impacts should be required to inventory the changes to greenhouse gas emissions that will result from the project or plan and identify strategies that will be undertaken to offset all net new emissions or to help meet state or regional emission goals. Emissions from automobiles, freight trucks, and heavy machinery during development can be offset by a plan that reduces emissions. These offsets can include preserving open spaces and converting to alternative fuel energy sources, for example. Additionally, mitigation requirements could involve the use of a one-to-one VMT reduction measure for large developments, whereby developers would be required to invest in strategies that would reduce VMT by the amount expected to be created by a large new development.

### 2.3.11 Benefits for Low GHG Vehicles

Incentives can be offered to drivers of low-GHG vehicles. Depending on effectiveness, these could include preferential vehicle access to metered parking spaces or HOV lines.

## TLU-2.4 FUEL MEASURES

### Intro

There are essentially three stages in the fuel life cycle that concern us: production, distribution, and sales/consumption. A given policy option typically attempts to affect decisions at one of these stages. Speaking broadly:

2.4.3, Biofuel expansion, could (depending on how finally defined) attempt to reduce CO<sub>2</sub> by increasing the production of certain types of fuels through a production credit or incentive.

2.4.1, the Low-GHG Fuel Standard, would typically be implemented at the distributor level, and influence the fuels bought by distributors. 2.4.4, Fuel infrastructure development, would support that process.

On the consumption end, 2.4.3, Biofuel expansion, could (again, depending on how finally defined) attempt to reduce CO<sub>2</sub> by setting consumption incentives, credits, and/or goals.

The impacts and costs in this section are difficult to quantify until specifics have been defined.

### 2.4.1 Low-GHG Fuel Standard

This option seeks to reduce GHG emissions by decreasing the carbon intensity of all passenger vehicle fuels sold in Minnesota. The Low Carbon Fuel Standard (LCFS) would require all fuel providers in the state to ensure the mix of fuel they sell into the state market meet, on average, a declining standard for GHG emissions measured in CO<sub>2</sub> equivalent gram per unit of fuel energy sold. The State should regulate quality standards for low carbon fuels. Low carbon fuels include, but are not limited to, biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, electricity, and low carbon blends such as E10 or E85.

The standard would be measured on a lifecycle basis in order to include all emissions from fuel production to consumption. Options for compliance may include: blending or selling increasing amounts of lower carbon fuels, using previously banked credits, and purchasing credits from fuel providers who earned credits by exceeding the standard.

This option could also promote R&D related to biofuels production, such as the use of enzymes for breaking down cellulose to produce ethanol (as opposed to corn-based ethanol, which has a lower life cycle benefit).

**MN Action:** 2% Biodiesel and ULSD already mandated and being used.

### 2.4.2 Low-GHG for State Fleets

Governments can mandate that public vehicle fleets include alternative fuel vehicles, typically targeting a certain percentage of penetration within a certain period of time. These mandates could be used to require pure electric vehicles and/or plug-in electric vehicles for fleets.

**MN Action:** 2% Biodiesel and ULSD already mandated and being used.

### 2.4.3 Biofuel Expansion

The state can adopt standards that require a certain amount or percentage of fuel sold within the state to be a renewable fuel (e.g., ethanol or biodiesel). This percentage can gradually increase over time. The State can help facilitate transition to renewable fuels by regulating quality standards for fuel blends.

This option could also promote R&D related to biofuels production, such as the use of enzymes for breaking down cellulose to produce ethanol (as opposed to corn-based ethanol, which has a lower life cycle benefit).

**MN Action:** Metro Mobility uses the highest level of biofuel allowable by operating conditions and vehicle manufacturers:

- B5 used by Metro Transit
- Testing B20
- Considering use of B10 by mid-2007 pending B20 test results.
- 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 – 2020.

### 2.4.4 Alternative Fuel Infrastructure Developments

The development of an alternative fuel infrastructure can aid in the promotion of alternative fuel usage. The expense of equipment and installation costs can be offset by creating an infrastructure. The convenient locations of stations offering alternative fuels at competitive prices can increase the usage of the fuel.

**MN Action:** Grants are available to partially reimburse service station owners who install E85 pumps.

Auto dealers are required to provide written notice that new flex fuel vehicles can run on E85.

To create energy parity, the state fuel tax on E85 is 14.2 cents/gallon, versus E10 that is taxed at 20 cents/gallon.

### **TLU-3 FREIGHT**

The options for heavy duty vehicles follow possibilities similar to those discussed under passenger vehicles.

Metro Transit buses will be considered heavy duty, although there are some overlapping options. Other regional bus lines can also be included.

### **TLU-3.1 VEHICLE TECHNOLOGY**

#### **3.1.1 Vehicle Technology**

The fuel efficiency of freight trucks can be improved using a variety of equipment modifications (e.g., aerodynamic devices, wide-base tires, fuel efficient lubricants) as well as driver training. Government agencies can promote truck fuel efficiency improvements with incentives and outreach.

**MN Action:** Metro Transit buses with Voith transmissions have been upgraded to utilize an auto neutral feature that disengages the transmission at stops to reduce fuel consumption.

MPCA – small business loans.

EPA mandates for 2007 and newer engines already require Diesel Particulate Filters (DPF) and Exhaust Gas Recirculation (EGR) systems to remove both ozone creating gasses and particulate pollution.

Super single tires are being used voluntarily by the industry to improve fuel economy.

Truck bodies are becoming more aerodynamic to improve fuel economy.

Engine idle shutdown after five minutes among other technologies are being voluntarily used to save fuel.

MPCA and Smartway loan programs are high interest loans.

#### **3.1.2 R&D on Low-GHG Vehicle Technology (e.g., fuel cell)**

The state could support research and development of low-GHG vehicle technology to encourage technological innovation in the field.

**MN Action:** U of MN and Metro Transit studying auxiliary power options to minimize idling and power more auxiliary systems electrically.

APU's and other anti-idling, GHG reducing equipment is already, voluntarily being used by the industry.

MTA moved two bills designed to create incentives for trucking companies not financially able to purchase this technology with either a tax-credit program or a grant program similar to that used in Wisconsin (HF's 1280 and 1447, Hortman).

### 3.1.3 Low-Sulfur Diesel (Fed)

**MN Action:** Metro Transit using ULSF.

15ppm sulfur content ULSD already mandated and being used by transportation industry.

### 3.1.4 Black Carbon Control for Freight Vehicles

Diesel particulate matter includes black carbon aerosols. Diesel particulate emissions can be reduced through the use of several types of exhaust retrofit devices.

There is a broad range of costs and impacts depending on the option details. Control elsewhere has been done for health and criteria pollutants, and there is room to have incremental gains on top of the federal standards. Particulate filters are expensive and have high maintenance costs, although post-2007 vehicles will have newer technology that will be less expensive.

**MN Action:** Metro Transit future bus purchases will utilize particulate filters.

Green Fleet – diesel retrofit are aimed primarily at school buses, not private fleets.

2007 and newer heavy truck engines already mandate Diesel Particulate Filters and Exhaust Gas Recirculation technology (these technologies decrease fuel economy).

## TLU-3.2 VEHICLE OPERATION

### 3.2.1 Freight Logistics Improvements/GIS

Trucking operations suffer from inefficiencies that increase fuel consumption. Inefficiencies include idling unnecessarily, using longer or more congested routes, and hauling empty trailers. Improvements in freight logistics can reduce these inefficiencies. Systems including websites and advanced software packages can help with load matching and route and schedule optimization.

Many in the trucking industry are already using logistics software to increase efficiency and profits. Unclear what the public policy action here is.

### 3.2.2 Reduce / Enforce Speed Limits

Reduced vehicle speeds improve fuel economy, reduce CO<sub>2</sub> emissions, and improve safety.

### **3.2.3 Improve Traffic Flow**

Improving vehicle flow on the roadway system, can reduce fuel use and GHG emissions by freight vehicles. Coordinated operation of the regional transportation network can improve system efficiency, reliability, and safety.

### **3.2.4 Increased Size and Weight of Trucks**

Larger trucks take advantage of economies of scale to haul more freight with a proportionally smaller increase in fuel consumption. Minnesota could change state truck size and weight regulations to allow truckers to take advantage of this economy of scale.

Increasing the size and weight of trucks also raises safety concerns and may create compatibility problems with intermodal transportation.

### **3.2.5 Pre-Clearance at Scale Houses**

Truck idling time can be reduced through the pre-clearance at highway truck weigh stations and expanded use of weigh-in-motion systems.

### **3.2.6 Truck Stop Electrification**

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

### **3.2.7 Enforce Anti-Idling**

Vehicle idling can be reduced by enforcing anti-idling ordinances and/or encouraging the use of alternatives. Many states and local governments have adopted idling regulations for trucks and buses. Alternatives to long-term truck idling include the use of technologies such as automatic engine shut down/start-up system controls, direct-fired heaters, auxiliary power units, and truck stop electrification. Idling reductions could also be considered for other vehicle types and fleets.

## **TLU-3.3 INCREASING LOW-GHG TRAVEL OPTIONS**

### **3.3.1 Intermodal Freight Initiatives**

This option focuses on the improvements to railroad infrastructure and other strategies to encourage more use of freight rail. For example, transport of freight can be shifted from the roadway system to rail. In many cases, carrying freight by railroads rather than truck can reduce emissions and fuel consumption while reducing congestion on major roadways.

Private sector already taking advantage of intermodal freight options. Lack of highway capacity may drive the ability of haulers to use intermodal options.

### **TLU-3.4 INCENTIVES & DISINCENTIVES**

#### **3.4.1 Procurement of Efficient Fleet Vehicles**

This option would provide incentives for or discounts to transit agencies and for other fleet vehicles for the purchase of hybrid and/or other cleaner-technology vehicles.

**MN Action:** Metro Transit is in the process of increasing its fleet of 3 hybrid electric buses to 153 electric hybrids by 2011.

#### **3.4.2 Incentives to Retire or Improve Older, Less Efficient Vehicles**

GHG emissions can be reduced from heavy-duty diesel vehicles by developing and implementing an incentives program to accelerate the replacement and/or retirement of the highest-emitting diesel vehicles. Starting with the 2007 model year, stringent new federal emission standards for new heavy-duty diesel vehicles take effect. Incentives can be offered to the owners of older vehicles to retire their vehicles early and replace them with vehicles meeting the 2007 emission standards.

**MN Action:** Metro Transit schedules 40' and 60' bus replacements at 12 years to replace old buses/engines and emission technology while meeting FTA's minimum requirement for service life.

MTA moved two bills designed to create incentives for trucking companies not financially able to purchase this technology with either a tax-credit program or a grant program similar to that used in Wisconsin (HF's 1280 and 1447, Hortman).

#### **3.4.3 Maintenance and Driver Training**

Better driver information and education can lead to a gain in fuel efficiency. Drivers also need to be aware of maintenance issues that cause an increase in pollution and vehicle operating cost. Additionally, education could be geared to encourage energy-efficient driving habits, such as speed control, as well as encourage reductions in idling.

Private sector already educating drivers and modifying maintenance in an effort to improve fuel economy and reduce emissions. It is already in their best interest considering fuel costs.

#### **3.4.4 Increased Truck Tolls or Highway User Fees**

Roadway tolling can be used to provide revenue for alternative modes. Roadway pricing revenues can help fund needed highway improvements and help manage system-wide demand. In addition, pricing revenues can be used to fund transit and other transportation alternatives within a corridor or region.

## **TLU-4 INTERCITY TRAVEL: AVIATION, HIGH SPEED RAIL, BUS**

### **4.1 High-Speed Rail**

Intercity rail provides express train passenger services covering longer distances than commuter trains, which can reduce automobile use and possibly aircraft activity.

### **4.2 Integrated Aviation, Rail Bus Networks**

Encourage transportation infrastructure between cities to support connectivity of alternative transportation modes.

### **4.3 Aircraft Emissions Reductions**

More efficient operation of aircraft could reduce GHG emissions. This can include idle time at the gate, on the runway, and research and development of emission-reducing technologies.

### **4.4 Airport Ground Equipment**

Airports can reduce emissions from ground equipment by using alternative fuels and electrification of gates. This option could also include better runway management.

## **TLU-5 OFF-ROAD VEHICLES**

These options may have higher impacts on criteria pollutants than on greenhouse gas emissions.

### **5.1 Incentives for Purchase of Efficient Vehicles/Equipment**

### **5.2 Improved Operations, Operator training**

Better operations information and education can lead to a gain in fuel efficiency. Operators also need to be aware of maintenance issues that cause an increase in pollution and vehicle operating cost.

### **5.3 Maintenance Improvements**

By ensuring vehicles are well-maintained, fuel efficiency and emissions benefits can be achieved.

#### **5.4 Increased use of Alternative Fuel or Low Sulfur Diesel**

This option seeks to reduce GHG emissions by increasing the availability and usage of alternative fuels and low sulfur diesel for off-road vehicles.