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## Transportation and Land Use Sector Brief Descriptions of Potential State Actions

### TLU-1. PASSENGER VEHICLE GHG EMISSION RATES

#### 1.1 VEHICLE TECHNOLOGY

##### 1.1.1 Tailpipe GHG Emission Standards: California Clean Car

Greenhouse gas (GHG) tailpipe emissions standards are also known as the “Pavley” standards or the California Clean Car 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 the stronger set of standards applicable in California. The standards require manufacturers to meet a declining fleet-wide average standard for GHG emissions per mile.

This option could also involve state action to encourage an increase in the federal corporate average fuel economy (CAFE) standards for light-duty 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 established 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 (ZEVs), 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.

LEV II is aimed at criteria emissions, but could have some GHG benefits as well.

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

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

**1.1.4 Add-on Technologies (Low-Friction Oil, Low-Rolling-Resistance Tires)**

Add-on technologies can be made to passenger vehicles to improve fuel efficiency, such as low-friction oil or low-rolling-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 resistance replacement tires may not be readily available to consumers, and there is little information regarding the fuel economy of replacement tires.

**1.1.5 Hybrid Buses**

New buses powered by hybrid engines as well as hybrid plug in engines, use much less fuel and emit fewer emissions.

**1.1.6 Support New CAFE Standards**

The new standards will increase the fuel mileage and thus reduce GHG emissions.

**1.1.7 Require GHG Emission Stickers on New Cars**

To increase consumer awareness about greenhouse gas emissions, this would require that auto manufacturers affix a “global warming index” sticker to new cars and passenger trucks detailing carbon dioxide and other greenhouse gas emissions. These stickers will provide a comparison of the greenhouse gas emissions of the vehicle with the average projected emissions from all vehicles of the same model year.

**1.1.8 Develop Infrastructure for Plug-In Vehicles**

This will provide plug-in vehicles with numerous locations for recharging, allowing these vehicles to be used for long distance trips.

**1.2 VEHICLE OPERATION****1.2.1 Enforce Speed Limits**

Reduced vehicle speeds (at higher speeds) improve fuel economy, reduce GHG emissions, and improve safety. Speed cameras, both for intercity highways and urban roads, have proven to be an effective and cost-effective means of achieving compliance with posted speed limits. This measure could be augmented by lowering the speed limit on interstates, freeways, and major arterials. Significant enforcement resources may be needed for this measure to achieve the expected reductions if only enforcement officers are used without speed cameras or other technologies.

**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 could also provide associated vehicle GHG emissions. Drivers also need to be aware of maintenance issues that cause an increase in pollution and vehicle operating cost – tire inflation and engine lubricants are especially important. Additionally, education could

be geared to encourage energy-efficient driving habits (notably, slower acceleration, shifting at lower RPMs, and use of cruise control) as well as encourage the use of alternative modes of transportation (e.g., how to use public transportation; how to commute to work by bike, etc.).

### **1.2.3 Transportation System Management (Signal Synchronization and Intelligent Transportation Systems)**

Transportation system management improves smooth vehicle flow on the roadway system, which reduces 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 appropriate intersections, synchronized signals, incident clearing and management, variable message signs, 511 and other real-time driver information, ramp metering, and other forms of intelligent transportation systems (ITS).

### **1.2.4 Driver Feedback Technology, including with Pay-As-You-Drive Insurance**

This driver feedback technology provides feedback on driving habits that may reduce GHG emissions. Two important elements are use of an on-board computer and display that provide instantaneous fuel economy information and guidance on more fuel-efficient shifting for manual transmissions. With the introduction of GPS-based pay-as-you-drive insurance, feedback can also be provided to drivers to increase awareness of their present cost of driving.

### **1.2.5 Require Tune-Up Services Including Tire Pressure Checks**

This cuts down on fuel usage. This is a new regulation in California.

### **1.2.6 School Bus Idling Restrictions**

Idling Restrictions should be applied across the board including school buses. Idling consumes approximately an additional gallon of fuel per hour.

### **1.2.7 School Education Programs**

A GHG curriculum could be developed for teachers to use at the elementary and secondary system levels. The curriculum can be included on a web site for statewide distribution. This can both disseminate current information through children to their parents and educate future drivers.

### **1.2.8 Enforcement of Auto Anti-idling Reduction Requirements**

Consider further modifications to make state law easier to understand and enforce.

### **1.2.9 Public Education**

Take steps to better inform the public of the measures they can take to reduce their greenhouse gas emissions.

## **1.3 INCENTIVES AND DISINCENTIVES**

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

Governments can mandate or incentivize public and private vehicle fleets to include low-GHG vehicles, typically targeting a certain percentage of penetration within a certain period of time. Establish procurement policies (especially state lead-by-example) that select vehicles achieving

best-in-class low GHG emissions, regardless of vehicle technology, where practicable (emergency vehicles exempted). Procurement policies should also ensure that vehicles purchased are appropriate to their intended use (e.g., passenger vehicles for transporting employees or light trucks only where needed for towing, hauling, or off-road travel).

### **1.3.2 Feebates (State-Specific or Regional)**

The state could adopt a variety of programs to move purchases of vehicles toward a lower-GHG fleet mix (including pure electric, hybrid, plug-in hybrid, and/or 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 emission/lower fuel economy vehicles and 2) rebates or tax credits on low emission/higher fuel economy vehicles.

Implement a sliding scale tax that would allow purchasers of low GHG-emitting vehicles to earn a rebate on their vehicle registration or sales tax of up to X%, and purchasers of high GHG-emitting vehicles to be assessed a vehicle registration or additional sales tax of up to X%. The sliding scale could be designed to be revenue-neutral, i.e., such that rebates are offset by fees assessed.

### **1.3.3 CO<sub>2</sub>-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 registration fees, feebates, and/or tax credits. Higher vehicle registration fees can be charged for vehicles that have higher emissions, and vehicles that emit less could be charged a lower vehicle registration fee. Vehicle licensing fees could also be based on vehicle weight, with use of a dollar-per-vehicle-ton multiplier instead of the present broad categories of vehicle weight.

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

The state could adopt a variety of programs to increase purchase of low-GHG vehicles (including pure electric, hybrid, plug-in hybrid, and other alternative fuel vehicles). State incentives could include tax credits. Tax credits can be offered for the first-time purchase of a hybrid, alternative fuel vehicle or other set of specifications that incorporate low-GHG emission standards. The state could also adopt other programs to more broadly promote flexible-fuel strategies to support a range of alternative vehicle types as opposed to those that currently operate on petroleum-based fuels.

Offer tax incentives for vehicles that achieve low GHG emissions. Offer a \$X,000 tax credit for any vehicle that achieves the equivalent or lower GHG emissions per mile of a high-fuel-economy vehicle (e.g., exceeds vehicle GHG emissions standards in Option 1.1.1 for a given model year by 20% or exceeds fuel economy of 30 mpg average city/highway mileage for a light truck, 40 mpg for a passenger automobile).

**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 GHG emissions. Because of the energy input required for manufacture of new vehicles, keeping low-GHG emitters in the fleet longer will provide benefits if those vehicles are well maintained.

**1.3.6 Emission-Based Tolling (Discount for Clean Vehicles)**

Vehicles that are more fuel efficient pay lower tolls than vehicles that are less fuel efficient.

**1.3.7 Establish a Carbon Emission Tax, Modeled After the Clean Air Discount Bill Introduced in California**

The California Clean Car Discount bill provides rebates to those who purchase vehicles that emit low levels of greenhouse gases while surcharging those who purchase new, higher emitting vehicles.

**1.3.8 Establish a Fleet Replacement Grant Program, Modeled After Los Angeles**

Assist in faster retirement of older fleet vehicles by creating a grant program that helps truck owners purchase more fuel efficient, lower GHG emitting vehicles.

**1.3.9 Provide a Tax Incentive for Adult Bicycles**

Provides incentive for adults to purchase, use, and commute by bicycle. In England this works by having employees of participating employers choose the bike they want, along with safety and security equipment. They are then issued a voucher that they give to the bike shop. The value of this voucher is deducted from the employee's salary over an agreed period, but the sum is free of tax.

**1.3.10 Push Alternative Travel Into the Advertising Mainstream**

Promote the use of alternative travel such as walking, cycling, and the use of trains, buses, and trolleys through mainstream advertising media such as TV, billboards, radio, magazines, etc.

**TLU-2. LAND USE AND LOCATION EFFICIENCY****2.1 GENERAL****2.1.1 Statewide Growth Management Plan**

Adopt a statewide growth management plan and corresponding GHG emission cap guiding conforming regional transportation & land use plans/programs that meet state-determined GHG budgets and VMT per capita targets.

**2.1.2 Include GHG Evaluations in State Policies**

Ensure state policies, capital funding programs, and the project environmental review process evaluate GHG implications to be a model for climate-friendly and energy efficient development patterns.

**2.1.3 Shape Investment to Maximize GHG Reductions**

Shape public and private investment to maximize GHG reductions and growth management, including an Indirect Source Rule to hold development accountable for GHGs, Transfer of Development Rights, Open Space Protection, Coastal Zone Management, and Adequate Public Facilities initiatives.

**2.1.4 Provide Technical and Financial Support to Local Agencies**

Provide technical/financial support to local/regional agencies for land use, planning, and zoning activities to enhance technical tools, increase technical capacity, and fund Blueprint Planning Grant programs.

**2.1.5 Land Use, Zoning, Tax and Building Code Reform**

Modify and fund reforms of state and local tax and zoning/building codes and policies to support GHG reductions and implementation of State growth plans. Measures can include building setbacks, shifting parking minimum requirements to maximum standards, reducing restrictions on density, floor area ratios and mixed-use development, and reforming on-street parking availability and pricing.

**2.1.6 State Congressional Advocates for Federal Action**

Ensure the State's Congressional delegation works for Federal highway, transportation and land-use related legislation/programs supporting timely climate change action.

**2.1.7 Use of Flexible Federal Transportation Funding**

The Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorizes \$286 billion in spending between 2004 – 2009 for numerous surface transportation programs such as highways, transit, freight, safety, and research. Much of this funding is flexible in terms of its utilization by the state, and full funding for transit, pedestrian and bicycle funding, intercity rail, and other climate-friendly investments should be prioritized.

**2.1.8 Downtown Revitalization**

Revitalizing downtown areas can reduce VMT for commuters and provide sufficient density for transit operation thereby providing two means of reducing greenhouse gas emissions.

**2.1.9 Brownfield Redevelopment**

Redeveloping brownfields in urban areas can be a key factor in downtown revitalization providing new areas for residential, commercial, or mixed-use development. By producing "infill" of existing urban areas it also reduces average trip distances and can save public funds by taking advantage of existing infrastructure and public utilities.

**2.1.10 Traffic Calming**

Traffic calming measures such as roundabouts, speed bumps, and chokers result in traffic moving at slower speeds. The reduced speed of traffic is often associated with a reduction in greenhouse gases and makes these areas more attractive, convenient and safer for cyclists and pedestrians, encouraging these climate-friendly modes.

## **2.2 INCREASE LOW-GHG TRAVEL OPTIONS**

### **2.2.1 Make Full Use of CMAQ Funds—With Application Reviews Considering GHG Reductions**

Fully allocate all Congestion Mitigation and Air Quality (CMAQ) funding and prioritize for GHG-reducing investments.

### **2.2.2 Improve Transit Service (Frequency, Convenience, and Quality)**

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 could also include expansion of intercity bus service. Use of Iowa Department of Transportation (IDOT) data on travel origins and destinations could help determine whether there are intercity regional routes that need prioritization.

### **2.2.3 Transit Marketing and Promotion (Including Individualized Transit Marketing)**

Greater use of public transit and reduction in automobile travel can be achieved by enhanced promotion and marketing of transit, or through reduction in transit fares. Individualized transit marketing has proved to be highly effective in reducing auto trips through increased transit use.

### **2.2.4 Bike and Pedestrian Infrastructure**

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

### **2.2.5 Expand Transit Infrastructure (Rail, Bus, BRT)**

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 [BRT] routes). This option also could include expansion of intercity bus service.

### **2.2.6 Promote Midwest Regional High Speed Rail Network**

The Midwest Regional Rail Initiative or Midwest Regional Rail System is a plan to implement a high-speed rail network in the Midwest using Chicago as a hub and including 3,000 miles of track.

### **2.2.7 Establish Omaha, Des Moines, Iowa City, Davenport Leg of Midwest Regional High Speed Rail Network**

As part of the Midwest Regional Rail Initiative, a line under study would include a route linking the Quad Cities to Iowa City, Des Moines, and on to Omaha. This route would be primarily used for passenger rail service, but would remove traffic and congestion from the interstates.

### **2.2.8 Operate Game and Special Event Trains to Iowa City and Ames**

Using rail to transport people to football games and special events in Iowa City and Ames would serve to reduce greenhouse gas emissions while reducing congestion in the highways and downtown areas of these cities.

**2.2.9 Establish Trolley System for Des Moines**

A high frequency trolley service for Des Moines downtown attractions and satellite areas would promote economic growth, and provide efficient public transit as an alternative to driving.

**2.2.10 HOV Lanes**

High-occupancy vehicle (HOV) lanes can be added through new road capacity designated for HOVs or by converting existing lanes. HOV lanes can be 24-hour or designated for peak hours only, and can also employ reversible lane strategies. HOV programs are most successful as part of an integrated regional transportation strategy that includes other improvements and incentives for transit and rideshare use.

**2.2.11 Enhance Current “Fix it First” Policy**

“Fix it First” would prioritize funding for preservation and management of the existing system ahead of capital or capacity expansion projects. Repair before expansion.

**2.2.12 Transit Prioritization (Signal Prioritization, HOV Lanes)**

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

**2.2.13 Telecommute, Live-Near-Your-Work, and Tele-Education**

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. Live-near-your-work, also known as “proximate commute,” encourages organizations with multiple locations (e.g., banks, fast food restaurants) to transfer employees such that most work at the branch location closest to their home.

**2.2.14 Require Government to Use Telecommuting**

Requiring the government to use telecommuting would reduce work trips and would set an example for public and private industries.

**2.2.15 Car Sharing**

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

**2.2.16 E-Commerce**

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

**2.2.17 CO<sub>2</sub> Conformity Type**

Program capping CO<sub>2</sub> emissions in some form of a mobile budget.

**2.2.18 Park-and-Ride Lots**

This strategy will expand the construction of well lighted and police patrolled parking locations for carpoolers and others to interface with buses, light and heavy rail, as well as commuter trains in the state. It is most effective when implemented jointly with HOV lanes as well as transit service.

**2.2.19 Guaranteed Ride Home for Transit Users**

Guaranteed ride home (GRH) will serve as a safety net for commuters who would like to use transit services or carpools but are afraid they will not be able to get home in an emergency.

**2.2.20 Telecommuting Support and Incentives**

For telecommuting to succeed, top-down support is needed at both the public and private sector levels along with promotion and outreach.

**2.2.21 Adopt Best Workplaces for Commuters Policies**

Iowa would adopt the policies and programs as set forth by the EPA's Best Work Places Program to reduce VMT associated with daily work commutes. For more information, please visit: [www.bestworkplaces.org](http://www.bestworkplaces.org).

**2.2.22 Provide Incentives for Communities to Become "Best Workplaces for Commuters"**

Incentives will be provided to communities who meet the criteria for being recognized as a "Best Workplace for Commuters District." Some examples of programs that can be implemented to receive this recognition include transit passes, vanpool subsidies, shuttles connecting to transit, and discounted rideshare parking.

**2.2.23 Provide Incentives for Employers to Become "Best Workplaces for Commuters"**

Incentives will be provided to employers who meet the criteria for being recognized as a "Best Workplaces for Commuters." Some examples of programs that can be implemented to receive this recognition include: tax-free transit benefits, tax-free vanpool benefits, telework, parking cash-out, and proposal for alternative primary benefit to the Center for Urban Transportation Research that demonstrates the chosen option reduces the rate at which employees drive to work alone and is viewed by your employees as a significant workplace benefit.

**2.2.24 Issue Free Bus Passes to Downtown Workers**

Promoting the use of public transit through free bus passes for those who work in congested downtown areas.

**2.2.25 Issue Free Bus Passes to Students and Retired People**

Promoting the use of public transit through free bus passes for students and retired persons.

**2.2.26 Create Regional Transportation Centers**

Provides centralized location(s) where various forms of transportation connect to one another, such as rail, bus, and bikeways.

**2.2.27 Commuter Bus from Iowa City to Cedar Rapids**

This service would reduce VMT associated with travel between these two cities as well as reduce highway congestion and the associated greenhouse gas emissions.

**2.2.28 Van Pooling and Car Pooling**

These options reduce VMT associated with workplace commuting as well as reduced rush hour traffic congestion and the greenhouse gas emissions associated with traffic.

**2.2.29 New Passenger Rail Lines (Amtrak Studies)**

Amtrak is currently studying three new passenger rail line segments. (1) Quad Cities to Davenport, (2) Davenport to Iowa City, and (3) Iowa City to Des Moines. These lines would remove traffic from the interstates and would reduce greenhouse gas emissions associated with VMT between these cities.

**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 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).

**2.3.2 VMT Tax**

The state would charge a tax or fee reflective of miles traveled by passenger vehicles. In many cases it has been proposed that the fee be revenue-neutral, offsetting fuel tax revenue that is on a trajectory to otherwise decline with improving fuel economy and increased use of untaxed alternative fuels. As an alternative, revenues could be increased somewhat and used to fund transit and other transportation alternatives within a corridor or region.

**2.3.3 Pay-As-You-Drive Insurance**

The state would encourage and support the provision of pay-as-you-drive auto insurance, possibly including state support for additional pilot programs. The program works by shifting some portion of the annual insurance premium to a per-mile insurance premium.

**2.3.4 Increased Fuel Tax (With Targeted Use of Revenue Toward Travel Alternatives)**

Increasing the state tax on conventional fuels can reduce consumption. In addition, revenues can be used to fund transit and other transportation alternatives within a corridor or region.

**2.3.5 Location-Efficient Mortgages**

The state could encourage and support mortgage providers who 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, Emission-Based Truck Tolls, and/or Road Tolls (With Targeted Use of Revenue Toward Travel Alternatives)**

Roadway tolling can be used to discourage single-occupant automobile use and provide revenue for alternative modes. Emission-based tolls can be applied to heavy vehicles, similar to a system now in place in Germany. If tolls or other user charges vary with congestion levels (congestion pricing), they can also be particularly effective at reducing congestion and thus significantly improving vehicle fuel economy. 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.

**2.3.7 Parking Pricing, Excise Tax, and/or Supply Restrictions**

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.

**2.3.8 Free Downtown Parking to Carpoolers**

Provides an incentive for carpoolers while discourages single occupancy vehicles.

**2.3.9 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.

**2.3.10 Transit Pricing Incentives**

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

**2.3.11 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 GHG 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, for example, preserving open spaces and converting to alternative fuel

energy sources. 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.

### **2.3.12 Benefits for Low-GHG Vehicles (Preferential Parking, Use of HOV Lanes)**

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 lanes.

### **2.3.13 Reserve Parking Spaces for High-Occupancy Vehicles and Car-Share Programs**

Provides incentives for those that carpool or use car-sharing programs.

## **2.4 FUEL MEASURES**

### **2.4.1 Low-GHG Fuel Standard (e.g., Renewable)**

This option would reduce GHG emissions by decreasing the carbon intensity of all passenger vehicle fuels sold in the State. The Low Carbon Fuel Standard (LCFS) would require all fuel providers in the state to ensure that 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 grams 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 life cycle 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).

### **2.4.2 Low-GHG for State Fleets (e.g., CNG, Biodiesel)**

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.

### **2.4.3 Biofuel Expansion (Biodiesel, CNG, LPG, Cellulosic Ethanol)**

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).

#### **2.4.4 Alternative Fuel Infrastructure Development**

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.

#### **2.4.5 State Government E85 Use Plan**

This plan will detail how an E85 use goal can be met and how the state and retailers can work together to ensure that all E85 purchases are electronically coded and reported accurately. The Department of Administrative Services will provide regularly updated lists of E85 refueling stations to state employees. (Executive Order 3, 2007)

#### **2.4.6 Biodiesel Market Plan**

As one of the top biodiesel producers in the U.S., a biodiesel market plan would lay out the strategies to meet the target demand rate to ensure an appropriate level of consumption of biodiesel relative to its supply/production.

#### **2.4.7 Electric Vehicle Charging Facility Development**

Locating electric vehicle charging stations at fueling stations would provide for easy access to plug-in owners and would allow plug-in vehicles to be used for long distance trips.

### **TLU-3. HEAVY-DUTY VEHICLES**

#### **3.1 VEHICLE TECHNOLOGY**

##### **3.1.1 Vehicle Technology Improvements (e.g., Aerodynamics)**

The fuel efficiency of freight trucks can be improved using a variety of equipment modifications (e.g., aerodynamic devices on both the tractor and on trailers, speed governors, wide-base tires, fuel efficient lubricants, low rolling-resistance radial tires, automatic tire inflation devices) as well as driver training. Government agencies can promote truck fuel efficiency improvements with incentives and outreach.

##### **3.1.2 R&D on Low-GHG Vehicle Technology**

The state could support R&D of low-GHG vehicle technology to encourage technological innovation in the field.

### **3.1.3 Black Carbon Control Technologies (e.g., Use of Particulate Traps, Other Complementary Technologies)**

Diesel particulate matter includes black carbon aerosols, which are thought to contribute to global warming through positive radiative forcing. Diesel particulate emissions can be reduced through the use of several types of exhaust retrofit devices and particulate traps.

### **3.1.5 Facilitate Adoption of New Clean Technologies—Rail and Marine Engines**

There are new proposed EPA criteria air pollutant emission standards for locomotive engines and commercial marine vessel diesel engines. Steps or incentives might be taken to introduce these technologies to the marketplace earlier than the Federal requirements.

## **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 Web sites and advanced software packages can help with load matching and route and schedule optimization.

### **3.2.2 Enforce Speed Limits**

Reduced vehicle speeds (at higher speeds) improve fuel economy, reduce GHG emissions, and improve safety. Speed cameras, both for intercity highways and urban roads, have proven to be an effective and cost-effective means of achieving compliance with posted speed limits. This measure could be augmented by lowering the speed limit on interstates, freeways, and major arterials. Significant enforcement resources may be needed for this measure to achieve the expected reductions if only enforcement officers are used without speed cameras or other technologies.

### **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. The State could change state truck size and weight regulations to allow truckers to take advantage of this economy of scale.

However, it is possible that this action would induce some shipments to shift from rail to trucking, possibly increasing net GHG emissions. Increasing the size and weight of trucks also raises safety concerns, increases road maintenance needs, and may create compatibility problems with intermodal transportation.

### **3.2.5 Increase the Number of Rest Areas**

There may not be sufficient parking capacity for long-distance truckers to leave Iowa highways and rest.

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

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

### **3.2.7 Truck Stop Electrification**

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

### **3.2.8 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.

### **3.2.9 Clean Freight Operating Improvements**

Uncovered rail cars on coal trains have fugitive coal dust emissions. There may also be ways to change truck operations to reduce associated particulate (black carbon) emissions.

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

### **3.3.1 Intermodal Freight Initiatives**

This option focuses on the improvements to railroad infrastructure and railyards 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. Shifting current freight movements from truck to rail decreases impacts on highway infrastructure, and may reduce idling and greenhouse gas emissions and particulate matter associated with freight moved by heavy duty trucks. Moving freight from truck to rail may require sufficient intermodal and rail networks be in place.

### **3.3.2 Feeder Barge Container Service**

Container shipping was invented as state-to-state shipping. Marine container shipping is often assumed to be too slow for domestic freight, but Europe has seen high growth rates in water-borne (especially river) container freight, over relatively short distances. This option would support policies to shift more freight back to marine shipments, including infrastructure investments.

### **3.3.3 Increase Rail Capacity and Address Rail Freight System Bottlenecks**

Increasing rail capacity allows the possibility of shifting more freight to rail from trucks. There may also be some capacity constraints that restrict use of more fuel-efficient double-stack rail cars.

## **3.4 INCENTIVES AND DISINCENTIVES**

### **3.4.1 Procurement of Efficient Fleet Vehicles (Public, Private or Other)**

This option would provide incentives for or discounts for fleet operators for the purchase of hybrid and/or other cleaner-technology vehicles. It would also provide education and encouragement for “right-sizing” fleet vehicles, purchasing the smallest, most fuel-efficient vehicle compatible with its needs and vehicles (e.g., replacing large sedans and SUVs with smaller vehicles where feasible)

### **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. Older vehicles also demonstrate reduced fuel efficiency (and thus increased GHG emissions) over time due to wear and tear. 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.

### **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.

### **3.4.4 Increased Emission-Based 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 (Planning, Governance, and Investment)**

Encourage transportation infrastructure between cities to support connectivity of alternative transportation modes. Intermodal passenger terminals shared between bus, rail, transit and possibly airports can facilitate shifts away from personal vehicles.

#### **4.3 Aircraft Emissions**

More efficient operation of aircraft could reduce GHG emissions. Incentives or subsidies can be provided to speed implementation of a number of air traffic control innovations that are well under development (reduced vertical separation minimums, continuous descent landings) at State airports. Other improvements can include reduced aircraft engine idle time at the gate and on the runway, research and development of emission-reducing technologies for aircraft, and the use of ground tractors to pull aircraft the full distance from the gate to the taxiway (rather than inefficiently using the aircraft's engines for this purpose – already implemented by Virgin Atlantic).

#### **4.4 Airport Ground Equipment**

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

#### **4.5 Iowa Specific Carbon Offsets**

Currently, some airlines offer patrons the option of purchasing of carbon offsets. This option would allow for the purchase of offsets specifically located in the state of Iowa.

### **TLU-5. OFF-ROAD VEHICLES (CONSTRUCTION EQUIPMENT, OUTBOARD MOTORS, ATVS, ETC.)**

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

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 emission/lower fuel economy vehicles and 2) rebates or tax credits on low emission/higher fuel economy vehicles. Higher vehicle registration fees can be charged for vehicles that have lower fuel economy, or vehicles that use alternative fuels could be charged a lower vehicle registration fee. Vehicle licensing fees could be based on vehicle weight, with use of a dollar-per-vehicle-ton multiplier instead of the present broad categories of vehicle weight.

#### **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 that vehicles are well-maintained, fuel efficiency and emissions benefits can be achieved.

**5.4 Increased Use of Alternative Fuels 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.

**5.5 Adopt Green Port Strategy (Port Land-Side: Clean-up Port Dwelling and Cargo Handling Equipment Operations)**

There are ports on the West Coast (Los Angeles, for example) that have adopted measures to introduce less polluting, more energy efficient technologies for vessel dwelling and for land-side cargo handling equipment that could be adopted in port facilities.

**5.6 Low Carbon Fuel (Off-road and Recreational Marine)**

Consider “on- and off-road” as well as recreational marine usage.

**5.7 Locomotive Idling Reductions**

Consider increasing measures to reduce locomotive idling including auxiliary engines to help maintain power, as well as plug in power receptacles in the proposed train storage yards.

**5.8 Inclusion of Idling Reduction Requirements**

For equipment in construction contracts, there would be clauses that would restrict idling time in construction equipment.

**5.9 Diesel Cranes at the Port-Electrification or Other GHG-Reducing Alternatives**

Further consider electrifying, or other methods to reduce GHG emissions, if feasible.

**5.10 “Shore Power” at Port Sites**

For future consideration, where applicable and feasible for shipping vessels.

**5.11 Outlaw the Use of Two-Stroke Engines**

Two-stroke engines (also known as “Two-Cycle Engines”), typically used in small motorized devices such as chainsaws, outboard motors, small capacity motorcycles, lawnmowers, etc. have significantly higher levels of emissions due to the engine design. As a result, many states have sought to ban the use of or at least partially ban the use of two-stroke engines.