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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

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 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.

This option could also involve state Action to encourage an increase in the federal Corporate Average Fuel Economy (CAFE) standards for light duty vehicles.

NOTE: Maryland has adopted California Clean Car standards, and awaits the necessary EPA action. For Maryland, this option could then involve a) encouraging speedy EPA action, and / or b) developing plans to replace the anticipated emissions benefits if EPA does not act.

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.



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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.

LEVII 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 of low-GHG vehicle technology to encourage technological innovation in the field.

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.

TLU-1.2 VEHICLE OPERATION

1.2.1 Enforce Speed Limits

Reduced vehicle speeds improve fuel economy, reduce CO₂ emissions, and improve safety. This could be implemented by requiring interstates, freeways, and major arterials to be signed with a maximum speed that is lower than the current speed. Significant enforcement resources may be needed for this measure to achieve the expected reductions.

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



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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 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

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).

TLU-1.3 INCENTIVES & DISINCENTIVES

1.3.1 Procurement of Low-GHG 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 greenhouse gas emissions, regardless of vehicle technology, where practicable (emergency vehicles exempted). Procurement policies should also assure that vehicles purchased are appropriate to intended use (e.g., passenger vehicles for transporting employees; light trucks only where needed for towing/hauling/off-road travel).

1.3.2 Feebates

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 emissions/lower fuel economy vehicles and (2) rebates or tax credits on low emissions/higher fuel economy vehicles.

Implement a sliding scale tax that would allow purchasers of low greenhouse gas emitting vehicles to earn a rebate on their vehicle registration or sales tax of up to X%, and purchasers of high greenhouse gas emitting vehicles to be assessed a vehicle registration or additional sales tax



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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 CO₂-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/or vehicles that emit less could be charged a lower vehicle registration fee. Vehicle licensing fees could also be based up 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 greenhouse gas emissions. Offer a \$X,000 tax credit for any vehicle that achieves the equivalent or lower greenhouse gas emissions per mile of a high fuel economy vehicle (e.g., exceeds vehicle GHG emissions standards in 1.1.1 for a given model year by 20% or exceeds fuel economy of 30 mpg average of 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 well maintained.



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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 emissions 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.

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.

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. One proposal might be that all metropolitan area communities must prepare local comprehensive plans which are consistent with regional plans.

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.



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TLU-2.2 INCREASING LOW-GHG TRAVEL OPTIONS

2.2.1 Make Full Use of CMAQ Funds

Fully allocate all CMAQ funding / prioritize for GHG-reducing investments.

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 DOT 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 marketing 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 pedestrian and bicycle travel 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.

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.

2.2.6 HOV Lanes

HOV Lanes can be added through new road capacity designated for HOVs or converting existing lanes. HOV lanes can be 24-hour or designated for peak hours only, and also employ reversible



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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.

2.2.7 “Fix it First”

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

2.2.8 Transit Prioritization

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

2.2.9 Telecommute, Live-Near-Your-Work, 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.

2.2.10 Car sharing

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

2.2.11 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.



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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 / fee

The state would charge a tax or fee 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.

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 possibilities.

2.3.4 Increase Fuel Taxes

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 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.



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2.3.6 Congestion Pricing

Roadway tolling can be used to discourage single-occupant automobile use and provide revenue for alternative modes. If tolls or other user charges vary with congestion levels (congestion pricing), they can also be particularly effective at reducing congestion. 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.

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.

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

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



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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

2.4.1 Low-GHG Fuel Standard

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 the mix of fuel they sell into the state market meet, on average, a declining standard for GHG emissions measured in CO₂ 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).

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.



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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).

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.

TLU-3 HEAVY DUTY VEHICLES

TLU-3.1 VEHICLE TECHNOLOGY

3.1.1 Vehicle Technology Improvements

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.

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.



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3.1.3 Black Carbon Control 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.

TLU-3.2 VEHICLE OPERATION

3.2.2 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.

3.2.2 Enforce Speed Limits

Reduced vehicle speeds improve fuel economy, reduce CO₂ emissions, and improve safety. Significant enforcement resources may be needed for this measure to achieve the expected reductions.

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.



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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. State of Maryland 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.



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3.3.1 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 (esp. river) container freight, over relatively short distances. This option would support policies to shift more freight back to marine shipments, including infrastructure investments.

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.

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.

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 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.



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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

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

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



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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.