DRAFT
Transportation and Land Use Technical Working Group
Brief Descriptions of Potential State Actions

T-1 VEHICLE/EQUIPMENT TECHNOLOGY

1.1 Clean Car Program

A Clean Car Program is 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.

With the recently enacted increase in the federal Corporate Average Fuel Economy (CAFE) standards for light duty vehicles, the benefits of this policy are more limited than they were previously. Nonetheless, state adoption of the Clean Car Program would reduce GHG emissions by an additional approximately 3% on top of the CAFÉ standards. And if California adopted further tighter standards, other states could follow suit. At least 12 states have adopted or are in the process of adopting California's standards.

1.2 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.

1.3 Heavy Duty Vehicle Fuel Efficiency 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. This option could also provide incentives for or discounts to transit agencies for the purchase of hybrid and/or other cleaner-technology buses

1.4 Vehicle Purchase or Registration Incentives

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) by private vehicle owners and by vehicle fleet owners. State incentives could include registration fees, feebates, and/or tax credits. Higher vehicle registration fees can be charged for vehicles that have lower fuel economy, and/or vehicles that use alternative fuels or hybrid vehicles 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. "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. Tax credits can be offered for the first time purchase of low-GHG emission vehicles. 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.

1.5 Incentives to Retire or Improve Older High-GHG Vehicles

Incentives can be used to retire older passenger vehicles with poor fuel economy. 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. Incentives for or discounts to transit agencies for the purchase of hybrid and/or other cleaner-technology buses.

1.6 Promotion of Electric Vehicles

The state could take steps to promote expanded market penetration of electric, hybrid-electric, and plug-in hybrid electric vehicles, as private vehicles and in commercial and public vehicle fleets. This could involve tax or registration fee incentives, similar to those described in option 1.4. The state could also encourage development of electric vehicle charging stations. And the state could help create a market for these vehicles by purchasing them for the state fleet.

1.7 Promotion of Natural Gas Vehicles

The state could take steps to promote expanded market penetration of compressed natural gas (CNG) vehicles, as private vehicles and in commercial and public vehicle fleets. This could involve tax or registration fee incentives, similar to those described in option 1.4. Natural gas is readily available throughout much of Alaska, and the footprint of availability is expanding. Existing gasoline vehicles can be readily retrofitted as dual-fuel. Refueling can occur either at a commercial station, with rapid refueling possible, or in a home/office station.

1.8 Promotion of Low-GHG Refrigerants

Hydrofluorcarbons used in vehicle air conditioning systems and transportation refrigeration units (TRUs) on truck trailers and shipping containers are potent greenhouse gases. They contribute to global climate change when then leak or are released accidentally during maintenance. Manufacturers, working with the U.S. EPA, are currently exploring the use of alternative refrigerants with lower global warming potential. For vehicle air conditioning systems, the preferred alternative is known as HFC-152a. It would be put into new automobiles as they are produced and would replace current vehicles in the fleet as they are retired. The new refrigerant would not be used in existing vehicles now on the road, but benefits would accrue due to normal fleet turnover.

1.8 Promotion of Engine Block Heaters

This policy would promote the use of engine block heaters to reduce the time that drivers spend idling engines to warm them in cold weather. Block heaters could be promoted for use in vehicle fleets as well as private vehicles. Access to outdoor power outlets in parking lots would need to increase.

T-2 VEHICLE OPERATION AND SYSTEM EFFICIENCY

2.1 Lower and/or Enforce Speed Limits

Reduced vehicle speeds improve fuel economy, reduce CO2 emissions, and improve safety. This could be implemented by requiring 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. However, speed enforcement could be done with automatic enforcement to reduce the demand for law enforcement personnel.

2.2 Driver and Alternative Transportation Education

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. 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.).

2.3 Vehicle Idling Regulations and/or Alternatives

Vehicle idling can be reduced by adopting anti-idling ordinances. Many states and local governments have adopted idling regulations for trucks and buses. Idling reductions could also be considered for other vehicle types and fleets, such as taxis.

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. Truck idling time can also be reduced through the pre-clearance at highway truck weigh stations and expanded use of weigh-in-motion systems. Alaska DOT has installed weigh-in-motion and electronic clearance technology at the busiest weigh station (outbound Glenn Highway station in Anchorage); this technology could be expanded with additional funding.

2.4 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 roundabouts at intersections, synchronized signals, incident management, variable message signs, and other firms of intelligent transportation systems (ITS). Alaska DOT is developing a plan for expanded use of ITS technologies in both the Glenn/Parks and Seward corridors.

2.5 Encourage Freight Movement by More Energy Efficient Modes

Some freight movements can be shifted to more energy efficient modes, thereby reducing GHG emissions. In general, freight movements by water (barges, container ships, bulk carriers) are the most efficient on a ton-miles per gallon basis, followed by rail, truck, and air. While many commodities are not candidates for mode diversion, some freight shipments can be shifted to less energy intensive modes. The state can support mode shift through targeted investments in infrastructure and support for operational improvements. The state can also provide information about the relative emissions and cost benefits of freight mode diversions, and could offer state recognition or awards to encourage shippers to choose the most efficient freight mode. Alaska could also potentially offer incentives (such as tax credits) to encourage selection of efficient freight modes.

2.6 Improved Weather Information

Poor information on weather can lead to inefficient movement of passenger cars and trucks, marine vessels, and aircraft. With better weather information, for example, ferries and aircraft can avoid embarking on trips that must be rerouted or turned back due to inclement weather. The state could invest in more weather information infrastructure and support dissemination of this information. FAA and DOT&PF have already installed a significant number of weather stations and cameras, and this data is widely available to the traveling public.

T-3 ALTERNATIVE FUELS

3.1 Low Carbon Fuel Standard

This option seeks to reduce GHG emissions by decreasing the carbon intensity of all transportation fuels sold in Alaska. The Low Carbon Fuel Standard (LCFS) would require all fuel providers in Alaska to ensure the mix of fuel they sell into the Alaska market meets, on average, a declining standard for GHG emissions measured in CO2 equivalent gram per unit of fuel energy sold. Low carbon fuels include biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, and electricity.

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.

3.2 Renewable Fuel Standard

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. Consideration of biofuels would need to consider any associated costs associated with biofuels production, as well as the life-cycle GHG impacts of transporting to Alaska biofuels that are produced out of state.

3.3 Alternative Fuel Mandates for Fleets

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.

3.4 Alternative Fuel Production Incentives and Research

Various incentives can encourage companies to continue or begin producing alternative fuels. The incentives can come in many different forms, such as granting state tax credits based on the amount of alternative fuel produced, reduced taxes for alternative fuel production facilities, or providing loans or grants to companies that are producing or want to produce alternative fuel. Alaska would need to promote alternative fuels that are most appropriate for Alaska's climate, and can encourage collaboration with other research entities across the Arctic region (e.g., Norway) to identify such alternatives. The state can organize a public/private fuel-buying consortium that enters a long-term contract with a supplier to help overcome the risk of producing fuel. Application of these incentives should consider the full cycle of energy and GHG impacts.

3.5 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.

T-4 TRAVEL DEMAND MANAGEMENT

4.1 Promote Efficient Development Patterns (Smart Growth)

Smart growth principles that promote efficient land development patterns reduce VMT and emissions while helping to conserve natural resource land and natural areas. This option aims to promote more efficient development through one or more of the following strategies:

- Planning activities, incentives, and/or regulatory changes to encourage "brownfields" development or other types of infill development.
- Planning activities, incentives, and/or regulatory changes to limit urban growth areas while increasing residential density.
- Incentives or requirements to designate centers for employment and housing, possibly with incentives or requirements that new infrastructure planning and investments reflect these growth nodes.
- 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.

4.2 VMT and GHG Reduction Goals in Planning

Transportation agencies (ADOT&PF, MPOs) could adopt VMT or GHG reduction goals as part of the transportation planning process. These agencies would be required to quantify the GHG emissions resulting from long-range transportation plans and transportation programs. In addition to plans and programs, quantification of impacts could be determined for projects and corridors.

The state could also require local governments to adopt a schedule for VMT and/or GHG emission reductions as part of the local planning process. 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.

4.3 Ridesharing and Transit Promotion

Ridesharing programs are designed to reduce vehicle trips and vehicle miles traveled by providing assistance and encouragement to individuals and employers to use carpools and vanpools. Government agencies can establish and expand ridesharing programs, provide incentives or assistance for others to do so, and provide supportive infrastructure (e.g., park-and-ride lots). The state could step in quickly to improve and expand the number of park-and-ride lots, including using real estate previously purchased for future highway expansion. This option could also involve promotion and marketing of transit, and/or reduction in transit fares. It could also involve expansion of Commuter Choice Programs, which encourage employers to provide options such as telecommuting, transit subsidies, pre-tax transit fare program, and guaranteed ride-home service in order to reduce automobile commutes.

4.4 Expand and/or Improve Existing Transit Service

Greater use of public transit and reduction in automobile travel can be achieved by expanding and/or improving existing transit service. This option also could include expansion of intercity bus or rail service. The technology to further improve both transit and ridesharing is improving, including real-time communication between those seeking and those offering rides.

4.5 Bicycle and Pedestrian System 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. Snow removal practices can help to ensure that sidewalks and bike trails are kept cleared, with a priority that is at least equal to roadways.

4.6 Pay-as-You-Drive Automobile Insurance

The state would encourage and support the provision of pay-as-you-drive auto insurance. With pay-as-you-drive insurance, a portion of premium as assessed on a per-mile basis, thereby providing an incentive vehicle owners to drive less. This option might include state support for pilot programs.

4.7 Telecommuting and Short Work Week

Telecommuting can reduce emissions caused by trips to work. Use of satellite office buildings where employees can work for 1-2 days a week can help minimize long commutes. The state could lead by example by promoting telecommuting among state employees. The state (and possible other government agencies) could also shift to a four-day work week, thereby reducing commute travel as well as the energy needed when buildings are occupied.

T-5 AIRCRAFT AND AIRPORT STRATEGIES

5.1 Aircraft Efficiency Improvements

Newer and more efficient aircraft use less fuel and produce fewer GHG emissions. Substitution of larger aircraft means less fuel use per seat mile. Fuel efficiency of existing aircraft can be improved through maintenance practices (drag reduction, engine water wash, etc.), weight reduction (lighter weight components and containers, etc.), and operational improvements (reduced APU usage, etc.).

5.2 Aircraft Operational Changes

The fuel efficiency of air transport could be improved by government intervention to incentivize more efficient operations. For example, larger passenger aircraft use less fuel per seat-mile or ton-mile, but the traditional weight-based landing fee provides no financial advantage to larger aircraft. In contrast, the use of a flat fee during congested periods creates an economic incentive to use larger aircraft, which would reduce GHGs for a given number of passengers or freight. States have limited authority to implement these changes, so this option may require lobbying at the federal level.

5.3 Airport Operational Changes

Airports can improve operational efficiency through measures such as optimizing the layout of runways, electrification of gates, improving air traffic control operations to reduce time spent in holding patterns, and hauling active aircraft to the runway with tractors.

In addition, airport ground support equipment (GSE) can use alternative fuels. GSE include aircraft and baggage tow tractors, ground power units, air start units, and medium and light-duty trucks for such operations as refueling and de-icing. Airports can reduce emissions from ground equipment by using alternative fuels (natural gas, propane, electrification). This option could also include use of fixed gate-based support equipment to eliminate mobile GSE.

5.4 Improving Efficiency of Airport Ground Transportation

Airports can encourage ground transportation practices that have lower GHG emissions. One option is greater use of bus and van shuttles to transport passengers to and from airports, rather than single-occupant automobiles. Airports can also encourage or require bus and van shuttles serving the airports to improve efficiency and/or use alternative low-GHG fuels.

T-6 MARINE TRANSPORTATION STRATEGIES

6.1 Ferry Operational Improvements

Changes in operating practices can potentially reduce fuel use and emissions from ferries. One example is fuel management systems that are tightly integrated with the various systems aboard each vessel. Another operational strategy might be slower vessel speeds, especially for the two high speed ferries in the AMHS.

6.2 Commercial and Recreational Vessel Engine Efficiency Improvements

Older, inefficient marine engines can be replaced with newer more efficient engines. Marine engine systems can be modified to enable vessels to run on fewer engines. Waste heat recovery systems can be installed on vessels to replace boilers, thereby reducing fuel use and GHG emissions. Additionally, the state could offer incentives to phase out two-cycle engines, thereby supporting existing state restrictions on engine use in protected waters.

6.3 Alternative Fuels for Ferries, Fishing Vessels, or other Harbor Craft

This strategy would involve substituting biodiesel fuel for conventional diesel in harbor craft propulsion and auxiliary engines. Biodiesel fuels are derived from a variety of renewable sources such as vegetable oil, animal fat and cooking oil, and are used alone or blended with diesel fuel. Most diesel engines can operate using a blend of 20% biodiesel (B20) without modification. The use of B20 is estimated to reduce life-cycle GHG emissions by approximately 10% compared to conventional diesel. Cold weather and fuel availability may limit year-round use of biodiesel, although synthetic fuels may have potential as a viable alternative fuel. Another limiting factor is the availability of fuels in sufficient quantity in a variety of different locations.

6.4 Shore Power/Cold Ironing

Emissions from vessels at berth can be reduced by providing shore power. So-called “cold ironing” enables ships to shut down their auxiliary engines and run off the shore-side electrical power grid to supply power at the dock for refrigeration, lighting, climate control, and other needs. To support shore power, the port or terminal operator must install necessary shore-side infrastructure, and ship owners must retrofit their ships to accommodate shore power through a connection interface with the ship’s main electrical panel. Shore power is currently used by AMHS for all overnight and longer-term vessel layups; shore power can be impractical for the typical AMHS port call of about one hour.

6.5 Alternative Fuels for Port Cargo Handling Equipment

Cargo handling equipment (CHE) at ports and rail yards include yard tractors, cranes, forklifts, container handlers (e.g., top picks and side picks), and bulk handling equipment such as tractors, loaders, dozers, excavators, and backhoes. Some of this equipment can use alternative fuels to reduce GHG emissions. Options include biodiesel, natural gas, propane, and electrification.

6.6 Management and Regulation of Fisheries to Include Consideration of Fuel Efficiency

Management and regulation of fisheries could include consideration of actions on fuel use and efficiency. State fishery managers as well as Board of Fish regulators need formal direction to consider their actions on GHG emissions. Harvests also need to be coordinated with the available

freight options such as barge or flight schedules when possible.

6.7 Cruise Industry Outreach

This strategy would address multiple aspects of cruise ship operations as they relate to climate change in Alaska. In addition to promoting engine and operational efficiency improvements in cruise ships, it would also encourage the cruise industry to reduce overall energy use onboard ships and improve waste management practices. A partnership could be formed with the cruise industry to educate passengers about the impacts of climate change on Alaska.

T-7 RAILROAD TRANSPORTATION STRATEGIES

7.1 Railroad Improvements for Freight

This option focuses on the improvements to railroad infrastructure and other strategies to encourage more use of freight rail. In this way, 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.

7.2 Locomotive Idle Reduction

There are a number of strategies to reduce idling times of locomotive line-haul and switching engines when there is no operational need for the engine to idle. These can involve operator training and use of technologies such as an auxiliary power unit (APU) or an automatic engine start-stop (AESS) device. The new EPA standards for locomotives require idle reduction systems on newly manufactured locomotives.

7.3 Efficient Switcher Locomotives

Several types of switcher locomotives can reduce fuel use and emissions. Hybrid-electric locomotives (such as the “Green Goat”) use a small, low-emission diesel engine to charge a battery pack that powers the traction motors. These engines can also recover braking energy to improve fuel efficiency. Generator set (“Gen Set”) locomotives use a series of smaller diesel engines (each approximately 700 horsepower) to directly power the traction motors. One or two of the engines can be shut down in operations with lower power demand, saving fuel and reducing emissions.

7.4 Commuter Rail

The provision of a commuter rail option in urban regions would provide an additional alternative to travel by car for people who work or study in downtown areas and live in outlying areas. Commuter train services would include, at a minimum, frequent train service during morning and evening peak commuter hours. Commuter rail services can build off of existing rail infrastructure, with the possible construction of additional track mileage and stations. A commuter rail feasibility study is currently underway for the Fairbanks area. In Anchorage, a Regional Transit Authority has just been created, with a goal of establishing commuter rail service on an existing rail line.