



Transportation and Land Use (TLU) Policy Work Group Policy Options

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007-2020			
	TRANSPORTATION AND LAND USE						
TLU-1	Smart Growth and Related Planning	0.08	0.47	2.43	<0	<0	TBD
TLU-2	Incentives for Purchase and Operation of Low-GHG Vehicles	Quantified as part of TLU-6					TBD
TLU-3	Improve and Expand Transit Service	0.17	0.97	5.09	TBD	TBD	TBD
TLU-4	Heavy-Duty Vehicle Idle Reduction	0.07	0.11	0.91	-\$131	-\$144	TBD
TLU-5	Low Carbon Fuels Standard	0.38	2.21	16.14	N/A	N/A	TBD
TLU-6	Clean Car Program (Pavley GHG Standards for Autos)	0.70	3.40	18.8	-\$1,880	-\$100	TBD
TLU-7	Transit Marketing, Promotion, and Pricing Incentives	Quantified as part of TLU-3					TBD
TLU-8a	Fuel Tax	0.17	0.50	3.86	TBD	TBD	TBD
TLU-8b	Variable-Priced Insurance	0.32	0.94	7.19	TBD	TBD	TBD
TLU-9	Parking Management	0.03	0.03	0.34	\$0	\$0	TBD
TLU-10	Commuter Benefits Programs	0.42	0.45	4.77	TBD	TBD	TBD
TLU-11	Driver and Consumer Education	Not quantified					TBD
	SECTOR TOTAL AFTER ADJUSTING FOR OVERLAPS	2.29	8.17	49.67			
	REDUCTIONS FROM RECENT ACTIONS	0	0	0	-	-	
	SECTOR TOTAL PLUS RECENT ACTIONS	2.29	8.17	49.67			

TLU-1. Smart Growth and Related Planning

Policy Description

Implement land use planning, development, and analysis that supports protection of natural and cultural resources, strengthens communities, creates more compact development, and reduces growth in driving and emissions.

Policy Design

Goals:

- Support and promote public and private planning and development practices, including smart growth planning and infrastructure provision that reduce the number and length of trips and expand travel modes in Colorado.
- Reduce light-duty VMT by 2% statewide by 2020.¹
- Require that Colorado Department of Transportation (CDOT and metropolitan planning organizations (MPOs) quantify and report GHG emissions from long-range transportation plans by 2010.

Timing: See above.

Parties Involved: Municipal elected officials; local and regional planning commissions and staffs; CDOT and other state agencies which have programs/projects that have land use impacts; private developers and contractors; planning, land use, and engineering professionals; public and private organizations with land use, transportation, and environmental interests.

Implementation Mechanisms

- Provide incentives to developers for density and mixed use.
 - To help balance any reluctance the market may display toward acceptance of higher density or mixed use, relax some design requirements (such as parking minimums) or provide fee credits (e.g. against road impact fees).
- Improve techniques for estimating reductions in vehicle trip generation for land uses with mixed use developments. (internal capture)
 - Mixed use developments have shown to have reduced VMT and VT due to increased access to goods and services. Traditional traffic generation estimates are based upon suburban models and require mixed use developers to pay for impact fees that may be unnecessary and may render these projects infeasible. Inaccurate traffic generation estimates may also overemphasize the need to

¹ VMT reduction goal of 2% is based on DRCOG modeling of “compact urban footprint” scenario.

increase vehicle capacity on the surrounding roadway network to the detriment of the pedestrian environment.

- Include reductions in estimated traffic generation as a result of intelligently located development. (infill)
 - New development located in established urban areas results in reduced VMT and VT due to shorter average trip distances and higher potential for alternative mode use. Traffic generations forecasts should take location of development into account when estimating vehicle trip generation.
- Implement a concurrency management system or adequate public facilities requirement.
 - Concurrency standards or requirements affect the timing of development and the provision of transportation infrastructure. If implemented using multimodal strategies and district or area-based measurement, they can support infill, compact development and transit use.
- Encourage the use of intergovernmental agreements to implement urban growth boundaries.
 - Urban growth boundaries are difficult to implement unilaterally and may be meaningless in effect if other nearby cities annex the land outside the adopting city's boundary. Intergovernmental agreements are an appropriate means of resolving where in a given county urban growth will be allowed to occur.
- Providing a means for local governments to share local sales tax proceeds.
 - Eliminating competition between local governments of commercial development would reduce existing pressures that discourage growth management.
- Implement interjurisdictional planning and/or regional review of local plans.
 - Because local governments face fiscal and other challenges, and because the land use decisions of one local government will affect other jurisdictions around it, local efforts to manage growth responsibly could be bolstered by requiring interjurisdictional planning or regional oversight over some aspects of local planning.
- Program infrastructure investments so as to encourage and reward compact development.
 - Compact urban development patterns require supportive infrastructure investments- especially high capacity transit systems. If state transportation funds were targeted to encourage and reward compact growth and infill development, that could reinforce improved growth management efforts by local governments.
- Undertake local planning for local street patterns prior to development.
 - Discussion: True street grid systems will require a street network that goes beyond the bounds of any one development. Frequently, much of the connectivity problem is caused by poor connections between subdivision projects. Cities in Colorado currently identify a network of arterial and collector streets which are formalized through a "master streets plan." To facilitate the development of a

more connected street system, cities could also extend the concept to include local streets and a local street grid layout.

- Increase property owners' awareness of conservation easements in Colorado.
 - Conservation easements give land owners tax breaks for agreeing to restrict development on their land. Efforts to increase the extent of conservation easements on private lands could help focus development to urbanized areas.
- Promote Brownfield development through rebates of property taxes to offset cleanup costs.
 - Tax rebates for Brownfield development often pay for themselves after a few years with increased property tax revenue.
- Increase funding for a Conservation/ Land Protection Fund
 - Often parcels of land are put on the market and sold before conservation organizations have an opportunity to collect enough funds to buy the parcel. The Conservation/ Land Protection Fund, already active in Colorado, is a revolving load fund that will provide conservation organizations with access to immediate financial resources so desirable land can be purchased once available. (<http://www.cclt.org/>)
- By executive order or legislative direction, require that Colorado Department of Transportation (CDOT) and metropolitan planning organizations (MPOs) quantify and report GHG emissions from long-range transportation plans by 2010. Make available financial and technical assistance to MPOs through CDOT.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.08	0.47	MMtCO ₂ e
Net Present Value (2007-2020)	Net savings	Net savings	\$ Million
Cumulative Emissions Reductions (2007-2020)	0.18	2.43	MMtCO ₂ e
Cost-Effectiveness	Net savings	Net savings	\$/MtCO ₂ e

Data Sources: DRCOG Metro Vision 2035 land use scenarios.

For cost information, a variety of literature finds that integrated transportation and land use planning produces net savings on the total costs of buildings + land + infrastructure + transportation. However, some components may be higher even though total costs are reduced. The preponderance of literature suggests net savings overall (see US EPA, *Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality*, 2001). A National Academy of Sciences / Transportation Research Board review found substantial regional and state-level infrastructure cost savings from more compact development (see Robert Burchell, et al., *The Costs of Sprawl—Revisited (TCRP Report 39)*, Transportation Research Board, Washington, D.C. 1998). An analysis of the New Jersey State Plan found that municipalities, counties, and school districts would save an estimated \$160 million from 2000 to 2020 by pursuing smart growth patterns (see Robert Burchell, et al., *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan*, Center for Urban Policy Research, Rutgers University, 2000).

Quantification Methods: Assume 2% reduction in light duty vehicle VMT with full implementation, consistent with Compact Urban Footprint and Compact Urban Footprint Plus Transit scenarios (DRCOG Metro Vision 2035 land use scenarios).

Costs cannot be quantified due to the broad scope of this options and the uncertainty in how it would be implemented by local governments. Research suggests that the option will result in net cost savings. (See Data Sources above).

Key Assumptions:

- 2% reduction projected for the Denver area is achievable on average across Colorado’s urban and rural areas.
- Implementation: 10% in 2010, 50% in 2015, 100% in 2020.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-2. Incentives for Purchase and Operation of Low-GHG Vehicles

Policy Description

This option includes several policies and programs to encourage purchase of low GHG emission vehicles through monetary and convenience rewards and incentives throughout the state.

- **Feebates** – This is a study option rather than an implementation option. The state would participate in a multi-state study of the feasibility and effectiveness of a regional feebate system with other western states. The feebate study would be conducted through a multi-state cooperative agreement for greater impact and could be implemented through the recently formed Western Regional Climate Action Initiative.
- **Tax Credits for Low-GHG Vehicles** – Amend the current income tax credit program for hybrid, alternative fuel, and low-emission vehicles so that it continues in its present form beyond 2010.
- **Operating Incentives for Low-GHG Vehicles** – Maintain current preferential state-controlled infrastructure (HOV lanes) access for alternative fuel vehicles (natural gas, propane, 100% electric).

Tax-funded, non-tax paying entities (state and municipalities) shall be required to purchase the lowest GHG vehicle suitable for their usage.

Policy Design

Goals:

- Feebate program would be developed as part of multi-state study of regional feasibility and effectiveness. This option would be considered as a contingency in the circumstance where the clean car standards (TLU-6) were not to be implemented.
- Income tax credits as defined in state statute but would continue at present levels beyond 2010.
- Access to HOV lanes for alternative fuel vehicles would continue as current policy.

Timing: The feebate program and extension of tax credits would require legislative approval. Goal of implementation before 2010.

Parties Involved: State legislature, state and municipal fleet managers, Governor (and administration), tax-paying Colorado motor vehicle owners (residents and business, especially if subject to TABOR).

Implementation Mechanisms

The proposed policies and programs in this option will need to be passed through the legislative process and will be subject to TABOR if revenue growth is anticipated through the 'Feebate' segment. Implementation of the Feebate will be channeled through the Colorado Department of

Motor Vehicle. The other policies, tax credits and incentives are already in place to some degree and will simply need to be modified from time to time to meet the new criteria as technology changes.

Related Policies/Programs in Place

While feebates are set as a new proposal, they are not completely unlike the application of existing taxes such as vehicle sales tax and gas guzzler tax. The difference is the method of calculation. In the case of feebates, the calculation will be on vehicle 'green rating' and can adopt the green house gas scores for vehicles as determined by the U.S. EPA

(<http://www.epa.gov/greenvehicle/>)

Currently there are tax credits in place for Alternative Fuel Vehicles (including hybrid) and Alternative Fuel Refueling Facility Installation. These credits are outlined by the Colorado Department of Revenue, Taxpayer Service Division

(<http://www.revenue.state.co.us/fyi/html/income09.html>).

Currently, an incentive for access to HOV lanes is in place for vehicles that meet the definition of the EPA Inherently Low Emission Vehicle (ILEV) classification and have a gross vehicle weight rating of 26,000 pounds or less may be operated upon HOV lanes regardless of the number of occupants and without payment of a special toll or fee. A special sticker must be obtained from the state Department of Transportation. At this time, hybrid electric vehicles do not qualify as ILEVs due to the use of conventional gasoline fuel and cannot receive the HOV exemption decal. (Reference [Colorado Revised Statutes 42-4-1012](#)).

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO_{2e}

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	Quantified as part of TLU - 6		MMtCO _{2e}
Net Present Value (2006-2020)			\$ Million
Cumulative Emissions Reductions (2006-2020)			MMtCO _{2e}
Cost-Effectiveness			\$/MtCO _{2e}

Data Sources: See TLU -6

Quantification Methods: See TLU - 6

Key Assumptions: See TLU - 6

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-3. Improve and Expand Transit Service

Policy Description

Improvements to existing transit service and expansion of transit routes can shift passenger transportation from single-occupant vehicles to public transit, thereby reducing emissions. This mitigation option involves a number of actions to be undertaken by state government, local government, and transit agencies.

Policy Design

Goals: Implement transit investments that encourage greater use of public transportation, such as the following:

- Improve service frequency on selected existing transit routes.
- Support and encourage improvements in intercity bus service.
- Reduce travel times on selected existing transit routes (signal prioritization, exclusive lanes, etc.).
- Improve service quality on selected existing transit routes (safety, cleanliness, improvements to shelters/stations).
- Expand transit service and infrastructure (commuter rail, light rail, bus, BRT).

In conjunction with TLU-7, this option will reduce light-duty vehicle urban VMT by 6% compared to 2020 VMT under a baseline scenario.² Thus, between 2007 and 2020, light duty urban VMT would grow by 22% instead of 28%.

Timing:

- Many programs are in place and are therefore immediately expandable/implementable. Enhancement and continuation can begin short-term.
- Infrastructure improvements will take 3-5 years at a minimum.

Parties involved: CDOT, transit agencies, Metropolitan Planning Organizations, municipalities, counties

Implementation Mechanisms

- Create a reliable state-wide funding source for transit systems. The Colorado Transportation Finance and Implementation Panel (“blue ribbon panel”) is currently exploring funding options for Colorado’s transportation system. Encourage the panel to include transit funding set-asides in any funding mechanism that is recommended by the panel.

² VMT reduction goal of 6% based on recent modeling by Robert Johnston of University of California, Davis.

- CDOT and state MPOs should maximize use of federal discretionary transportation funds that can be use for public transit capital projects and/or operating assistance.
- Require all new large residential developments include a resident travel plan that will achieve a 20 percent transit mode share, with developments that are unable to achieve this goal making a cash-in-lieu payment
- Create a state-wide transit plan.
- Monitor and support the activities of the Rocky Mountain Rail Authority and Colorado Rail Association.
- I-70 Corridor: Support the mediation facilitated by the Keystone Center to resolve issues and build trust for stakeholders along the I-70 corridor.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.17	0.97	MMtCO ₂ e
Net Present Value (2006-2020)	TBD	TBD	\$ Million
Cumulative Emissions Reductions (2006-2020)	0.38	5.09	MMtCO ₂ e
Cost-Effectiveness	TBD	TBD	\$/MtCO ₂ e

Data Sources:

- I-70 corridor: CDOT Traffic Data by Route

Quantification Methods: Reduce light-duty urban VMT by 6% compared to baseline scenario.

Further reduce light-duty VMT by 8-10 million VMT annually to reflect bus service between Denver and ski resorts on I-70. (Calculated as a 1% reduction in non-truck VMT along the route).³

Key Assumptions:

- Implementation: 10% in 2010, 50% in 2015, 100% in 2020.

Key Uncertainties

³ Source: I-70 Mountain Corridor Draft PEIS, Appendix B, B.1.5.1

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-4. Heavy-Duty Vehicle Idle Reduction

Policy Description

This options focuses on reducing idling from diesel and gasoline heavy-duty vehicles, buses, and other vehicles through a combination of statewide anti-idling regulations and by promoting and expanding the use of technologies that reduce heavy-duty vehicle idling. These technologies include truck stop electrification as well as vehicle equipment modifications such as auxiliary power units, direct fired heaters, and automatic engine shut down/startup system controls.

Policy Design

Colorado would develop and implement a statewide regulation banning extended idling by heavy-duty vehicles in most situations. The anti-idling regulation should be designed to be easily enforceable by state and local agencies and supported with dedicated state funding for enforcement for this measure to be successful in reducing vehicle idling and GHG emissions. The regulation should limit exemptions as much as possible for easy enforcement. However, idling that occurs for public health and safety reasons (such as emergency vehicles) should be exempted from these requirements.

Colorado would encourage and support the establishment of truck stop electrification stations at key truck stops and rest areas throughout the state. Such efforts would include working with the U.S. EPA, DOE, truck stop owners, and equipment vendors to securing funding for truck stop electrification.

Colorado would also promote reduced idling through programs aimed at increasing voluntary adoption of idling reduction technologies. Components of such an effort should include collaborative outreach and education timed with the implementation and enforcement of a statewide anti-idling regulation and seeking funding for pilot projects and demonstrations as well as funds available through any federal or other programs to evaluate the effectiveness of various idle reduction technologies.

Goals:

- Adopt statewide regulation on extended heavy-duty vehicle idling by 2009.
- Development of truck stop electrification at 2 locations by 2012 and all major CO truck stops by 2020.
- Implement state incentives for purchase of heavy-duty vehicle auxiliary power units (APUs) by 2012.

- Reduce fuel consumption from extended (overnight) idling of heavy-duty vehicles 50% by year 2012 and 95% 2020.⁴

Timing: See above.

Parties Involved: Trucking industry, Colorado Motor Carriers Association, CDOT, Truck Stop Owners/operators, School District, Municipalities and Counties

Implementation Mechanisms

Information and education: Provide information to fleet carriers, shippers, retailers, bus companies, school districts, local governments and others involved in the diesel fleet industry indicating the economic benefits, as well as the environmental benefits, of reducing or eliminating idling. Emphasize the fuel savings benefits, reductions in toxic emissions, and reduced engine wear associated with reducing idling. Also, identifying best practices within the industry and recognizing companies with these best practices in place within Colorado should be used to encourage companies to select these carriers for their shipments. Develop outreach materials with cost benefits information and toxic diesel health impacts. Outreach materials should also be geared toward making the general public aware of the GHG, toxics and fuel-saving benefits of eliminating idling on personal vehicles, as well as on trucks and buses.

Technical assistance: Coordinate with anti-idling product manufacturers to organize workshops/outreach programs to regulated community to let them know of technological options that provide alternatives to the need for idling including products for cabin comfort, power for other functions (e.g., refrigerated trucks), and engine warm-up.

Funding Mechanism and/or incentives: Identify funding source to partially fund idling technology loan and/or grants for innovative truck stop electrification and other idling reduction technologies in the State focusing in high idling areas. Explore any available tax credits or other funding that may be available for idle reduction programs. Dedicated funding stream also needs to be identified to support enforcement of anti-idling laws that may be adopted as well as education and outreach.

Voluntary and or negotiated agreements: Work with regulated entities to promote voluntary compliance through distribution of materials, staff training, etc. Encourage participation in EPA's SmartWay Transport partnership (or similar programs).

Codes and standards: Develop a statewide regulation banning idling by heavy-duty diesel commercial trucks, buses and other vehicles. It may make sense to model CO regulation on adjacent states regulations so some uniformity of regulations occurs on a regional basis.

Pilots and demos: Investigate availability of funding for pilot projects on idling reduction technologies from EPA, DOE and DOT particularly in the areas of truck stop electrification. Evaluate the effectiveness of the pilot program before implementing on a broader scale.

Enforcement & reporting: Phased enforcement program to initially conduct outreach (phase I), warnings for a limited period of time (phase II), then issuance of tickets (phase III) coupled with enforcement should be system for tracking violation so the state can determine compliance rates and benefits achieved from the regulation.

⁴ Goals assume that alternatives to extended engine idling (like truck stop electrification and APUs) are not widely available in 2012 but are widely available by 2020.)

Related Policies/Programs in Place

There are currently no known laws in place in Colorado. Our neighboring states of Arizona and New Mexico have either put in place or are in the process of adopting anti-idling laws which could serve as a model for Colorado regulations. In addition, Maricopa County, Arizona has idling restrictions in place. Arizona also has a school bus idling pilot project that can be referenced. A check should also be made to see if any Colorado shippers/carriers/retailers are participating in the EPA’s SmartWay Transport Program and using best practices for idling reduction.

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.066	0.112	MMtCO ₂ e
Net Present Value (2006-2020)	TBD	-131	\$ Million
Cumulative Emissions Reductions (2006-2020)	0.179	0.912	MMtCO ₂ e
Cost-Effectiveness	TBD	-144	\$/MtCO ₂ e

Data Sources:

Truck Stop Electrification

- Number of truck stop parking places in state: www.truckstopinfoplus.com
- Number of truck stops with TSE: www.epa.gov/smartway
- Idling hours per truck per night: Literature finds that sleeper trucks idle an average of 5.9 hours per night.⁵

Truck Idling Regulation

- Staff Report: Initial Statement of Reasons for Proposed Rulemaking. Airborne Toxic Control Measure to Limit Diesel-fueled Commercial Motor Vehicle Idling. California Air Resources Board, July 2004.

Quantification Methods:

Truck Stop Electrification

- Idling hours reduced = No. of affected spaces * Estimated occupancy * 5.9 hours per night * 365 nights per year

Truck Idling Regulation

⁵ Lutsey, Nicholas, Christie-Joy Broderick, Daniel Sperling, Carollyn Oglesby, "Heavy-Duty Truck Idling Characteristics - Results from a Nationwide Truck Survey," paper submitted for the 2004 Annual Meeting of the Transportation Research Board, 2004.

- CARB report provides average hours of idling reduced per vehicle per day by the regulation.
- CARB report provides heavy duty vehicle population figures for California. Figures for Colorado are scaled based on the relative size of economy-wide employment in Colorado.

Cost is calculated as the sum of equipment costs, savings on fuel, and cost to government for outreach and enforcement of the regulations.

NPV of Program Costs to 2020

Component	\$ Millions
Equipment	41.48
Fuel Savings	-174.57
Government Outreach and Enforcement	2.04
Total	-131.05

Key Assumptions:

Truck Stop Electrification

- Overnight idling is eliminated at truck stops with TSE.
- 2 truck stops have TSE by 2012.
- All truck stops with 5 or more spaces have TSE by 2020.

Truck Idling Regulation

- Regulation prohibits idling for more than 5 consecutive minutes by commercial diesel-fueled heavy duty vehicles. Compliance is primarily achieved by drivers manually switching off engines.
- 100% implementation is achieved by 2010.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-5. Low Carbon Fuels Standard

Policy Description

This option seeks to utilize a broader fuel neutral strategy to reduce GHG emissions by decreasing the carbon intensity of all passenger vehicle fuels sold in Colorado. This fuel neutral, market- and performance-based strategy would culminate in a “Low Carbon Fuels Standard.” Low carbon fuels could include biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, electricity, and low carbon blends such as E10 or E85.

The elements of a strategy to reduce carbon intensity in motor fuels would include:

- Fuel Quality Standards
- State Government Fleet ‘Leadership’ Programs for adoption of Low Carbon Fuels
- Low Carbon Fuel Infrastructure Development
- Options for Compliance

The Low Carbon Fuel Standard (LCFS) will require all fuel providers in Colorado to ensure the mix of fuel they sell into the Colorado market meet, on average, a declining standard for GHG emissions measured in CO₂ equivalent gram per unit of fuel energy sold. The standard will also be measured on a lifecycle basis in order to include all emissions from fuel production to consumption.

Fuel providers (defined as refiners, importers, and blenders of passenger vehicle fuels) will need to demonstrate on an annual basis that their fuel mixtures provided to the market met the low carbon standard. 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. Penalties for noncompliance will be determined during the implementation process.

Policy Design

Goal levels: Create a Low Carbon Fuel Standard for transportation fuels sold in Colorado that would reduce carbon intensity of Colorado’s passenger vehicle fuels by at least 10 percent by 2020.

Timing: Following design period, program would be implemented prior to 2020. Fuel providers would be required to meet 10% reduction standard no later than 2020.

Parties Involved: Fuel providers, Agriculture, State Department of Revenue, State Department of Public Health and Environment.

Compliance Pathways: Fuel providers could meet the required reduction through the use of a variety of alternative fuel blends and vehicle technologies. The table below illustrates three

possible scenarios through which the state of California could meet its Low Carbon Fuel Standard.

Table: Low Carbon Fuel Standard Compliance Scenarios for California

Scenario Number-->	1	2	3
<i>Total Petroleum Displaced by Low-Carbon Fuels (B gal)</i>	3	3.1	3.2
<i>Low-Carbon Fuels</i>			
Total Ethanol Demand (B gal)	2.7	3.8	4.7
Number of Flex Fuel Vehicles (millions)	3	6	8.5
Number of Plug-in Hybrids (millions)	4.1	1.7	0
Number of Hydrogen Fuel Cell Vehicles (millions)	0.5	0.5	0.2

Source: Office of the Governor (State of California), “The Role of a Low Carbon Fuel Standard in Reducing Greenhouse Gas Emissions and Protecting Our Economy.” White Paper. January 8, 2007.
<http://gov.ca.gov/index.php?fact-sheet/5155/>

Various fuel types and vehicle technologies reduce GHG emission by different degrees. The following table provides reduction estimates.

Table: Alternative Fuel Impacts on GHG Emissions

Fuel	Reduction (grams of GHGs per mile)
Ethanol E10 (corn)	1.5%
Ethanol E10 (woody biomass)	7.2%
Ethanol E85 (corn)	17.6%
Ethanol E85 (woody biomass)	83.2%
Plug-in Hybrid	35.7%
Hydrogen Fuel Cell	46.6%
Biodiesel B20*	9.9%
Biodiesel B100*	53.9%

() = Feedstock

* Calculated relative to diesel fuel. All other calculations relative to gasoline.

Source: GREET model outputs

Implementation Mechanisms

The following options or a combination of the options described below could be implemented to increase low carbon fuel use.

1. *Carbon Fuel Accounting.* All of these policy options should be evaluated based on fuel life-cycle or net accounting that measures the net carbon emission per usable unit of energy delivered. In the case of traditional fuels, this includes carbon emissions of harvesting, mining, processing, transportation, and other energy inputs and carbon outputs from production to consumption. Biofuels should undergo the same net carbon accounting, including fertilizer, fuel used on the farm for seeding and harvesting, processing, and transportation.
2. *Low Carbon Fuel Standard.* A benchmark for promotion of low carbon fuels should be based on energy output per volume of GHG generated, allowing policy to promote fuels with a favorable GHG energy ratio. The Low Carbon Fuel Standard will require all fuel providers in Colorado to ensure the mix of fuel they sell into the Colorado market meet, on average, a declining level of GHG emissions measured in grams of CO₂ equivalent per unit of fuel

energy sold. The standard will also be measured on a lifecycle basis in order to include all emissions from fuel production to consumption.

A LCF Standard is market- and performance-based, allowing averaging, banking and trading to achieve lowest cost and consumer-responsive solutions. A LCF Standard is also *fuel neutral* where fuel providers will choose which fuels to sell and in what volumes. This provides flexible options for compliance including: 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.

An Executive Order would initiate this process, followed by a detailed report and regulatory proceedings before implementation. The appropriate state agencies will undertake a study to develop the framework for the Low Carbon Fuel Standard. Once the study is completed, it will be introduced to the State's legislative proceedings at which point the appropriate state agency will conduct public hearings on the proposal. The final report is expected to be finalized by 2010 and upon the adoption of this report, an appropriate state agency will initiate a regulatory proceeding, establishing and implementing the Low Carbon Fuel Standard.

3. *Credits for Compliance.* Fuel providers, defined as refiners, importers, and blenders of passenger vehicle fuels, would demonstrate on an annual basis that their fuel mixtures provided to the market met the target by using credits previously banked or purchased. Providers that exceed the performance target for the compliance period will be able to generate credits in proportion to the degree of over performance and quantity of fuel provided. These credits can be used for future use or sold to other regulated fuel providers. Penalties for noncompliance will be determined during the Implementation Process.
4. *Contingency for option of High Carbon Fuel Tax.* Options encouraging consumer demand shifts may be considered as a contingency for successful implementation if compliance enforcement for the standard does not meet the goals. The High Carbon Fuel Tax might place a percentage tax on each gallon of fuel sold based on that fuel's GHG emissions measured in grams of CO₂ equivalent per unit of fuel energy sold. The fuel would also be measured on a lifecycle basis in order to include all emissions from fuel production to consumption. This carbon tax provides an economic incentive for both producers and consumers to shift production to fuels with lower carbon content. A tiered system, whereby conventional petroleum is taxed at a high rate and low carbon fuels are taxed at a low rate, if at all, would also generate some revenue for a State Carbon Trust Fund. Revenues collected would finance loans, incentives, and rebates for direct investment in research by Colorado institutions, infrastructure for transportation alternatives, and Colorado production of low carbon fuels.

Since there is much political aversion to a new tax or "fee," this policy option is considered as a contingency that would be considered as an option in the future. A carbon tax could be implemented through a new fuel tax infrastructure whereby the tax might need to be collected at the refinery level (as opposed to the distribution level). Revenues can directly move other goals, favorably shift the market towards low carbon fuels, and assist with funding programs (crops, public trans demos). A carbon tax tied to road use could also provide additional incentives for local production and distribution.

5. *State Government Fleet 'Leadership' Programs.* State Agencies may explore how they can implement the purchasing of low carbon fuels or alternative fuel vehicles into contracts. The

award of construction contracts is another area in which the state can immediately have an effect on GHG emissions. After these programs are implemented, the benefits of GHG emission reductions, as well as lower fuel costs should be documented. The appropriate state agencies would publish a report detailing the benefits of the program.

6. *Carbon Reduction Requirements.* Reduction in carbon-intensive fuels can also be achieved directly through voluntary or mandated goals. Options include a specific mandate (e.g. 10% of fuel used in Colorado markets will be either ethanol or biodiesel by 2025) or flexible mandates (e.g. by 2020, the total amount of GHG emissions from fuel consumption will be 90% of current levels), or a yearly reduction by current producers. Legislative action will put these goals in place. Policy will also be designed to avoid a situation similar to the “flex fuel hoax,” whereby ethanol-capable vehicles were purchased for compliance, but no ethanol had been used. Any requirement should account for actual fuel use and punishments for failure to meet these goals will be implemented.
7. *Transportation Alternatives.* State agencies would calculate the carbon reduction benefits of alternative transportation vehicles such as hydrogen, natural gas, and electricity, including neighborhood electric vehicles (NEVs) and other specialized transportation. Policy would be created to provide incentives for these vehicles and infrastructure for their use based on the achievable GHG reductions.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.38	2.21	MMtCO ₂ e
Net Present Value (2006-2020)	n/a	n/a	\$ Million
Cumulative Emissions Reductions (2006-2020)	0.58	16.14	MMtCO ₂ e
Cost-Effectiveness	n/a	n/a	\$/MtCO ₂ e

Data Sources: The estimate of greenhouse gas emissions reductions from the low carbon fuel standard is based upon a 10% reduction in carbon intensity taken off of a baseline from the Colorado Inventory and Forecast of Greenhouse Gas emissions.

Quantification Methods: The result of the 10% reduction in carbon intensity is based upon the current carbon intensity for light duty vehicle fuels in Colorado and the forecast levels of gasoline consumption for the horizon year. A ramp-up period is estimated so that the 10% goal would be reached at the horizon year, 2020.

Key Assumptions:

- Program starts in 2009, first year of emission reduction
- Program reaches 2% carbon intensity reduction goal by 2010
- Program reaches 10% carbon intensity reduction goal by 2018
- Program only applies to fuel for light duty vehicles, "replacing" current gasoline fuel.

Key Uncertainties

Transportation fuel providers would need to undertake changes in their production and distribution methods in order to achieve the goals.

Additional Benefits and Costs

Additional air quality impacts may result from changes in the sources and types of transportation fuels.

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-6. Clean Car Program (Pavley GHG Standards for Autos)

Policy Description

Colorado would adopt the State Clean Car Program in order to reduce GHG emissions from new light-duty vehicles. Under the current federal law, states have the option of choosing between the federal standard for air pollution emissions and the state standard. This policy assumed the standards, which must still be approved by US EPA, would take effect in Colorado beginning with Model Year 2011 (calendar year 2010). Other Clean Car Program elements can include standards requiring reductions in smog- and soot-forming pollutants, and promoting introduction of very low-emitting technologies into new 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. In 2005, California finalized a set of GHG standards for new light duty vehicles, phased in from 2009 to 2016. More than a dozen states already have adopted or stated an intention to adopt the Clean Car Program standards, including Arizona, California, Connecticut, Maine, Massachusetts, Montana, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Utah, Vermont and Washington.

Policy Design

Goal levels: Adopt GHG emission standards for light duty cars and trucks equivalent to those established by the California Air Resources Board. The California standards phase in during the 2009 through 2016 model years. When fully phased in, the near term (2009-2012) standards will result in about a 22 percent reduction per-mile GHG emissions as compared to the 2002 fleet, and the mid-term (2013-2016) standards will result in about a 30 percent reduction.

Timing: To meet federal compliance, a rule writing process would take place by the appropriate agencies so that Colorado can implement the California standards. Regulatory program could begin with vehicle model year 2011.

Parties Involved: Applies to model year 2011 new cars and light trucks. The law would directly affect automobile manufacturers, car dealers, and consumers.

Other: The California standards currently are being litigated. The timing may be affected by the date of enactment of legislation, likely litigation, and the regulatory process.

Implementation Mechanisms

Institute a regulatory program beginning with vehicle model year 2011.

Related Policies/Programs in Place

None.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.7	3.4	MMtCO ₂ e
Net Present Value (2006-2020)	tbd	-\$1,880	\$ Million
Cumulative Emissions Reductions (2006-2020)	Tbd	18.8	MMtCO ₂ e
Cost-Effectiveness	-\$100	-\$100	\$/MtCO ₂ e

Data Sources:

- CCS, Draft Colorado Greenhouse Gas Inventory and Reference Case Projections
- Diane Brown and Elizabeth Ridlington, Cars and Global Warming: Policy Options to Reduce Arizona’s Global Warming Pollution from Cars and Light Trucks, AZ PIRG Education Fund: February 2006, <http://www.arizonapirg.org/AZ.asp?id2=22371>.
- Elizabeth Ridlington, Tony Dutzik, and Christopher Phelps, Cars and Global Warming: Policy Options to Reduce Connecticut’s Global Warming Pollution from Cars and Light Trucks, Spring 2005.

Quantification Methods:

- The California Air Resources Board (CARB), the Public Interest Research Groups (PIRGs), and a coalition of New England States have all calculated the impact of the Pavley standards on GHG emissions. CCS reviewed and compared results of these analyses of clean car programs, and found all three modeling efforts to be reasonable and valid. The PIRG model has been applied in Connecticut, Arizona, and New Mexico. The model estimated a 13.7% reduction in GHG emissions from passenger vehicles by 2020 in Arizona and a 12% reduction in Connecticut. Both CARB and the New England states estimated higher reductions, in the range of 18-19%. The primary sources of variation in these modeling efforts are: (1) the future mix of VMT by passenger vehicle type, and (2) the fleet penetration rate.
- CCS assumes the effects of the Clean Car Program in Colorado will be greater than the PIRG model results for Connecticut and Arizona, and less than the results of the California and New England modeling efforts. CCS estimates the effect on Colorado GHG emissions in 2020 to be the median of the lower and upper bounds of prior modeling efforts, or 15.5%.
- Estimation of cost to consumers includes a conservative price of \$1.74 per gallon of gasoline, well below current prices. A higher price would yield even greater projected savings to consumers from the clean car program.

Key Assumptions:

- The prior modeling efforts have established a valid and reasonable method of projecting GHG emissions reductions from this policy. The CCS comparison of the three modeling methods provides some independent professional validation of the models and their results. The key assumption of the emissions reduction projected by CCS is that the most likely scenario for emissions reductions is one that would fall between the more conservative scenario projected by the PIRG model and the more optimistic scenario projected by the California and the New England models.

Key Uncertainties

The net emissions impact of this policy depends on fleet turnover rates for light duty vehicles and future patterns of consumer purchase choices between passenger cars and light duty trucks.

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-7. Transit Marketing, Promotion, and Pricing Incentives

Policy Description

This option would promote greater use of public transit and a reduction in automobile travel through various forms of marketing and pricing incentives. Travel patterns are affected by public knowledge and attitudes; therefore marketing becomes an important tool in order to increase transit usage. Instead of merely advertising its availability, transit marketing could be an ongoing dialogue between community partners and transit agencies. Employer-provided transit benefit programs encourage commuting by transit (see TLU-10). Public transit can be made more affordable by offering other price incentives, such as group discounts or discounted pricing for multi-modal purchases.

Policy Design

Goals:

- Expand participation in employer-sponsored annual transit passes (Eco Pass, PassFort, etc.). By 2012, 10% of employees in Colorado's urban areas would be offered annual transit passes; by 2020, 25% of urban area employees would be offered annual transit passes.
- Expand number of employers offering Commuter Checks (pre-tax transit fare program). Goal of 25% transit commuters in state metropolitan areas will use Commuter Checks by 2012 and 50% by 2020.
- Work with transit agencies to develop and implement new transit marketing programs in metropolitan areas.
- In conjunction with TLU-3, this option will reduce light-duty vehicle urban VMT by 6% compared to 2020 VMT under a baseline scenario.⁶ Thus, between 2007 and 2020, light duty urban VMT would grow by 22% instead of 28%.

Timing: New marketing programs and discounted fare programs implemented by 2009.

Parties Involved: Transit agencies, CDOT, MPOs.

Implementation Mechanisms

Regulatory mechanisms

- Regulatory requirement that employers over a certain size threshold must provide transit passes to employees if located within a jurisdiction that offers them; STATE LAW
- Require TDM plans, including transit pass provisions, as a condition of development approvals for commercial and residential developments over some size threshold if

⁶ VMT reduction goal of 6% based on recent modeling by Robert Johnston of University of California, Davis.

located within a jurisdiction that offers ecopasses. (Boulder generally does this as part of the development review process for anything requiring discretionary approval.) LOCAL GOVERNMENT ORDINANCE

- Require all public employers located within jurisdictions that offer transit passes to provide them to employees. STATE LAW
- Require all public educational institutions at middle school, high school, community college and university level to provide transit passes to students. STATE LAW
- Pass a state law or regulation that has State agencies “opt-out” of doing transit passes. (Assumes State agencies can now only “opt- in” to such programs.)

Incentives mechanisms

- Provide matching funds to employers to start transit pass programs. (Boulder and Boulder County currently have programs which provides a subsidy during the first year, the subsidy is reduced the second year, and eliminated the final year.) STATE DOT FUNDING
- Provide matching funds to residential neighborhoods to start transit pass programs. LOCAL GOVERNMENT FUNDING
- Provide a state tax incentive for employer transit pass programs. STATE LAW

Transit agency mechanisms

- Ensure that all major transit systems in Colorado offer Ecopass-like programs (RTD and Transfort already do).
- Investigate the existing Colorado Rural Transportation Authority law to see if it allows formation of a state-wide RTA. Discourage counties and cities from forming regional RTAs.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

Quantified as part of TLU-3.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-8a. Fuel Tax Increase

Policy Description

The state would increase the gasoline tax, thereby increasing the cost of driving and encouraging vehicle owners to drive less. A portion of the gas tax revenues could be used to fund improvements in alternative travel options or other GHG mitigation strategies.

Policy Design

The state would increase the gasoline tax by \$0.15 per gallon, to \$0.37 per gallon. This would effectively raise the retail price of gasoline by approximately 5%. Implementation no later than Jan 1, 2010.

Timing: See above.

Parties Involved: State Legislature, Colorado citizens, Governor.

Implementation Mechanisms

Straightforward use of existing tax mechanism. A TABOR election would be required to authorize the increase.

Related Policies/Programs in Place

Colorado’s current gasoline tax is 22 cents/gallon.

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.17	0.50	MMtCO ₂ e
Net Present Value (2006-2020)	TBD	TBD	\$ Million
Cumulative Emissions Reductions (2006-2020)	0.39	3.86	MMtCO ₂ e
Cost-Effectiveness	TBD	TBD	\$/MtCO ₂ e

Data Sources:

Much research is available on the consumer response to higher fuel prices. Elasticity values measure the decrease in VMT induced by an increase in fuel price. The work of Ken Small is

regarded as particularly authoritative on this topic. Small provides separate elasticity values for short and long term responses to increased fuel prices.⁷

Quantification Methods:

Fuel tax

- Short term light-duty VMT reduction = 5% * -0.09
- Long term light-duty VMT reduction = 5% * -0.43

Key Assumptions:

Consumers would initially respond to the price increase by reducing or shortening unnecessary vehicle trips. In the long term, consumers would respond to higher fuel prices by purchasing more fuel efficient vehicles, living closer to work, switching to alternate modes, etc. Long term responses are in full effect by 2015.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

Because Colorado has a problem funding its transportation system, the Governor's Transportation Finance and Implementation Panel may propose a fuel tax increase, among other possible revenue streams, in order to solve that problem. If so, then the travel-reduction objective of this Policy Option would be met, and an additional tax increase in aid of climate protection would be neither needed nor feasible.

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

⁷ Small, Kenneth A. and Van Dender, Kurt. Fuel Efficiency and Motor Vehicle Travel: The Declining Rebound Effect. July 17, 2006.

TLU-8b. Variable Priced Insurance

Policy Description

Variable priced insurance transfers some of the fixed annual auto insurance premium to a variable basis, thereby encouraging vehicle owners to drive less. One form of this concept is “pay-at-the-pump insurance,” whereby insurance premiums are paid as a fuel tax surcharge. Another form is Pay-As-You-Drive (PAYD) insurance, whereby a portion of vehicle insurance payments are assessed on a per-mile basis. Variable priced insurance has been promoted by a variety of groups for reasons that include emissions reductions, safety (through decreased driving) and fairness (by changing insurance costs to more closely track the portion of individuals' risk that is created by miles driven).

Several companies in the U.S. offer PAYD insurance today:

- Progressive Insurance is running an initial 5,000-car pilot in Texas, which has seen reductions in driving of about 20%.⁸ A similar pilot in Minnesota filled up its 4,800 spots quickly, and Progressive has since rolled out the program in Michigan and Oregon.⁹
- GMAC Insurance and OnStar vehicle services have designed a new mileage discount program that will allow motorists who own GM Vehicles with OnStar service to earn an extra discount based on the miles they drive. This program is currently available in Arizona, Indiana, Illinois and Pennsylvania with plans to expand the program to additional states in the near future.
- King County Metro (Seattle) is in negotiations with an insurance company to run a five-year pilot program offering PAYD insurance to some of its 150,000 Transit Pass holders. King County is seeking \$2.2 million from the government and partner agencies to fund a statewide PAYD pilot program.

Any of these programs or pilots could be useful sources of models for a Colorado pilot project.

Policy Design

Colorado would change insurance regulations to enable PAYD insurance, and initiate and promote an aggressive pilot of PAYD. Successful adoption of PAYD could happen either through competitive pressure whereby increasing numbers of companies offer it in order to stay competitive or through a change in state policy mandating insurance companies to offer PAYD as an option at some point after it has been demonstrated to effectively reduce VMT.

⁸ For mid-program summaries of the Texas initiative, see: www.nctcog.org/trans/air/programs/payd/index.asp.

⁹ See <https://tripsense.progressive.com/>

Rates can be set—as most insurance rates are—for classes. PAYD rates would be charged within classes, so that a driver in that class (for example, “rural”) traveling the average distance would pay the same under PAYD as before.

The necessary equipment for remote mileage readings is standard on GM OnStar-equipped vehicles. Add-on equipment to relay mileage automatically has been added in several pilot projects for several hundred dollars. All model year 1996 vehicles and newer have on-board diagnostics (OBD) that already electronically monitor mileage. This data can be quickly downloaded via transponders. Also, current odometers are sufficiently tamper-proof to support yearly mileage readings with no additional technology. A system would need to be set-up to manually read odometers where VMT cannot be monitored electronically.

Goals: Assuming a pilot program is successful and the State mandates insurance companies to offer PAYD, market penetration could increase to 50% by 2020.

Timing: See above.

Parties Involved: Insurance companies, State Legislature, Colorado citizens, Governor.

Implementation Mechanisms

Authorization and pilot project, followed by evaluation and statewide implementation. Would likely require action by state insurance commission.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.32	0.94	MMtCO ₂ e
Net Present Value (2006-2020)	TBD	TBD	\$ Million
Cumulative Emissions Reductions (2006-2020)	0.70	7.19	MMtCO ₂ e
Cost-Effectiveness	TBD	TBD	\$/MtCO ₂ e

Data Sources:

The Arizona Public Research Interest Group (PIRG) Education Fund analyzed the potential GHG savings from a Pay-As-You-Drive (PAYD) automobile insurance policy. The strategy for a PAYD policy analyzed assumes that insurers are required to offer mileage-based insurance for certain elements of vehicle insurance, including collision and liability. The PIRG Education Fund assumes the PAYD policy is required, phased in over time, and that all drivers in Arizona are eventually covered.

To calculate GHG savings, the Arizona Public Research Interest Group Education Fund converted Arizona state automobile collision and liability insurance expenditures to an insurance cost per mile (6.4 cents per mile). If insurance consumers pay 80 % of their collision and liability insurance on a per-mile basis, then drivers would be assessed about a 5.1-cent charge per mile. This per-mile insurance charge would reduce vehicle-miles traveled by about 8 %.¹⁰ (To put this charge in context, at 20 mpg, 5.1 cents/mile = ~\$1/gallon of gasoline.)

CCS compared the PIRG Education Fund results for estimated reductions in vehicle miles of travel with other studies of PAYD policies, including those produced by the Economic Policy Institute and Resources for the Future (RFF). CCS found that the AZ PIRG estimates were comparable with other estimates, which ranged from 8 % to 20 %. The 8 % reductions estimates CCS used for estimated reductions in vehicle miles of travel and greenhouse gas emissions reductions fell within the lower range of the comparable estimates.

Quantification Methods:

- 2010 Reduction = LDV VMT * 10% of drivers * 8%
- 2020 Reduction = LDV VMT * 50% of drivers * 8%

Key Assumptions:

The PAYD program is voluntarily adopted by drivers. 50% of drivers drive less than the average. These drivers stand to benefit monetarily from participating in PAYD without changing their driving habits. Therefore at maximum implementation, 50% of drivers will participate.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

Although variable priced insurance can be designed to have no relative impact on high-mileage classes such as rural drivers, concerns about potential disproportionate impacts on high-mileage classes will remain until detailed implementation proposals are developed.

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

¹⁰ Elizabeth Ridlington and Diane E. Brown, *A Blueprint for Action: Policy Options to Reduce Arizona's Contribution to Global Warming*, Arizona Public Research Interest Group Education Fund, April 2006, pp. 25-26. <http://www.arizonapirg.org/AZ.asp?id2=23683>. See also: <http://www.serconline.org/payd/links.html>, which links to a wide variety of PAYD studies and materials.

TLU-9. Parking Management

Policy Description

The location, supply, and pricing of parking can have a major impact on travel decisions, including choice of mode. *Parking management* refers to policies and programs that result in more efficient use of parking resources. Managing parking by restricting parking availability or encouraging market rate pricing can encourage more transit usage, ridesharing, bicycling, and walking. Reducing requirements for parking supply can also encourage infill and transit-oriented development by lowering the cost of such projects.

Policy Design

This option would encourage innovative parking management by local governments as a way to reduce automobile use and encourage infill and transit-oriented development. Local governments influence the supply and/or management of most public and private parking. When appropriately applied, parking management can significantly reduce the number of parking spaces required in a particular situation, providing a variety of economic, social, and environmental benefits. Specific action items are listed below.

Employer-to-Commuter Parking Incentives to Encourage Mode Shift (see TLU-10)

- *Parking cash-out* – Commuters who are offered subsidized parking can choose cash instead.
- *Discounted or preferential parking* for rideshare (carpool and vanpool) vehicles.
- *Bicycle parking and changing facilities* increase the convenience and security of bicycle transportation.

Market Based Incentives

Unbundled Parking means that parking is rented or sold separately, rather than automatically included with building space. Developers can make some or all parking optional when selling buildings.

Example: An apartment that normally rents for \$1,000 with two parking spaces could be unbundled to \$800 plus \$100 per parking space.

Policies/Regulations:

- *Parking tax reform* includes various tax policies that support parking management, including *commercial parking taxes* (a tax on parking rental transactions) and *per-space parking levies* (a special property tax applied to parking facilities).
- *Improve Enforcement and Control* – Ensure that parking regulation enforcement is efficient, considerate and fair.

- *Address spillover parking* – Use management, enforcement and pricing to address spillover problems, such as undesirable use of nearby parking facilities.
- *Parking requirements* – Reduce or eliminate requirements for minimum number of parking spaces at new development; establish parking caps for new development.

Goals:

- By 2010, establish a state program to encourage local governments to voluntarily revise parking policies in accordance with the actions outlined above.
- By 2010, state lead by example by adopting parking incentives to encourage mode shift (as outlined above) for state-owned parking facilities.

Timing: As described above

Parties Involved: Local governments, public and private sector businesses, developers.

Implementation Mechanisms

Parking pricing in most instances does not require a vote of the people. Code changes often require public meetings to be held to adopt/revise ordinances, giving the public the opportunity to provide input. Parking policies should primarily be customer oriented – not revenue or violator oriented.

A phased implementation strategy is recommended. Depending on the parking supply already available, local governments may skip some of the steps if they have already been incorporated as part of an integrated parking management and transportation plan.

Zoning Code Changes: Most municipal codes require developers and employers to provide a certain number of parking spaces for every built square foot of space, or for a certain number of employees or customers at the site. Local governments can amend parking requirements to limit, rather than require a minimum number of parking spaces per floor area or employee. This approach encourages development density, preserves land for other uses, and makes it easier for employers to adopt parking mgmt programs to reduce the demand for driving.

Shared Parking Facilities: Shared parking facilities serve multiple users or destinations. This is most successful if destinations have different peak periods. Developers could be charged “in lieu fees” to help fund public parking facilities instead of providing private facilities that serve a single destination. This tends to be more cost effective and efficient. It can be mandated or optional.

Unbundle Parking: Unbundling means that parking is rented or sold separately, rather than automatically included with building space. This is more equitable and efficient, since occupants only pay for parking they need. Location-efficient mortgages can incorporate unbundled parking.

Smart Growth: See TLU-1. A general term for development policies that result in more efficient transportation and land use patterns, by creating more compact, development

with multi-modal transportation systems. These land use patterns, in turn, tend to reduce vehicle ownership and use, and so reduce parking requirements. They allow more sharing of parking facilities, shifts to alternative modes, and various types of parking pricing. Effective parking management is a key component of smart growth.

Congestion Parking Pricing: Local municipalities can charge more during peak driving hours for on-street parking using advanced parking meters. This encourages drivers with flexibility to drive during less congested hours, spreading parking demand more evenly throughout the day, and reducing local traffic congestion.

Parking Tax Reform: Parking tax reform includes tax policies that support parking management, including commercial parking taxes on parking rental transactions and per-space parking levies applied to parking facilities. These can help reduce parking supply and increase parking prices, as well as providing revenues for public programs.

Improve Enforcement and Control: Improving enforcement and control supports parking management by increasing regulatory and pricing effectiveness. As parking management activities expand, so too should enforcement activities. Occasional “amnesty” notices should be part of any enforcement program. Parking policies should primarily be customer oriented – not revenue or violator oriented.

Improve User Information and Marketing: Provides information to travelers about parking availability, regulations, price, and about travel options, such as walking, ridesharing and transit. User information can be provided by signs, maps, brochures, websites, and electronic guidance systems.

Financial Incentives: Travelers (mainly commuters) are offered financial benefits for reducing their automobile trips; basically the benefits represent the cost savings that result from reduced parking demand. *Parking cash-out* means that commuters who are offered subsidized parking can choose cash instead. Another incentive is to provide *discounted* or *preferential parking* for carpool/vanpool vehicles. In urban areas commuters tend to shift to walking and transit. In suburban areas they tend to shift to cycling and ridesharing.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.03	0.03	MMtCO ₂ e
Net Present Value (2006-2020)	0	0	\$ Million

Cumulative Emissions Reductions (2006-2020)	0.09	0.34	MMtCO ₂ e
Cost-Effectiveness	0	0	\$/MtCO ₂ e

Data Sources:

Parking cash-out

- Employees by firm size: County Business Patterns 2005
- The number of parking spaces subject to the regulation is estimated using the national percentage of employees with access to free parking (Shoup, Donald. “Congress Okays Cash Out”, Access Fall 1998 No. 13) and the percentage of free parking spaces that are leased rather than owned by employers (California Legislative Analyst’s Office, “Extra Cash or Free Parking”, 2002).
- Average monthly parking cost in Denver: Downtown Denver 2006 Parking Inventory
- Average monthly parking cost in Boulder:
http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=3546&Itemid=1273

Parking surcharge

- Parking inventories for Boulder and Denver¹¹

Quantification Methods:

Parking cash-out

- We modeled the program after California’s parking cash-out law, which requires employers with 50 or more employees that provide free parking on leased spaces to provide a cash-out program.
- We used the EPA’s Commuter model to assess the impact of an employer parking cash-out program on light-duty VMT. Major inputs include the number of affected employees (36,000 in Denver and 11,100 in Boulder) and the amount of the parking subsidy (\$5.90/day in Denver and \$3.10/day in Boulder).

Parking surcharge

- We estimated the total number of public parking spaces in downtown Denver, Boulder, Fort Collins, and Colorado Springs based on data from Denver and Boulder.
- Reduction in VMT = No. of parking spaces * vehicles per space per day * average vehicle round trip length * increase in parking charge * elasticity of demand

Any net costs associated with parking management policies are negligible. The parking cash-out program does not incur any change in real costs to either employers or employees. A parking surcharge represents an additional cost to drivers, which is offset by additional fiscal revenue.

Key Assumptions:

Parking cash-out

¹¹ Downtown Denver 2006 Parking Inventory ; City of Boulder Parking Best Practices Review, Final Report, Nov. 7 2005

- The parking cash-out program applies to employers with 50 or more employees that provide free parking on leased spaces.
- Results presented are based on implementation in downtown Denver and Boulder only. The amount of employer subsidized leased spaces in other cities is presumed to be negligible.

Parking surcharge

- A parking surcharge of 10% goes into effect in 2010.
- Each parking space accommodates an average of 2 vehicles per day, with an average round trip length of 21 miles.
- We assume an elasticity of -0.2. Vaca and Kuzmyak (2005)¹² found that the price elasticity of vehicle travel with respect to parking pricing ranges from -0.1 to -0.3 (meaning that a 10% increase in parking price would typically be expected to reduce vehicle trips by 1% - 3%, depending on the location, availability of transit and HOV options, demographics, etc.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

¹² Vaca and Kuzmyak, 2005. "Parking Pricing and Fees" Chapter 13, TCRP Report 95, Traveler Response to Transportation System Changes, Transit Cooperative Research Program, Transportation Research Board.

TLU-10. Commuter Benefits Programs

Policy Description

Employers can significantly reduce automobile travel by their employees when they offer commuter benefits programs. Such programs often include free or low cost transit passes, strong telework programs, carpooling matching and vanpool subsidies, guaranteed ride home services, parking cash-out, amenities for bicyclists, and other benefits. State and local government agencies can offer these programs to their employees and can encourage private employers to offer such programs. The state can also require that large employers to participate in an employee trip reduction program.

Policy Design

The ultimate goal of this option is to shift commuters from single occupancy vehicles (SOVs) to alternative modes of transportation. Commuter benefits programs should be part of a larger Colorado Corporate Climate Challenge, which would tie in with the Residential/Commercial/Industrial (RCI) sector program(s) to also encourage energy conservation and minimize waste. It could be a stand alone program or serve as a menu item in the Corporate Climate Challenge.

- Ensure employer support and participation.
- Have state commit \$10M dollars to the program by 2010 (possible funding through creation of Clean Energy Fund, if approved in 2007).
- Could seek legislation to create a multi-modal capital transportation fund and require the transfer of excess state revenues up to \$50 million into the fund through FY 2011-16. Fifty percent of the funding would be allocated to state projects, 27 percent to counties, and 23 percent to municipalities.

Goals: By 2010, all employers in Colorado served by a transportation authority or district with more than 100 employees will offer a commuter benefits program. To reach this over-all goal:

- By 2010, 300 employers in Colorado will participate in the national Best Workplaces for Commuters program. (Currently, approximately 160 Colorado employers participate.)
- By 2010, all state agencies, all colleges and universities, and all local governments (over 100 employees) who are served by a transportation authority or district will offer a commuter benefits program with benefits no less than those established for the national Best Workplaces for Commuters program.
- By 2010, the state would adopt an employee trip reduction act and require that employers with more than 100 workers (per location) participate in an employee trip reduction program.

Timing: Full implementation by 2010. 2008 for legislation for a potential vote in 2008 or 2009 to be effective sometime in 2010.

Parties Involved: CDOT, MPOs, municipalities, regional transportation districts or authorities, employers, state legislature.

Implementation Mechanisms

Issuance of an executive order mandating that all state agencies, state universities, and local governments with greater than 100 employees in one location implement a commuter benefits program meeting the Best Workplace for Commuters National Standard of Excellence (www.bwc.gov).

Drafting of a State Bill mandating that all private employers and private colleges/universities with more than 100 employees in one location and served by a transportation authority implement a commuter benefits program meeting the Best Workplace for Commuters National Standard of Excellence.

Scoping of a guidance document for how program funds will be distributed as incentives to state agencies, local governments, colleges/universities, and private employers.

OPTION (if cross-cutting Corporate Climate Challenge is approved)

Coordinate with the other policy working groups to implement a cross-cutting Corporate Climate Challenge for the State of Colorado. Develop specific benchmarks in each of the following categories: energy use reduction/renewable energy, solid waste reduction, and single occupancy trip reduction. Tax incentives could be given to private entities that earn points by meeting reduction goals across sectors. Initial Corporate Climate Challenge participation could require conducting a greenhouse gas inventory and registering with the multi-state climate registry that will begin in Colorado in 2008 (www.theclimateregistry.org). Corporate Climate Challenge participation could be either mandatory or voluntary for employers with more than 100 employees at one location and could be incentivized with program funds.

Related Policies/Programs in Place

The Environmental Protection Agency's Best Workplace for Commuters National Standard of Excellence (www.bwc.gov) provides guidance, standards, and resources for entities to develop commuter benefit programs.

Several states have implemented commuter benefits programs/ordinances:

<http://www.nctr.usf.edu/clearinghouse/statestatutes.htm#AZTRO>

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.42	0.45	MMtCO ₂ e
Net Present Value (2006-2020)	TBD	TBD	\$ Million
Cumulative Emissions Reductions (2006-2020)	1.26	4.77	MMtCO ₂ e
Cost-Effectiveness	TBD	TBD	\$/MtCO ₂ e

Data Sources:

- Number of employees affected: County Business Patterns 2005 and Current Employment Survey (Bureau of Labor Statistics), May 2007.
- Average daily VMT per employee: EPA's Commuter model

Quantification Methods:

- VMT Reduction = affected employees * average daily commute VMT * 250 days/year * -11.50%

Key Assumptions:

- Average reduction in employee VMT by employers participating in the Best Workplaces for Commuters program is 11.5%. (Assumption based on average results of several possible program configurations, as determined by EPA's Commuter model.)
- All commercial establishments with 100 or more employees will provide benefits that meet the Best Workplaces for Commuters standards.
- All state and federal agencies as well as the local governments of Denver, Boulder, Fort Collins, and Colorado Springs will provide benefits that meet the Best Workplaces for Commuters standards.

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

- Can the State of Colorado mandate the implementation of Best Workplace for Commuter programs for all state agencies and local governments?
- How can Colorado get large employers to participate and buy-in to the program? Should the program be mandated or voluntary?
- Should the commuter benefit program be instituted as a stand-alone program or as part of a larger Colorado Corporate Climate Challenge?

- How should limited program funds be distributed as incentives to all potential participants?

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-11. Driver and Consumer Education

Policy Description

Education is the first step to successful implementation. Drivers will voluntarily reduce fuel use and GHG emissions from their activities when they have the information necessary to make proper decisions.

The option would involve development and implementation of a curriculum that addresses the limiting of GHGs in transportation through:

- Improved vehicle maintenance – regular vehicle tune-ups; fuel efficient tires; coolest temperature fueling; etc.
- Improved vehicle operation – turn off vehicle while parked; speed limit observation; elimination of ‘jack-rabbit’ starts
- Improved transportation choice – low- GHG emitting vehicles; right size vehicle; car-pooling; use of alternative fuels; walking; biking; telecommuting; mass transit

This curriculum would be a requirement for all driver training programs with questions pertinent to training included on the written/driving portion of private and commercial driver licensing tests. (There are currently driver training programs in Utah and Arizona incorporating this type of curriculum in classroom settings.) In addition, programs including this curriculum are to be mandated for both state and municipal fleet operators. All GHG saving application methods included in the curriculum would be enforced at state and municipality fleet levels.

In the interest of time and expense, it is recommended that existing curriculum from such entities as DOE or National Energy Foundation be examined for application and modified as needed.

Policy Design

Goals:

- Reduce transportation GHG emissions through education to promote intelligent transportation purchasing choices and vehicle operation.
- Consumer information program would begin in 2008, with program expansion as resources are made available.
- By 2009, the State or appropriate agency would develop a marketing program for fuel efficient replacement tires and energy efficient driving practices and devices.
- By 2010, the State or appropriate agency would ensure that a training be delivered for all state and municipal fleet operators.
- By 2010, private and commercial driver licensing tests would be modified to incorporate information about fuel saving driving practices.

Timing: See above.

Parties Involved: Driver training programs; DMV; State, Commercial and Municipal Fleets

Implementation Mechanisms

It is recommended to solicit help for curriculum development by such non-profit organizations as Colorado’s Clean Cities Coalitions, American Lung Association and Colorado Energy Science. U.S. DOE Grant funding may be available to aid in the development. Once developed, the information can be disseminated throughout state driver training programs, both private and public. It can be delivered to all State fleet groups and can be used by Department of Motor Vehicles to select pertinent questions for license testing.

Related Policies/Programs in Place

At present, there is curriculum being delivered in High School Driver Training Programs at Amphitheater School District in Tucson, Arizona with contact there Marc Lappitt and at Jordan School District in Salt Lake County, Utah with contact being Jim Hinckle.

Types(s) of GHG Reductions

Net reduction in CO₂ emissions.

Estimated GHG Savings and Costs per MtCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	Not quantified	Not quantified	MMtCO ₂ e
Net Present Value (2006-2020)	Not quantified	Not quantified	\$ Million
Cumulative Emissions Reductions (2006-2020)	Not quantified	Not quantified	MMtCO ₂ e
Cost-Effectiveness	Not quantified	Not quantified	\$/MtCO ₂ e

Data Sources: N/A

Quantification Methods: Not quantified

Key Assumptions: N/A

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD