Transportation and Land Use (TLU) Policy Option Descriptions (POD)

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2009–2025 (Million $)	Cost-Effective-ness ($/tCO_2e$)	Level of Support
		2015	2025	Total 2009–2025			
TLU-1	Develop and Expand Low-GHG and Alternative Fuels	*Methods of Analysis and performance goals to be Discussed*					Pending
TLU-2	Add-On Technologies for Existing Vehicles and New Vehicles	*To be assessed following agreement on policy language and performance goals*					Pending
TLU-3	Smart Growth Planning	*Methods of Analysis and performance goals to be Discussed*					Pending
TLU-4	Improving Transportation System Management (TSM)	*Methods of Analysis and performance goals to be Discussed*					Pending
TLU-5	Increasing Choices in Modes of Transportation	*Methods of Analysis and performance goals to be Discussed*					Pending
TLU-6	Factoring GHG Emissions into Transportation and Land Use (TLU) Planning Processes	*Methods of Analysis and performance to be Discussed*					Pending
TLU-7	Incentive Programs for Increased Vehicle Fleet Efficiency	*To be assessed following agreement on policy language*					Pending
TLU-8	Increasing Freight Movement Efficiencies	*To be assessed following agreement on policy language*					Pending

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/tCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Note: The numbering used to denote the above pending priority policy options is for reference purposes only; it does not reflect prioritization among these important draft policy options.

TLU-1A. Develop and Expand Low-GHG and Alternative Fuels

Policy Background:

The 10 billion gallons of imported transportation fuel used annually in Florida is responsible for 40% of the greenhouse gas production, also creating a significant imbalance in trade and contributing to our strategic dependence. Oil prices have increased by 100% from 7/02/2007 to 7/01/2008 with no end in sight, increasing the cost of gasoline and damaging the economy of Florida as well as other states. Increased efficiency and the development of renewable alternatives could mitigate these adverse effects. Development of large scale, domestic, renewable fuels will provide a cost-competitive alternative that can stabilize the value of automotive fuels and other petroleum-derived products, and stimulate local economies.

Renewable fuels from biomass, cellulosic residues, and energy crops have been identified by the USDA and DOE as our best near term opportunity to reduce oil dependence and greenhouse gas emissions. The sunshine state of Florida ranks near the top in potential production of energy crops and residues (agricultural, forest, and municipal) for fuel ethanol. Development of this new industry in Florida will require substantial commercial investment and could result in over 200 biomass advanced biofuels plants that would directly employ more than 12,000 individuals around the state.

The 2008 Farm Bill (HR-2419) has an excellent program (Biomass Crop Assistance Program) to mitigate farming risks for energy crops which has not been sufficiently publicized in Florida and will greatly assist the development of this new industry. This Farm bill also defines "advanced biofuels" very broadly to include liquid and gaseous fuels made from any renewable biomass except the starch from corn.

The existing federal and the 2006 Florida Energy Act provide incentives (in the form of income and sales tax credits) for investments in the production, storage and distribution of biodiesel and ethanol. However, the Florida credits terminate on June 30, 2010 and are subject to relatively low statewide caps on the amount of credits allowable.

Policy Description:

The problems associated with the development of large-scale production of renewable, advanced biofuels are similar in many ways to those for the development of renewable power. Shifting the proportion of power and fuel to renewables is clearly in the best interest of the environment, the state of Florida, and the country.

To effect large-scale changes over time, massive investments of private capital will be required. With both, it is essential to create a large and stable market to mitigate risks and attract long-term investment. Although this has been done in part by legislative mandates in Florida which required Florida to use automotive fuel containing 10% ethanol by 2010, it is hoped that these mandates represent a starting point that can be expanded further to reach the full potential of

Florida for renewable fuel production. This will be facilitated by specifically ensuring market access for these fledgling renewable industries by requiring that all advanced biofuels produced from non-food materials be purchased and used to reduce emissions in the state. Finally, it is essential to ensure fair market compensation for the new renewable product to provide market opportunity. The combination of ombined Federal state incentives for advanced biofuels should provide sufficient investment opportunity to build this new industry.

Policy Design:

1. Goals: Development of sufficient advanced biofuels production and distribution infrastructure to replace 30% of petroleum-based automotive fuel by 2030 consistent with the national goal.

2. Timing: Startup of at least one full scale advanced biofuels production plant in Florida by 2012 (>10 mil gal/yr), with rapid expansion to produce up to 100 plants within the state by 2020 and 200 plants by 2030.

3. Coverage of parties: Farmers and other suppliers of feedstocks, infrastructure contractors, ethanol producers, importers, distributors, and petroleum companies.

Implementation Items:

1. Amend the 2006 Florida Energy Act by extending the expiration date for the credits and increasing the statewide cap (currently $6.5 million) on the credits allowed for investments in the production, storage and distribution of biodiesel (B10-B100) and ethanol (E10-E100)

2. Provide a $0.20 per gallon production incentive to ethanol producers for ethanol that is produced in Florida from Florida-grown biomass and used in Florida automotive fuel. Cumulative annual production incentives paid out may not exceed $50 million. (based on provision widely used in other states).

3. Amend the 2006 Florida Energy Act by extending the expiration date for the credits and increasing the statewide cap (currently $6.5 million) on the credits allowed for investments in the production, storage and distribution of biodiesel (B10-B100) and ethanol (E10-E100)

4. Provide the opportunity to lease public lands for the production of nonfood energy crops consistent with the purposes for which land was acquired and consistent with the identified management plan for the purposes of the public land.

5. Increase awareness of the USDA Biomass Crop Assistance Program designed to mitigate risk to farmers that produce energy crops.

6. Provide the opportunity for public bonds to be used in the financing of advanced biofuels production in Florida.

7. Provide favorable land taxation not to exceed agricultural rates for the production energy crops that are used to produce advanced biofuels in Florida.

8. Develop a comprehensive marketing package to assist in the recruiting of advanced biofuel industries into Florida and compare with opportunities provided in other states.

9. Modify one of our Florida energy grant programs to promote and expand the use of advanced biofuels such as ethanol and biodiesel as clean, renewable transportation fuels, and accelerate the commercialization of new renewable fuel technologies and products by providing grants of up to $100,000 each for the development of business plans, engineering studies, design studies, permit applications, and legal work for potential new biofuels facilities in Florida. (based on the Renewable Fuels Research, Development, and Demonstration Program administered by the Illinois Department of Commerce and Economic Opportunity.) This may overlap our new Florida program (Florida Statutes 377.804).

10. Require that gasoline sold in the state of Florida contain 10% advanced biofuel once in-state production reaches 1 billion gal/yr for three months and 20% once in-state production reaches 2 billion gal/yr for three months (Modified from Pennsylvania HB 1202)

Related Policies/Programs in Place

Following is a link to a federal site which does outline all the various state tax incentives: http://www.eere.energy.gov/afdc/progs/in_matrx.php

Florida Grant Programs information

Alternative Fuels Production Incentive

The Innovation Incentive Program is created within the Office of Tourism, Trade, and Economic Development to provide resources for business projects that allow the state to effectively compete for high-value research and development, including alternative and renewable energy projects. To qualify, an alternative and renewable energy project must involve collaboration with an institution of higher education; provide the state a minimum full return on investment within a 20-year period; include matching funds provided by the applicant or other available sources; and be located in the state of Florida. Additional criteria may apply. For the purposes of this incentive, alternative and renewable energy means electrical, mechanical, or thermal energy produced from a method that uses one or more of the following energy sources: ethanol, cellulosic ethanol, biobutanol, biodiesel, biomass, biogas, hydrogen fuel cells, ocean energy, hydrogen, solar, hydro, wind, or geothermal. (Reference House Bill 7135, 2008, and Florida Statutes 377.804)

Renewable Energy Grants

The Renewable Energy Technologies Grants Program provides matching grants for demonstration, commercialization, research, and development projects relating to renewable

energy technologies, including those generating or utilizing hydrogen or biomass resources. (Reference Florida Statutes 377.804).

The potential interaction between federal and state policy actions related to the Renewable Fuel Standard (RFS) at the national level and various state and regional Greenhouse Gas (GHG) mitigation policies is worth understanding in order to most effectively formulate state and regional policies within the existing context of federal policies regarding transportation fuels.

The most recently passed federal law, the Energy Independence and Security Act (EISA) of 2007, expanded the federal renewable fuel standard significantly. Under the new law, fuel suppliers are required to blend 9 billion gallons of renewable fuel into gasoline. Fuel suppliers must increase the amount of renewable fuel blended into transportation fuels annually, to reach a level of 36 billion gallons in 2022.

Currently, a significant amount of gasoline in the United States is blended with a relatively small portion of renewable fuel in the form of ethanol. Most light duty motor vehicles in the fleet can handle gasoline blended with ethanol when ethanol makes up 10 percent of less of the volume of the fuel. The nation is quickly moving toward a standard of a minimum of 10 percent ethanol blended into gasoline to serve multiple goals including increasing use of renewable fuels, reducing reliance upon imported petroleum and petroleum products, reducing air pollution by producing cleaner burning fuel, and reducing greenhouse gas emissions from the combustion of transportation fuels.

In comparison with the 9 billion gallon renewable fuel goal for 2008, the United States consumed roughly 5 billion gallons of biofuels in 2006. The United States ethanol industry has successfully increased the amount of production from 1.8 billion gallons in 2001 to 6.5 billion gallons by 2007. The estimated ethanol production capacity for 2008 is 13.4 billion gallons, which exceeds the RFS goal of 9 billion for 2008 and also exceeds the RFS goal of 13 billion gallons for 2010.

The 2022 RFS goal of 36 billion gallons is not likely to be achievable through corn ethanol alone, and the
EISA limits the amount of corn ethanol that may be credited toward the RFS goals at 15 billion gallons beginning in 2015. The remainder of the RFS goal – 21 billion the 36 billion gallons - - is expected to be reached through 'advanced biofuels. ' As a result, the federal policy expects that advanced or 'second generation' biofuels will be commercially available in 2015, and will provide the majority of the fuel to meet the federal RFS in the longer term.

State governments and regional associations of state governments are considering and adopting a range of policies to reduce greenhouse gas (GHG) emission from the combustion of transportation fuels. Included in this set of policies under consideration are policies that overlap or interact to some extent\ with the federal Renewable Fuels Standard (RFS) as formulated in the Energy Independence and Security Act (EISA) of 2007. The Low - Carbon Fuel Standard

(LCFS) is the state policy most widely considered by individual states as a means to reduce the carbon intensity of transportation fuels being used.

Two sets of other policies that states are considering that may complement the federal policies are (1) policies that would incentivize or provide for increased capacity for production, blending, and distribution of renewable fuels to the point of fuel stations, and (2) policies that would incentive or provide for increased capacity of the motor vehicle fleet to utilize blends of fuel that reduce the portion of petroleum based products below the 90 % threshold for gasoline and the 95% threshold for diesel fuel and increase the percentage of renewable fuels (corn ethanol, advanced biofuels, and other renewable) above the 10 percent "E10" threshold for gasoline blends and the 5 percent "B5" threshold for diesel blends. Some policies that fall into this second category include promotion of 'flex fuel vehicles' that can safely and effectively use the higher blends of fuels and policies that provide the fuel station infrastructure to pump these higher blends into motor vehicles.

Estimated GHG Savings and Cost Per Ton

Table 1.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006-2020)			$ Million
Cumulative Emissions Reductions (2006-2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

Quantification Methods: TBD

Key Assumptions: TBD

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-1B. Develop and Expand Low-GHG and Alternative Fuels

Alternative fuels can have a key role in the transformation of the energy sector, climate stabilization, and the renaissance of rural areas.

There are "good" and "bad" alternative fuels depending on how they are produced, used, and traded, which in turn determines their ultimate economic, environmental, and social impacts.

Alternative fuel production, trade and use must be cost effective, equitable, and sustainable.

To develop and expand low-GHG and alternative fuels The TLU-1 recommendations are:

1. Integrate and better coordinate policy frameworks
2. Assess and monitor benefits and impacts of alternative fuels production, trade, and use
3. Address negative indirect effects of alternative fuels production, trade and use.
4. Reward positive impacts and investments including through carbon management
5. Build consensus for new projects by supporting informed and continuous dialogue engaging all relevant stakeholders
6. Increase investments in research, development, and demonstration

Public policy with regard to R&D investments should focus on the production of cost effective second generation alternative fuels; build on sustainability lessons learned from first generation alternative fuels to be used for second generation alternative fuels; increase conversion technology performance; and maximize climate change mitigation.

7. Build capacity to enable producers to manage carbon and water
8. Make sure that trade policies and climate change policies work together.
9. Open competition in the transport sector to all options and methods that can displace carbon and imported oil, including demand reduction

Policy Description:

This option seeks to reduce GHG emissions by decreasing the carbon intensity of vehicle fuels sold in Florida. The Low Carbon Fuel Standard (LCFS) would require all fuel providers in Florida to ensure the mix of fuel they sell into the Florida market meets, on average, a declining standard for GHG emissions measured in CO2 equivalent per unit of fuel energy. The State should regulate quality standards for low carbon fuels. Low carbon fuels include, but are not limited to, biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, electricity, and low carbon blends such as E10 or E85. The standard would be measured on a lifecycle basis in order to include all emissions from fuel production to consumption.

Fuel providers (defined as refiners, importers, and blenders of on-road 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 (gasoline and diesel) sold in Florida that would reduce carbon intensity of Florida's on-road vehicle fuels by at least 20 percent by 2020. In addition to the reduction standard and program timing, the following issues should be addressed in creating the program:

- Credit Generation and Trading
- Lifecycle Model and Boundary Conditions

Timing: Following design period, program would be implemented prior to 2020. Fuel providers would be required to meet the 20% reduction standard no later than 2020. If interim targets for reduction in carbon intensity are established, they will reflect the likely importance of cellulosic ethanol to meeting the standard and the likelihood that cellulosic ethanol will not be available in large commercially quantities until 2015 or later.

Parties Involved: Fuel providers, Florida Department of Economic Development, Florida Department of Environment and Natural Resources.

Compliance Pathways: The Low Carbon Fuel Standard does not specify any particular fuel or vehicle technology. The table below shows three possible compliance scenarios that would meet the standard for gasoline in California. As envisioned in California, much of the reduction in passenger vehicle fuel carbon intensity would be met by increasing ethanol use.

Low Carbon Fuel Standard Compliance Scenarios for California

Scenario Number-->	**1**	**2**	**3**
Total Petroleum Displaced by Low-Carbon Fuels (B gal)	3	3.1	3.2
Low-Carbon Fuels			
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/

The table below shows lifecycle ("well-to-wheels") GHG impacts of various biofuels options.

Estimated Biofuel Impacts on GHG Emissions

Fuel/Technology	Blend	Feedstock	Reduction (grams of GHGs per mile)*
Ethanol	E10	corn	1.5%
Ethanol	E10	cellulosic	7.2%
Ethanol	E85	corn	17.6%
Ethanol	E85	cellulosic	83.2%
Biodiesel	B20	soy	9.9%
Biodiesel	B20	canola	11.2%
Biodiesel	B20	palm	12.0%
Biodiesel	B100	soy	53.9%

* Ethanol reductions estimated relative to gasoline; biodiesel reductions estimated relative to diesel fuel. Actual reductions depend on many factors in the production, distribution, and use of fuels.
Sources: GREET v1.7 outputs; (S&T)2 Consultants, *Sensitivity Analysis of GHG Emissions From Biofuels in Canada*, 2006.

Implementation Mechanisms

A Governor's Executive Order would initiate the process for development of the LCFS, followed by a detailed report and rule-making proceedings that would involve consultation before implementation. The appropriate state agencies will undertake a study to develop the framework for the LCFS. Once the study is completed, it would be introduced to the State's legislative proceedings, at which point the appropriate state agency will conduct public hearings on the proposal. Once adopted, an appropriate state agency will initiate a rule-making proceeding, establishing and implementing the LCFS.

The LCFS is market-based and performance-based, allowing averaging, banking and trading to achieve lowest cost and consumer-responsive solutions. A LCFS 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.

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.

Related Policies/Programs in place:

Renewable Fuels Standards (U.S. and Florida)
Florida's state renewable fuel standard is among the most progressive standard in the country.

Goal levels:

Timing: Achieve by 2022 under the Federal RFS and 20__ under Florida RFS

Parties Involved: Federal Government, State Government, Producers, Marketers, Blenders, Consumers, and Refiners.

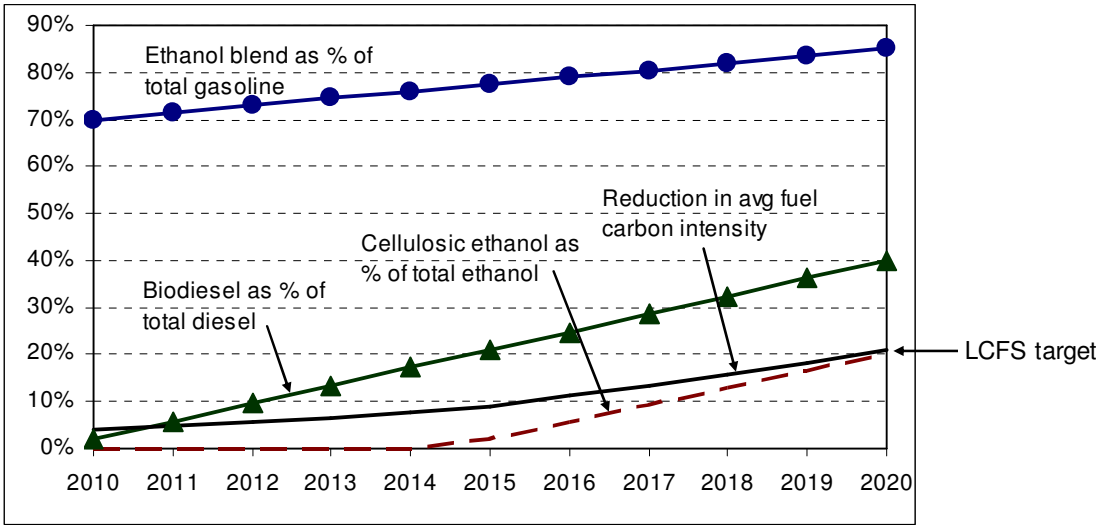
Estimated GHG Savings and Cost Per Ton:

	2012	2020	Units
GHG Emission Savings	TBD	TBD	$MMtCO_2e$
Net Present Value (2008-2050)			$ Million
Cumulative Reductions (2008-2050)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

- Data Sources: Lifecycle impacts of biofuels obtained from Argonne National Laboratory's GREET model (v1.7). Fuel consumption, fuel economy, and gasoline and ethanol prices obtained Energy Information Administration's Annual Energy Outlook, 2007 and 2008 releases. Price of biodiesel and conventional diesel obtained from U.S. Department of Energy Alternative Fuels Price Report, January 2008.
- Quantification Methods: The estimate of greenhouse gas emissions reductions from the low carbon fuel standard is based upon a 20% reduction in average carbon intensity of gasoline and diesel fuel sold in Florida. A ramp-up period is estimated so that the 20% goal would be reached at the horizon year, 2020.

  The GHG "credit" attributed to this mitigation option is the incremental reduction on top of any reduction due to current (baseline) use of biofuels. Ethanol currently makes up approximately 70% of Florida gasoline sales; biodiesel sales are currently small and assumed to be zero.

  In order to estimate the likely ramp up in biofuels usage needed to meet the LCFS, a scenario was developed, shown in the figure below. In this scenario, by 2020, ethanol sales in Florida would represent 85% of gasoline sales, with 40% of the ethanol used in flex-fuel vehicles (E85) and the remainder used conventional vehicles operating on E10. All ethanol would come from corn feedstocks through 2014. Starting in 2015, the market share of cellulosic ethanol would ramp up so that by 2020, 20% of all ethanol would be from cellulosic feedstocks. Biodiesel (from soy) would make up 40% of total Florida diesel sales by 2020. The cumulative impact of this increase in biofuels is a 20% reduction in average fuel carbon intensity in 2020.



Cost is calculated as the incremental cost of biofuels per gallon of gasoline equivalent (for ethanol) or diesel equivalent (for biodiesel) multiplied by total consumption of each fuel. We account for the consumer price of fuel plus the federal subsidy, in the form of an excise tax credit to blenders, for ethanol and biodiesel. This subsidy amounts to 51 cents per gallon for ethanol and 1 dollar per gallon for biodiesel from virgin oils. Ethanol and gasoline prices in future years are drawn from the Energy Information Administration's Annual Energy Outlook, 2008. Based on information from the U.S. Department Energy's Alternative Fuels Price Report, January 2008, the difference in the average price of biodiesel compared with conventional diesel in the Midwest is approximately $0.17 per gallon. This difference, combined with the one dollar subsidy, results in an assumed full cost of biodiesel of $1.17 more per gallon than the cost of conventional diesel.

- Key Assumptions:
    - Program starts in 2010, first year of emission reduction
    - Program reaches 20% carbon intensity reduction goal by 2020
    - Program applies to all on-road vehicles, "replacing" current gasoline and diesel fuel.
    - Baseline accounts for:
        - 70% ethanol existing market share, blended as E10 with ethanol feedstock for baseline usage assumed to be 100% corn.
        - 0% existing biodiesel market share.

Key Uncertainties

Transportation fuel providers would need to undertake changes in their production and distribution methods in order to achieve the goals. Because the policy does not prescribe particular technology pathways, there is uncertainty surrounding which fuels and technologies

fuel providers will use to meet the standard. The program assumes that providers will use the most cost-effective options to meet the standard, but compliance costs are unknown at this time.

Additional Benefits and Costs

Use of biodiesel reduces diesel particulate matter emissions, which have adverse public health effects. Use of ethanol also reduces air pollutant emissions.

Feasibility Issues

There are feasibility issues associated with transporting large volumes of biofuels to and within the state, as well as distributing biofuels to consumers. For example, ethanol cannot move in the pipeline network used for transport gasoline and diesel fuel. These issues would need to be resolved in order to achieve the LCFS.

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU 2. Add-On Technologies for Existing Vehicles and New Vehicles

Low rolling resistance (LRR) tires can reduce vehicle fuel use and associated carbon dioxide emissions by as much as x percent. Manufacturers currently use LRR tires on new vehicles, but they are not easily available to consumers as replacement tires. When installing original equipment tires, carmakers use low rolling resistance tires as a way to contribute to meeting the federal automobile fuel economy (CAFÉ) standards. When replacing the original tires, consumers often purchase less efficient tires. Currently, tire manufacturers and retailers are not required to provide information about the fuel efficiency of replacement tires. In addition, there is no current minimum standard for fuel efficiency that all replacement tires must meet.

The rolling resistances of the various tires consumers can purchase have significant variations depending on tread design, composition, cross-section geometry, and inflation pressure. State policy can improve the fuel economy of the light duty vehicle (LDV) fleet by setting minimum energy efficiency standards for replacement tires and requiring that greater information about Low-Rolling Resistance (LRR) replacement tires be made available to consumers at the point of sale.

In addition, other add-on technologies may be considered which result in more fuel efficient operation of motor vehicles. One example of these add-on technologies would be the addition of 'real-time' indicators of MPG (miles per gallon) for those vehicles that do not already provide such information to motor vehicle operators. The installation of technologies that provide drivers with current fuel efficiency (MPG) information has the potential to increase driver awareness of fuel consumption rates under different operating conditions for vehicles.

Provide consumers with information about the fuel efficiency and cost in relation to the purchase, maintenance, and operation of their vehicles. Consumers would receive real-time information on MPG while their vehicles are in operation and alerts when their tire pressure is too low (i.e., devices such as Air Alert Valve Caps). Generally, a set of four light-emitting diode (LED) self-calibrating tire pressure valve caps such as Tire Alert cost about $22.00, and real time MPG monitoring systems such as ScanGauge are about $100.00. In addition, consumers would receive public education and information relating to the impact that vehicle maintenance practices have on the operation of their vehicles. Finally, consumers would be encouraged to consider a vehicle's MPG before and at the time of purchase of their vehicles.

Independent review of validity of any claims relating to add-on technologies should be provided to assess effectiveness of such claims.

Policy Design:

- **Goal levels:** Require that replacement tires be LRR tires achieving an average x.x% gain in fuel economy.
- **Timing:** The requirement would begin in 20xx.
- **Parties:** State government, industry

Implementation Mechanisms

An appropriate State agency would initiate a fuel-efficient tire replacement program. The program could include consumer education, product labeling, and minimum standards elements. The program would include consideration of the technical feasibility and cost of such a program, the relationship between tires fuel efficiency and tire safety, potential effects upon tire life, and impacts on the potential for tire recycling. In addition, the program would exempt certain classes of tires that sell in low volumes, including specialty and high performance tires.

The program would include consideration of the technical feasibility and cost of such a program, the relationship between tire fuel efficiency and tire safety, potential effects upon tire life, and impacts on the potential for tire recycling. In addition, the program may determine it necessary to exempt certain classes of tires that sell in low volumes, including specialty and high performance tires.

The minimum standard is likely to be less stringent than the energy efficiency of original equipment tires. Such a regulation would improve the fuel efficiency of the overall LDV fleet, but not necessarily the fuel efficiency of all tires since consumers would still make choices in the marketplace. The replacement tires in the future would be on average more fuel efficient than those historically purchased, but are likely to be, on average, not as fuel efficient as the tires included as original equipment by the automobile manufacturers.

Information and Education: Provide information to the general public and commercial businesses (i.e., taxi and food delivery services) that use light-duty vehicles for daily business that the improved fuel efficiency is directly related to the decreased rolling resistance of a vehicle's tires. Information on the potential annual costs savings using LRR tires would also be provided. For example, a car averaging 15,000 miles per year would have annual fuel savings estimated to be $124. A chart of recommended tire models would be included with information on product labeling and minimum standards elements. Best scientific information including the results from tests of tires conducted by the tire manufacturers, the California Energy Commission, and the National Academy of Sciences would be reviewed and incorporated.

The manufacturers of the LRR tires would be contacted to encourage the promotion of their relevant products through regional newspaper and television advertising. The producers of LRRs may freely provide promotional materials.

Promotion and Marketing:

State Lead by Example: The state will lead by example by initiating a fuel efficient tire replacement program. This would include all weather fuel efficient tires and would require legislative approval for rental rates for vehicles, both owned and leased.

Over time, all state fleet tires in need of replacement will be changed to LRR tires, if available for the vehicle type and season.

Voluntary LRR Standards: Establish voluntary LRR standards that achieve an average 4.0% gain in fuel economy.

Encourage Procurement of LRR Tires:

- Encourage local/county governments to act consistently with and support state procurement on their behalf.
- Encourage federal agencies located within the state to act accordingly with and support state actions.
- Encourage businesses that depend upon vehicles to conduct daily business to act accordingly with and support state actions.

Marketing Program: Develop a marketing program with tire dealers and consumers to encourage the purchase of LRR tires. This effort might include a voluntary labeling program for tire fuel efficiency.

University Research: Encourage the Florida university system to conduct research on alternative non-combustible applications for used tires.

Website: All state-supported programs would have dedicated detailed websites. In addition to information and materials, program participation by the various governmental agencies and individual businesses (i.e., success stories) would also be documented and extolled.

Technical Assistance: Contact the LRR manufacturers and tire distributors to coordinate objectives and obtain technical support for outreach materials.

Funding Mechanisms and/or Incentives: Replacement of tires on state fleet vehicles is already budgeted through the Florida DOT annual funding processes.

Voluntary and or Negotiated Agreements: Work with the manufactures and affected parties to achieve objectives with flexibility of the timelines.

Codes and Standards: The state of California and Germany have developed substantial information pertaining to LRR tires due to legislative actions that require tires to be replaced with more efficient ones. Associated documentation identifies testing methods and LRR standards. The appropriate state agency can review the information and establish suitable Florida standards.

Pilots and Demonstrations: Coordinate with product developers to help them promote their technologies.

Reporting: The state will develop a system for tracking purposes so that the state can eventually determine the turnover to LRR tires and the benefits achieved from the conversion. A simple tracking system would be established relatively easily by contacting the primary tire distributors of the major Florida cities on an annual basis and estimates can be gathered from their inventories.

Enforcement: No enforcement actions are necessary initially when the program is instituted as a voluntary program. After the mandatory labeling becomes in effect, spot checks at the primary tire distributors in the main Florida cities would be annually conducted by the county health departments and the state staffs.

Related Policies/Programs in Place

In October of 2003, the state of California adopted the world's first fuel-efficient replacement tire law (AB 844). This law directed the California Energy Commission to develop a State Efficient Tire Program that includes the following issues: 1) develop a consumer education program, 2) require that retailers provide labeling information to consumers at the point of sale, and 3) promulgate through a rule development process a minimum standard for the fuel efficiency of replacement tires sold. The California rule development process began January 2007.

Estimated GHG Savings and Cost Per Ton

Assuming 20% market penetration by 2012 to achieve the goal of 50% market penetration by 2015 with an increase to 100% at Year 2020, achieving an average 4% improvement in fuel economy:

Table 3.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

- Tires and Passenger Vehicle Fuel Economy, Transportation Research Board/National Research Council, 2006.
- California State Fuel-Efficient Tire Report, California Energy Commission, January 2003.

Quantification Methods:

CCS evaluated and compared a series of existing assessments as follows:
At the request of the United States Congress, the National Research Council of the National Academy of Sciences (NRC/NAS) conducted a study of the feasibility of reducing rolling resistance in replacement tires. The 2006 NRC/NAS study made the following conclusions:

- "Reducing the average rolling resistance of replacement tires by a magnitude of 10% is technically and economically feasible.

- Tires and their rolling resistance characteristics can have a meaningful effect on vehicle fuel economy and consumption."

A 2003 study commissioned by the California Energy Commission found that about 300 million gallons of gasoline per year can be saved in that state with lower rolling resistance tires. A set of four low rolling resistance tires would cost consumers an estimated $5 to $12 more than conventional replacement tires. The fuel-efficient tires would reduce gasoline consumption by 1.5% to 4.5%, saving the typical driver up to $411 over the 50,000-mile life of the tires, assuming a 4.0% fuel efficiency increase associated with the LRR tires and $3.50 a gallon gasoline. Consumers would save more than $470 million annually at current retail prices or approximately $1.4 billion over the 3-year lifetime of a typical set of replacement tires.

The provision of consumer information on its own is not expected to produce measureable reductions in GHG emissions. However, the provision of consumer information has the potential to increase the effectiveness of other related programs. As a result, the GHG emissions reductions that may be associated with these programs is incorporated into the estimates for other TLU policies.

Key Assumptions:

The estimate of costs associated with LRR replacement tires account for faster tire wear (assuming that tires have lower tread) and an increase in the cost of production that is passed through to consumers. According to the NRC/NAS study, consumers would pay an additional $12.00 per year to replace tires (including installation), and they would pay an additional $1.00 per tire due to increased production costs.

Key Uncertainties

The low rolling resistance fuel efficient tires program is based upon existing off-the-shelf technologies and products that already exist in the consumer marketplace. These tires are already available in the marketplace, and are comparable with the tires included as original equipment on newly purchase light-duty vehicles.

Additional Benefits and Costs

None noted

Feasibility Issues

None noted

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU 3. Smart Growth Planning

Policy Description

The essence and intention of smart growth within the context of climate change is to establish a policy framework, clear guidelines, and measurement parameters for the development of new, and the re-development of older, human habitat communities that will have a net-zero carbon effect on the general environment and reduce overall GHG emissions. This can be accomplished through the complex interactions of the three primary elements of community development that have a direct impact on GHG emissions and affect climate change:

- Construction energy and building lifetime energy use—measured by the protocols of LEED, GreenGlobes, and/or the Florida Green Building Coalition;
- Individual VMT generation and other transportation energy use (e.g., deliveries, maintenance, buses, security, health, fire, and safety) necessary to support human communities; and
- The changing of land uses from carbon sequestering land uses (e.g., forests, agriculture, parks, wetlands) to carbon releasing land uses (e.g., building sites, roadways) and development patterns.

In the aggregate, measured at various levels of development from small to large, the balance of carbon sequestering and carbon releasing land uses must *at least* balance and eventually become negative in releasing carbon to reduce GHG emissions and reverse existing adverse trends in our atmosphere.

In accordance with Florida's schedule of increasing standards for both building energy efficiency and appliance energy efficiency outlined in HB 697 and HB 7135, community development and re-development patterns should follow a similar schedule of reduced overall energy use and increased efficiencies, thereby reducing GHG emissions and the energy and resources necessary to provide all the requisites for human lifestyle support.

Taken singularly in isolated policies, these three factors—land use changes, individual VMT and transportation energy use in necessary daily lifestyle support, and the life cycle energy use of buildings—are not making the necessary reductions in GHG emissions to meet climate change goals. Considered together in an integrated set of policies and guidelines they can accomplish the goal of a carbon neutral footprint of human community activities on the general environment.

Policy Design

Goal levels:

- Require that municipalities increase the penetration of green initiatives into all aspects of their operations and programs by adopting an approach for internal and external stakeholders to work together to develop integrated energy and environmental solutions to reduce GHG emissions through multi-pollutant prevention, environmental improvements, greater operational efficiency, and expanded public acceptance of green initiatives.

- Require that community development proposals submitted for review are certified by LEED, GreenGlobes, Florida Green Building Coalition, or other approved certification to ensure that the new development results in a net reduction in GHG emissions relative to a business as usual baseline scenario.
- Work with LEED, GreenGlobes, and Florida Green Building Coalition to establish both standards and a review methodology to ensure that new development (taken in its entirety) results in a net reduction in GHG emissions relative to a business as usual baseline scenario
- Minimize GHG emissions from development through phased-in approach with short term goal and long term goal.
- Compact Urban Development and Mixed Use Development to be encouraged
- Pedestrian –friendly development and urban infill development to be encouraged

Timing: Establish a consortium of universities to provide both research and training to local, regional and state officials as they implement the goal that new development does not increase GHG emissions.

Parties Involved: State and local governments, regional governments, private property owners, development companies, investors.

Implementation Mechanisms

Related Policies/Programs in Place

TBD

Estimated GHG Savings and Cost Per Ton

Table 4.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

Quantification Methods: TBD

Key Assumptions: TBD

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 4. Improving Transportation System Management

Policy Description:

Transportation System Management (TSM) is the concept of pairing transportation demand with transportation supply to help transportation networks serve the demand in an effective and efficient manner. Effective system management may utilize a variety of strategies based on advanced technologies, market-based incentives, regulations and design standards. Each strategy provides a relatively small benefit to greenhouse gas (GHG) reduction, but when applied in concert, substantial gains can be achieved. TSM strategies attempt to reduce the number of trips being taken by single occupant vehicle (SOV), shorten trip lengths, reduce vehicle delay, increase the reliability of the transportation network and reduce idling and other transportation actions that result in increased GHG emissions. The goal of TSM is to reduce the daily vehicle miles traveled (VMT) per capita on the transportation network. Effective TSM will also reduce vehicle hours traveled (VHT) per capita, which measures the amount of traffic congestion delay. Reduction of either VMT or VHT is highly correlated with a reduction in GHG emission.

TSM attempts to both improve transportation system performance and alter travel behavior through a combination of technological improvements, incentives, design, and restrictions. Technological improvements include traffic signal coordination, lane management, traveler information displays, and other intelligent transportation system applications. Incentives can include policies that financially favor desired behavior or allow users to gain a time advantage and include value pricing and smart parking strategies. System design is also important, since infrastructure and technology can be adapted to encourage less driving and includes access management applications and intersection improvements. Last, users can be barred from performing certain actions that would negatively impact the efficiency of the transportation system. TSM policies can be instituted at every level of government. Some can have a virtually instant affect, while others require many decades to reap full benefits.

Policy Design:

Goal levels: Develop and implement policies and strategies that include program funding, financial and development incentives, infrastructure investment and regulatory requirements to promote transportation system management improvements that result in reduced VMT and/or VHT which in turn result in reduced GHG emissions. These actions, taken in concert with other aggressive transportation and land use policy actions, should be designed to reduce urban area VMT by 7%–10% by 2020 and by 9%–12% by 2050 and VHT by amounts that are associated with these VMT reductions. VHT reduction is recognized as a means of reducing driver delay while also reducing excess fuel consumption in congested traffic.

- Reduce existing and future trips and trip lengths in an effort to reduce both VMT and VHT. Driving less, in terms of both hours and miles driven, will result in a decrease of GHG emissions. This can be achieved through the aggressive implementation of specific transportation demand management strategies and coordinated transportation and land use decision-making.

- Distribute existing and future trips in terms of both time and geography—when trips are taken and where trips are taken—in order to reduce congestion and smooth traffic flow. Reducing congestion and smoothing traffic flow by changing peoples driving patterns–either by changing the time of day that they drive or the route that they take– will result in less idling and stop-and-go driving. This will reduce VHT and GHG emissions. This can be achieved through increased investment in supporting transportation infrastructure, implementation of specific transportation system management strategies and the aggressive implementation of specific transportation demand management strategies.
- Improve transportation system operations to improve travel conditions on the transportation network. This includes traffic signal coordination, real-time traveler information, advanced computerized lane and parking space management, value pricing at toll locations, intersection improvements including round-about conversions, advanced incident management and other traffic operations applications. This will reduce the frequency of transportation actions that contribute to high levels of GHG (e.g., jack rabbit starts, idling, excessive braking). It will require an increased investment in transportation system management related infrastructure and aggressive implementation of non-capacity operational strategies that improve the flow of vehicles on the transportation network.

Timing: TSM strategies have a variety of implementation timeframes. Some, such as workplace-based strategies, can begin implementation almost immediately. Others that are based on infrastructure construction will have an implementation timeline of four to ten years. Systemic changes to the urban landscape have the longest horizon, up to 25 years.

Parties Involved: State government agencies (DOT, DCA, and DEP), regional government (MPOs, RPCs, and RTAs), Local transportation providers (public transit agencies, airports, seaports and expressway/bridge authorities), and local governments.

Implementation Mechanisms

Collectively, the implementation mechanisms recommended under this policy attempt to reduce GHG emissions by enhancing system efficiency and modifying travel behavior and conditions through transportation system management strategies. Those strategies will require a combination of program funding, financial and development incentives, infrastructure and technology investment, and regulatory requirements implemented at the state, regional and local level.

Reduce existing and future trips and trip lengths: These implementation mechanisms are intended to result either in the reduction of trip lengths or the complete elimination of certain trips. This will result in a reduction of both VMT and VHT that will reduce GHG emissions. Implementation mechanisms intended to reduce trips and trip lengths include:

- Encouraging and/or incentivizing public and private sector employers to implement *telework programs* for eligible employees. This will result in fewer work-based vehicle trips.
- Encouraging and/or incentivizing public and private sector employers to implement *job-sharing* programs for eligible employees. This will result in fewer work-based vehicle trips.

- Encouraging and/or incentivizing public and private sector employers to implement *carpooling/vanpooling* programs for eligible employees. This will result in fewer work-based vehicle trips.
- Requiring and/or incentivizing enhanced *coordination between land use and transportation decision-making* to reduce distances between clusters of affordable housing and employment opportunities. This will reduce work-based vehicle trip lengths.

Distribute existing and future trips in terms of both time (when a trip is taken) and geography (where a trip is taken): These implementation mechanisms are intended to change peoples driving patterns and behaviors (either by changing the time of day that they drive or the route that they take) resulting in reduced congestion and smoother traffic flows. Reducing congestion and smoothing traffic flow by will result in less idling and stop-and-go driving which in turn, will result in fewer GHG emissions. Implementation mechanisms intended to change peoples driving patterns and behaviors include:

- Encouraging and incentivizing transportation facility operators to implement *value-pricing policies.* This will encourage travelers to change the time of day they make various types of trips and result in fewer vehicle trips during peak operating hours. Alternatively, this will encourage travelers to change the route by which they make various types of trips and result in a more even distribution of vehicle trips across the transportation network.
- Encouraging and incentivizing public and private parking facility operators to implement *smart parking policies.* This will encourage travelers to change the time of day they make various types of trips and result in fewer vehicle trips during peak operating hours.
- Encouraging and incentivizing local governments and private developers to build up the *supporting transportation network* (e.g., lower functional class street network, local transit routes supporting express bus routes and premium transit options, more sidewalks and bike paths). This will encourage travelers to make appropriate route and mode choices and result in a more even distribution of vehicle trips across the transportation network.
- Encouraging and/or incentivizing public and private sector employers to implement *flex time and compressed time programs* for eligible employees. This will result in fewer work-based vehicle trips during peak operating hours and, in the case of compressed time programs, fewer work-based trips overall.

Improve transportation system operations to reduce occurrences of transportation actions that contribute to high levels of GHG (e.g., jack rabbit starts, idling, excessive braking): These implementation mechanisms are intended to maximize the efficiency of the transportation system through the application of technology and advanced design. Management of the supply of transportation capacity through the application of various technologies and design strategies will result in reduced congestion and smoother traffic flows. Reducing congestion and smoothing traffic flow will result in less idling and stop-and-go driving which will, in turn, result in reduced GHG emissions. Implementation mechanisms intended to change peoples driving patterns and behaviors include:

- Increase investment in *intelligent transportation system* (ITS) technologies at all levels. In particular, investment should be focused on technologies that smooth the flow of traffic (e.g., reducing congestion, braking, idling), resulting in a reduction of VHT and GHG emissions.
- Increase investment in *incident management programs* and technologies. Quickly responding to incidents will reduce the negative impacts that incidents have on the smooth flow of traffic. Incident management can also include roadside assistance programs such as FDOT's "Road Rangers." Incident management will result in a reduction in incident related stop-and-go traffic, in turn reducing VHT and GHG emissions.
- Increase investment in *traffic signal coordination.* This will smooth the flow of traffic on the roadway network and result in reduced idling, braking and jack-rabbit starting, in turn reducing VHT and GHG emissions.
- Encourage and/or incentivize *access management programs* at all levels, particularly those that coordinate land use and transportation decision-making. This will reduce conflicts on the roadway and make vehicular movements more predictable (including for transit vehicles, bicyclists and pedestrians). This will result in smoother traffic flows and reduced stop-and-go traffic conditions, reducing VHT and GHG emissions.
- Increase investment in *traveler information technologies.* This will provide travelers with a more predictable travel experience and let them make rational choices that maximize their efficient use of the transportation network. This will result in less congestion and VHT and, in some cases, reduced VMT.
- Increase investment in *managed lanes technology.* Real time lane management allows for the more efficient flow of vehicles through the transportation network, maximizing available capacity and smoothing traffic flow. This will result in less congestion and VHT and, in some cases, reduced VMT.

Related Policies/Programs in Place

TBD

Estimated GHG Savings and Cost Per Ton

Table 5.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources: TBD

Quantification Methods: TBD

Key Assumptions: TBD

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. Increasing Choices in Modes of Transportation

Policy Description:

An important strategy in reducing greenhouse gas (GHG) emissions produced from transportation sources is reducing the growth rate in vehicle miles of travel (VMT) per capita. Providing modal alternatives to the single-occupant vehicle can reduce the number of trips on the highway system and VMT per person. Modal alternatives can include bus transit, rail transit, paratransit, ridesharing, greenways, on and off road bicycle facilities and all manner of pedestrian facilities.

Public transit vehicles generate much lower levels of GHG per person-mile. The challenge is that transit (bus and rail) accounts for only 2 percent of trips made in the United States today, compared with 5% in Canada and 10% in Western Europe.[1] An expansion of transit services will require a substantial increase in funding for both infrastructure and operations. Increased transit use is key to reducing the growth rate of VMT. A higher rate of transit use can be achieved by expanding transit services, increasing transit's competitiveness with other modes, ensuring safety and security of transit systems, and educating the public about transit options available in their community.

Many employers partner with local governments and non-profit agencies to promote and fund local carpooling and vanpooling programs. These rideshare alternatives, combined with employee incentives, telecommuting, and parking strategies are often effective in reducing travel demand and ultimately, VMT. High-occupancy vehicle (HOV) lanes or high-occupancy toll (HOT) lanes on major transportation corridors can encourage ridesharing by providing reduced travel times and/or tolls for vehicles carrying passengers.

Bicycling and walking do not generate GHGs. A convenient and comprehensive bicycle and pedestrian network can be a pleasant, stress free option to driving on congested roadways. Although each modal alternative by itself may not significantly reduce GHGs, an integrated system of bicycle, pedestrian and public transportation facilities could provide a significant benefit in enhancing mobility while reducing the growth rate in VMT.

Policy Design:

Goal levels: Double transit ridership to equal levels found in Canada. Increase the percentage of people that walk, bicycle, carpool, vanpool or telecommute. Develop and implement policies and strategies that include program funding and financial incentives that expand non-automobile infrastructure and provide modal alternatives to single-occupant vehicle travel.

Timing: 1–30 years

[1] Making Transit Work: Insight From Western Europe, Canada, and the United States—Special Report 257. Transportation Research Board: Washington, DC. 2001.

Parties Involved: Public transit agencies, local governments, metropolitan planning organizations, regional transportation authorities, Florida Department of Transportation and local businesses.

Implementation Mechanisms

Improve availability and accessibility of service:

- Create new public transportation systems and options, including bus rapid transit (BRT). New transit systems and routes can serve areas presently without transit, or they can add new destinations from areas currently served.
- Encourage local governments and developers to provide and expand bicycle and pedestrian networks. A more complete infrastructure will entice travelers to shift from single occupant vehicles to walking or bicycling for appropriate trips. Better bicycle and pedestrian access also promotes transit use, since all transit trips begin and end as a pedestrian.
- Create new rail systems for passengers and freight. Work with rail companies to expand intercity passenger services. Partner with ports and rail lines to expand freight rail facilities to reduce the need for trucks on the roadways and incorporate rail services in the planning and design of new transportation corridors.
- Construct new or expand existing High Occupant Vehicle (HOV) or High Occupant Toll (HOT) lanes. This will encourage travelers to shift from single occupant vehicles to high occupant vehicles for all types of trips, particularly during peak hours. Transit vehicles can also use HOV/HOT lanes to gain a time advantage over operating in standard traffic lanes.

Increase the competitiveness of alternative modes:

- Increase investment in public transit systems to provide more frequent service and longer service hours, making transit more time competitive with single-occupant vehicle travel. This will encourage travelers to shift from automobiles because their wait time for their needed bus or train will be shorter.
- Hold steady or decrease the user cost of transit, making transit more cost competitive with single-occupant vehicle travel. As fuel prices increase, people will find significant cost savings in moving to alternative modes. Group discounts and employer pass programs can also reduce the cost to the user.
- Increase capital investment and management procedures to ensure reliability of transit service. Users, particularly those who can afford a car, will be more likely to use transit if the service is reliably on-schedule and on time.
- Simplify and streamline the use of transit through fewer required transfers.
- Allocate preferred and discounted parking spaces to vanpools and carpools.
- Offer “guaranteed ride home” programs to those who regularly use transit, vanpools, or carpools. Under these programs, people who must work beyond their usual shift ending time receive free or discounted taxis or door-to-door transit. This gives flexibility to the worker’s schedule and encourages the use of alternative modes.

Alternative modes must be safe and secure:

- Public transportation must be secure. Patrons should be able to observe law enforcement and counter-terror procedures and feel safe while using public transportation services. The public is mindful of the vulnerability of mass transit systems, and is more likely to ride if they feel secure.
- Crime must be kept to minimum on the streets and on transit. If the streets are not safe, people will not walk or ride a bicycle. Similarly, if transit vehicles and stations are unsafe, everyone who can drive will do so.
- Passengers must be safe from injury on the transportation system. This includes traffic control measures, intersection markings, and proper signage.

Educate and market the availability of alternative modes:

The benefits of alternative modes must be promoted to the public. Direct mail, traditional advertising, schools, and employers should be utilized to distribute information on transit and bicycle/pedestrian facilities to the public. The more knowledge the public has about their options, the greater share of alternative mode use.

Related Policies/Programs in Place

TBD

Estimated GHG Savings and Cost Per Ton

Table 6.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

Making Transit Work: Insight From Western Europe, Canada, and the United States—Special Report 257. Transportation Research Board: Washington, DC. 2001.

- Current and historical transit ridership, by mode type (urban/rural, bus or paratransit) – from National Transit Database and/or state sources
- Operating cost per passenger and per passenger-mile, by mode type (urban/rural, bus or paratransit) – from National Transit Database and/or state sources

- Revenue per passenger and per passenger-mile, by mode type (urban/rural, bus or paratransit) – from National Transit Database and/or state sources

Quantification Methods:

This analysis examines the reductions in GHGs possible from a shift from personal motor vehicles to transit, which emits fewer GHGs per passenger mile. The calculation of GHG reductions must account both for the reduction in the number of private vehicle miles, but also the partially offsetting increase in transit vehicle miles traveled. In addition to these direct reductions from individuals' shift of modes, two more long-term, indirect effects are estimated. The shifting of trips from personal vehicles to transit can reduce the number of vehicles on the road, and thus the amount of congestion in urban areas. Reducing congestion improves traffic flow and can improve actual average vehicle fuel economy achieved. Studies have also demonstrated that increased transit service can help shape land-use patterns, enabling densities and proximity to the center of urban areas. This has been demonstrated to result in reduced VMT by those living in transit corridors, even if they never use transit.

Direct quantification was undertaken for improvements in service frequency, travel time reductions, the introduction of new and expansion of existing routes and services for bus, bus rapid transit, commuter rail, and vanpools.

Travel time improvements provide a well-documented means of improving transit service and ridership. There is a direct benefit to riders as the improved service reduces their "generalized cost" (time cost plus financial cost) of their trip. In addition to co-benefits in improving service frequency, there is about a -0.4 elasticity for transit travel time. Estimated percentage reductions in travel time will be multiplied by this elasticity to calculate the ridership increase

Service frequency increases ridership from existing riders and attracts new riders. As waiting time between vehicles has been shown to be valued about two times more strongly on average than actual travel time, this mechanism can prove very effective. There is a reported -0.5 elasticity for service frequency alone (time between buses), while the aggregate impacts for service improvements in time between vehicles and travel time have shown an elasticity of between -0.6 and -1.0, incorporating the time and frequency impacts of aggregate increases in service miles provided. As above, the service frequency elasticity will be applied to improvements in this parameter. As a redundancy check, the aggregate elasticity was also applied to the total increase in vehicle revenue service miles to capture both factors together.

For service expansions and introduction, both the literature and a first-order statistical analysis show a long run elasticity for service expansion of between 0.6 and 1.0. An elasticity of 1.0 was applied to service increases.

Key Assumptions:

- Transit services can be expanded and introduced at the same average operating cost as current services. The mix in transit modes provided to further include bus

rapid transit, commuter rail, and van pools decreases the average net operating cost from the existing almost purely bus service being offered.

- New or improved services will be able to attract ridership in a manner consistent with service improvements in other similar areas of the country (i.e., the Florida transit market is not at saturation). Current fuel price increases provide a strong argument for this assumption.

Key Uncertainties

Funding availability for the provision of additional transit service.

Additional Benefits and Costs

The provision of transit service provides other more direct benefits and cost impacts. Most importantly are travel time benefits that accrue to transit users, reduced air pollution, and congestion relief that affect road users on parallel routes.

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU 6. Factoring GHG Emissions into Transportation and Land Use Planning Processes

Policy Description

This option seeks to ensure that local and state land use and transportation planning considers the impact of land use and transportation decisions on the reduction of greenhouse gas emissions. Transportation accounts for the second largest contributor to greenhouse gas emissions in Florida, and represents approximately 40% of emissions in Florida.

Florida has a long history of local government comprehensive planning, the cornerstone of which was the enactment and amendment of the Local Government Comprehensive Planning (LGCP) and Land Development Regulation Act. Each local government is required to adopt a comprehensive plan that contains certain required elements: a capital improvements element; a future land use plan; a traffic circulation element; a general sanitary sewer, solid waste, drainage, potable water, and natural groundwater aquifer recharge element; a conservation element; a recreation and open space element; a housing element; a coastal management element (where appropriate) and an intergovernmental coordination element. Local zoning codes and land development regulations must be consistent with the policies articulated in the comprehensive plan.

In addition to the comprehensive plan, Florida has adopted as the cornerstone of its growth management transportation framework a policy called concurrency. The policy is based on the premise that public facilities shall be in place concurrent with or prior to the impacts of a particular development. "Concurrency in Florida is tied to provisions in the state growth management act, requiring the adoption of level of service standards, elimination of existing service deficiencies, and provision of infrastructure to accommodate new growth reflected in the comprehensive plan. Plans and development regulations must aim at achieving and maintaining the desired level of service, and comprehensive plans are reviewed by the state for consistency between the capital improvement element and the various elements of the plan, including the future land use plan."[2]

With respect to transportation facilities, the general rule is that transportation facilities needed to serve new development shall be in place or under construction within 3 years after the local government approves a building permit or its functional equivalent that results in traffic generation. The implementation of transportation concurrency has been problematic and the Florida Legislature has adopted a number of exceptions to the general policy. First, in 2005, proportionate fair share mitigation or "pay and go" option for concurrency was adopted that: "allows developments to proceed under certain circumstances, notwithstanding a failure to meet transportation concurrency, where applicants contribute their fair share of the cost of improving the transportation facility."[3] The improvement must be financially feasible within a 10 year time frame and be in or added to the 5 year capital improvements element. Second, specific

[2] Transportation Concurrency—Best Practices Guide, Florida Department of Community Affairs, p.6.

[3] *Ibid*

exceptions from the concurrency requirement are provided for certain public transportation facilities, infill or redevelopment projects, and projects whose impacts are considered insignificant or de minimis.

It is generally accepted that the implementation of the concurrency policy in Florida has had the unintended consequence of encouraging developers to build outside of existing urban cores because lack of excess transportation capacity within these areas; thereby requiring expensive transportation improvements to meet concurrency standards. Development outside of the urban core results in longer trips (both commuting and not) that yield more vehicles mile traveled. Lower density development at the urban fringe and ex-urban development contributes to the premature conversion of natural and agricultural lands thereby reducing the greenhouse gas buffering capacity of the landscape.

During the 2008 session of the Florida Legislature, the Legislature adopted HB 697 that was signed into law on June 17, 2008. The new law requires local governments to include in their local government comprehensive plans policies that address energy efficiency and the reduction of greenhouse gas reductions. The following elements of the comprehensive plan are amended to require:

- Future Land Use Element—includes energy-efficient land use patterns and greenhouse gas reduction strategies.
- Traffic Circulation Element—include strategies to reduce greenhouse gas reductions.
- Housing Element—address energy efficiency in design and construction of new homes.

The Energy Bill, HB 7035, amends the State Comprehensive Plan to include goals related to energy and global climate change. Also the bill provides that each Metropolitan Planning Organization is encouraged to consider strategies that integrate transportation and land use planning "to provide for sustainable development and reduce greenhouse gas emissions."

On a broader scale, long-range visioning activities being conducted at the community and regional levels in Florida are identifying alternatives to current growth practices. Regional visioning enable communities to develop a comprehensive approach to planning for future land use, transportation, conservation, economic development, housing and other community needs. They provide an opportunity for regions to alter current growth patterns, thus modifying future transportation needs and associated energy consumption by enabling people to make fewer trips, make shorter trips, or use alternative modes.

In addition, the Department of Transportation (DOT) produces the Florida Transportation Plan (FTP), a long-range plan that identifies the goals and objectives for the next 20 years. The FTP addresses the needs of the entire state transportation system, not just those owned by DOT, and provide a vision for Florida's transportation and lays out a policy framework to achieve this vision.

A Metropolitan Planning Organization (MPO) is made up of local elected and appointed officials responsible for coordinating transportation planning in a metropolitan area of at least 50,000 people. The 26 MPOs in Florida are responsible for developing long-range transportation plans

(LRTPs) and programs, and for setting transportation funding priorities for the metropolitan areas (s. 339.179, F.S.). DOT's five year work program is developed based on the project priorities submitted annually by the MPOs and county commissions from counties not included in MPO areas. These LRTPs are developed based upon future land use and growth assumptions contained in the LGCPs.

Policy Design

Goal levels:

6.1— All local government comprehensive plans shall be revised to include policies and objectives that address energy efficient land use and greenhouse gas reduction strategies, including:

- Policies that increase density within the urban service area;
- Policies that promote compact development and maximize internal trips within the development;
- Policies that promote transit oriented development within urban service area and encourage the use of transit
- Policies that promote affordable and workforce housing in proximity to major employment centers.
- Policies that target infrastructure investment in greenhouse gas efficient locations.
- Policies that encourage the reduction of trip length and VMT.
- Policies that promote the preservation of greenspace, natural and agricultural areas.

Florida Department of Community Affairs is initiating a rule-making process to comply with recently passed state law on these issues.

6.1a – Any future plan amendment must be supported by data and analysis to demonstrate how the amendment is based upon energy efficient land use patterns and greenhouse gas reduction strategies.

6.2—By December 31, 2009, all local governments shall adopt land development regulations that implement the amended policies that address energy efficiency and greenhouse gas reduction strategies.

6.3—By July 1, 2009, amend the Local Government Comprehensive Planning and Land Development Act to allow local governments to enact mobility fee structures as an alternative to transportation concurrency.

6.4—By December 31, 2010, amend the Florida Transportation Plan to develop goals, objectives and strategies for addressing climate change and reducing greenhouse gas emissions.

6.5—By July 1, 2010, amend the 5-year state transportation work plan to prioritize projects that reduce vehicle miles traveled and consider the greenhouse gas impact of constructing new roads.

6.5a – By July 1, 2010 modify the Efficient Transportation Decision Making process to include climate change considerations (e.g. VMT, GHG emissions) in the evaluation of candidate projects for long range transportation plans and the five-year transportation work program.

6.6— Require Metropolitan Planning Organizations to prioritize projects that reduce vehicle miles traveled in each update of the M.P.O. long-range transportation plan. The ETDM (Efficient Transportation Decision Making) process provides a means to implement this goal.

6.7—By July 1, 2009, require all transportation authorities to give priority to projects that reduce vehicle miles traveled and consider the greenhouse gas impact of constructing new roads.

6.8—By date TBD, reduce Vehicle Miles of Travel (VMT) and associated Vehicle Hours of Travel (VHT) within urban service areas by 10% on per capita basis.

6.9—By July 1, 2009, establish growth policies that provide incentives for developing regional visions that integrate transportation and land use planning to provide for sustainable growth and reduce greenhouse gas emissions.

6.10 Impact Fees programs to be assessed for effectiveness and improvements

Timing: TBD

Parties Involved: TBD

Implementation Mechanisms

In order to assist local governments in implementing the requirements of HB 697, the Department of Community Affairs should prepare model comprehensive plan policies to address the new policies required in the Future Land Use Element, Traffic Circulation Element and the Housing Element. Provisions in Florida law governing the Florida Transportation Planning Process should be amended to require consideration of the greenhouse gas reduction in the setting and prioritizing of transportation projects. Priority should be given to projects that have the result of reducing greenhouse gas emissions or encourage compact development in urban areas. Regional Transportation Authorities should be required to also consider greenhouse gas reduction in the setting of project priorities.

Related Policies/Programs in Place

TBD

Estimated GHG Savings and Cost Per Ton

Table 7.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/$MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

- Total population and population density by Census tract, 1990 and 2000.
- Per-capita VMT by Census tract population density in Florida, from CUTR VMT forecasting model.
- Forecast statewide population growth

Quantification Methods:

- Achieve quantifiable VMT reduction goals of 10% per capita reduction of 2020 the projection off-baseline in urban areas through smart growth - The state of Florida will enable growth and development to achieve VMT reduction goals through a series of policies, including implementation mechanisms identified below. Scientific research shows that VMT reduction in urban areas is quantifiable through improved planning software. Florida agencies will assist local and/or regional governments in using the latest planning technology that measures VMT impacts to assist with decision-making on future growth and development. The more aggressively the policies are pursued, the greater the potential reduction in VMT that would be achievable.

- This analysis considers potential GHG reductions from reductions in VMT for personal (non-commercial) travel, as a result of a shift towards more compact development patterns. The analysis relies on estimates of per-capita VMT by Census tract population density range, as developed by Polzin, *et al* for the Center for Urban Transportation Research (CUTR) VMT forecasting model. The CUTR model is based on analysis of 2001 Nationwide Household Travel Survey data. The model provides estimates per-capita VMT by state for five density ranges. The model is currently set up for years 2005, 2035, and 2055; for this analysis, results were interpolated for CCS analysis years.

- The observed relationship between per-capita VMT and population density is a rough proxy for the effects of Smart Growth development as described above. Higher levels of population density are associated with overall shorter trips because destinations are closer together. In addition, areas with higher population densities are more likely to have pedestrian-friendly design (walkability, mixed-use, etc.) and to support transit service. It is difficult to separate out the individual effects of the various Smart Growth strategies at this aggregate level of analysis, but the analysis should provide an indicator of what can be achieved through a combined set of Smart Growth policies.

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The specific method used to estimate GHG benefits of Smart Growth strategies is as follows:

- Total population in 2000 is identified by five Census tract density ranges as identified in the CUTR model (<500, 500 – 1,999, 2000 – 3,999, 4,000 – 9,999, and 10,000 or more persons per square mile).

- The change in population from 1990 to 2000, and associated share of change by density range, is identified from Census data.

- For the Baseline scenario, new population growth between 2000 and 2020 (as determined from CCS baseline assumptions) is allocated to tract density ranges based on the share of growth in the 1990-2000 timeframe.

- The proportion of existing housing stock (population) that would be redeveloped over this timeframe is estimated at 15 percent, of which two-thirds is redeveloped in place and one-third is redeveloped elsewhere, with this redevelopment allocated to tract density ranges based on the 1990-2000 share of population growth. (The 15 percent and two-thirds figures come from the 2007 Growing Cooler report Section 1.7.3, citing analysis of Census data by Nelson (2006)).

- For the Climate Action scenario, a significant shift in the proportion of new development and relocated redevelopment is assumed to take place, with higher-density tracts (>2,000 persons per square mile) receiving 50 percent of new development under this scenario compared to only XX percent under the Baseline scenario. Total population by tract density under this scenario is then calculated.

- Total personal-travel VMT is calculated under the Baseline and Climate Action scenarios, based on VMT per capita (from the CUTR model) and total 2025 population by tract density range, and the percent reduction in personal-travel VMT is calculated.

  The percent reduction in VMT is adjusted by 90 percent to estimate the percent reduction in GHG emissions. This factor is the same as used in the Growing Cooler report to account for the fact that higher-density areas may experience somewhat lower travel speeds and therefore slightly reduced fuel economy.

- Key Assumptions:
  - Fraction of new population growth and redevelopment by Census tract density, under Baseline scenario.
  - Assumed shift in fraction of new population growth and redevelopment from lower-density to higher-density Census tracts, under Climate Action vs. baseline scenario.
  - Percent of residential building stock redeveloped (off-site) over the analysis timeframe.

Key Uncertainties

Smart Growth scenario analysis depends upon patterns of development that involve decisions of many individual property owners and private capital investors. As result, the scenarios show what is possible under a development scenario but should not be considered as predicted outcomes.

The estimates developed using this methodology are consistent with results found in meta-analysis in the published literature, such as the recent ULI report *Growing Cooler*.

Additional Benefits and Costs

Smart growth generally has very low direct costs to implement, comprised of the governmental costs of altering regulations and zoning and providing education and technical assistance. Tax incentives are an income transfer that results in a public sector cost but offsetting developer revenue. As most smart growth policies (e.g., allowing higher density and mixed use, reducing parking requirements) are deregulatory in nature, they are opening the development market and have significant indirect benefits. An exception is growth boundaries, which restrict the land use market and have an indirect cost.

Alternative patterns of development have a large number of additional impacts, which may both provide benefits and costs. Smart growth provides a range of co-benefits that are well documented in other places. Prominent among these is the reduced cost of providing utilities and infrastructure, as smart growth makes better use of existing facilities and infrastructure and on average has lower demand. Improved air quality, public health (e.g., due to walking), and quality of life are also notable co-benefits.

Feasibility Issues

Smart growth policies are being considered and implemented around the country in a wide range of communities. Because most policies are deregulatory in nature, this significantly lowers political barriers.

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU 7. Incentive Programs for Increased Vehicle Fleet Efficiency

Policy Description:

Florida can reduce its greenhouse gas emissions by improving the fuel economy of the light duty vehicle fleet. The first policy step would be to charge a state agency with tracking the fuel economy of the state's entire fleet. Once a baseline for Florida's fuel economy is established, the state could then establish goals for improving the fuel economy of the entire fleet.

Policy options to meet a goal of higher fuel economy include consumer education about vehicle purchases, monetary incentives through a feebate system or tax credits, investment in a plug-in hybrid infrastructure, and a state policy for scrapping older vehicles that do not have good fuel economy. Information about vehicle fuel economy and consumer benefits of higher fuel economy are available at www.fueleconomy.gov. For example, as the federal agencies responsible for that website explain, "The difference between a car that gets 20 mpg and one that gets 30 mpg amounts to $775 per year (assuming 15,000 miles of driving annually and a fuel cost of $3.10)."

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

- Procurement of efficient fleet vehicles
- Tax credits for efficient vehicles
- Set up incentive program for major corporate fleet owners including rental car and taxi companies.
- CO2-based registration fees and vehicle licensing fees
- Procurement of efficient fleet vehicles (public, private, or other)
- *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.
- *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* – Provide for preferential state-controlled (eg state highways) and local-government controlled (eg, parking) infrastructure and access for alternative fuel vehicles (E10, E85, natural gas, propane, 100% electric, others).
- *Excise Taxes* - A change in new vehicle excise taxes that increases taxes for relatively high-emitting vehicles and reduces taxes for relatively low-emitting vehicles. Overall, excise tax revenue would remain the same.

- *Labeling* - A consumer labeling program that provides buyers with better information on the GHG emissions of new vehicles

Policy Design:

Goal levels/Timing: TBD

Parties Involved: Florida Department of Environmental Protection, Consumer Organizations, FloridaAutomobile Dealers Association. .

Implementation Mechanisms

The proposed policies and programs in this option will need to be passed through the legislative process and implemented by state and local government agencies in partnership with affected parties.

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/).

Some European countries have implemented feebate programs, and other US states are considering both the rebate portion and the 'gas guzzler tax' elements of feebate types programs. In 2007, Canada introduced the "Vehicle Efficiency Incentive (VEI) program, which took effect in March 2007. The program includes both a rebate and a tax component.

Estimated GHG Savings and Cost Per Ton:

Table 8.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:
CCS conducted a review of the most relevant research and analysis on feebate proposals.

CCS made three findings:

1. There has been significant conceptual development of the feebate idea, especially at the national level;

2. There is a need for a greater understanding of potential benefits and costs of state level and multi-state coordinated feebate programs; and

3. There has not been sufficient pilot testing of feebate programs in the United States to provide implementation experience.

CCS assessed recent studies of potential GHG emission reductions from a national feebate program based on modeling work conducted by the U.S. Department of Energy's Oak Ridge National Laboratory (ORNL). CCS also reviewed other relevant recent studies and analyses of feebates conducted by the Canadian government, the State of California, and PIRG. The ORNL and other studies assume a national feebate rate high enough to produce responses from both consumers and manufacturers. ORNL's estimate of the national potential for reduction in carbon dioxide emissions is approximately 11 $MMtCO_2e$ in 2010 and 66 $MMtCO_2e$ in 2020.

Some attempts have recently been made to estimate the GHG emissions reduction potential from individual state feebate programs, including programs proposed for the states of Arizona and California. For example, a recent PIRG analysis suggests that a single state feebate program for Arizona would result in an estimated 0.1 $MMtCO_2e$ GHG emissions reductions in 2020.

These recent estimates of the potential impacts of individual state programs are contingent upon assumptions and analytical methods that have not undergone thorough peer review. Therefore, the results of these analyses are preliminary and should be interpreted with some caution. Further analysis and study of the potential benefits and costs of individual state and multi-state feebate programs would greatly increase confidence in projected results.

- Quantification Methods: TBD
- Key Assumptions:

Key Uncertainties

Consumer reaction to incentive programs varies.

Additional Benefits and Costs

Incentive programs that significantly reduce GHG emissions through vehicle fuel efficiency also have the potential to significantly reduce the amount of transportation fuel consumed from imported sources, thus reducing the dependency of the United States on foreign sources of fuels.

Feasibility Issues

The feasibility of vehicle efficiency incentive programs may be affected by the availability of vehicles that are provided in the marketplace by the limited number of automobile manufacturing firms.

Related Policies/Programs in Place

- New federal CAFÉ standards under development. Rulemaking documents may be found at: http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/

- State of Florida Department of Environmental Protection is undertaking rulemaking process related to adoption of state clean car GHG standards. State law requires that legislature approve such clean car regulations before going into effect. Rulemaking documents may be found at: http://www.floridadep.org/air/rules/ghg/california.htm

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU 8. Increase Freight Movement Efficiencies

Policy Description:

The movement of freight on the state's transportation system plays a critical role in our economy. There has been tremendous growth in freight traffic. National freight forecasts estimate an 89 percent increase in tons of freight by 2035 (AASHTO – Transportation Invest in our Future, America's Freight Challenge, May 2007). To meet this increased demand while minimizing greenhouse gas emissions (GHG) will require many actions. This policy option focuses on infrastructure activities to support a greater increase in freight hauled on rail while considering federal EPA emissions reduction changes that are currently being implemented with over-the-road diesel truck engines.

- Reduced vehicle idling through technologies and practices are already being encouraged through state rulemaking and national partnership programs with freight companies.
- Mode shifting of goods movement from high GHG emitting modes to lower GHG emitting modes (as considered on a ton-mile basis) can be encouraged.
- New engine and vehicle technologies have the potential to increase the fuel efficiency for truck and rail movements of goods.
- Intermodal transfer facilities have the potential to provide for more opportunities to shift goods movement between different modes of travel.

The use of rail to haul freight is more efficient from an energy consumption and GHG emission perspective. According to EPA data, freight railroads account for just under two percent of U.S. GHG emissions from transportation sources. The American Association of Railroads (AAR) estimates that for every ton-mile of freight moved by rail instead of truck, two-thirds less GHG emissions are emitted. AAR also estimates that if 10 percent of long-haul freight now moving by truck moved by rail instead, annual GHG emissions would fall by more than 12 million tons.

The State of Florida and all involved parties will assure the most efficient movement of freight while reducing GHG emissions. This also has the effect of delaying large investment needs to add capacity to the state highway system. With such large growth in freight forecast it is unlikely that freight movements by truck could ever be reduced but shifting more of the growth to rail would minimize the growth of GHG emissions.

Policy Design:

Goal levels: Reduce overall greenhouse gas emissions generated by freight movement through a combination of the following actions:

Timing:

By 2010, the Florida Department of Transportation and other interested parties, will:

- Through regional, statewide and national planning activities, seek to remove bottlenecks (both physical and operational) for the efficient movement of freight by all modes of transportation.
- Establish a Statewide Freight Advisory Committee of public and private parties to identify actions to support the efficient movement of freight and opportunities for intermodal freight movement.
- Support initiatives to encourage railroad capital investment to increase capacity (e.g. tax credits).
- Assist the identification of opportunities for increased intermodal freight movements .
- Seek continued and increased legislative appropriations for the Rail Revolving Loan and Grant Program. This funding supports rail improvements including the construction of rail spurs to industry to encourage use of rail.
- Continue to utilize federal Congestion Mitigation and Air Quality (CMAQ) funding to support rail freight improvements.
- Seek opportunities to support truck stop electrification including the utilization of federal Congestion Mitigation and Air Quality (CMAQ) funding. This could also include incentives (e.g. tax credits) to encourage installation of equipment.
- Provide incentives to trucking firms and truck owners to equip their vehicle(s) with devices that eliminate the need to idle including battery-electric auxiliary power systems, vehicle battery systems, thermal energy storage systems, fueled auxiliary power systems, etc.
- Provide incentives to trucking firms and truck owners including local and state municipalities to invest in hybrid truck technology as it becomes available in class 7 and 8 trucks over the next three years and beyond.

Parties Involved: Florida Department of Transportation, local governments, Florida Legislature, regional/metropolitan planning organizations, , Motor Truck Association, railroads, shippers, developers, U.S. Department of Transportation, and other state DOTs.

Implementation Mechanisms

Related Policies/Programs in place:

Estimated GHG Savings and Cost Per Ton:

	2012	2020	Units
GHG Emission Savings	0.39	0.63	$MMtCO_2e$
Net Present Value (2008-2050)	-$11	$30	$ Million
Cumulative Reductions (2008-2050)	1.6	5.9	$MMtCO_2e$
Cost-Effectiveness	-$29	$48	$/MtCO_2e$

- Data Sources:
    - Federal Highway Statistics 2006
    - Florida DOT
    - US EPA SmartWay Partnership
    - American Association of Railroad's *National Rail Freight Infrastructure Capacity and Investment Study*
    - AASHTO *Freight Demand and Logistics Bottom Line Report*

- Quantification Methods:

Estimate the reduction in CO2 emissions from reduced idling based on estimating the portion of emissions and fuel consumption in the Florida inventory that is attributable to Class 8 diesel trucks traveling on long-haul trips, estimate the portion of the total fuel consumption that would be consumed during idling, and apply a targeted reduction of 80 percent to this amount starting in 2008 and a reduction of 90 percent starting in 2015.

Estimate the mode shift potential from long-haul trucking to intermodal rail by estimating the amount of heavy duty truck traffic on long-haul trips, the commodity mix share that is amenable to an intermodal shift, the investment costs necessary to upgrade intermodal terminals and rail bottlenecks, and the expected mode shift likely based on logisitics cost cross-price elasticities.

Key Assumptions:

- This analysis assumes idle reductions are achieved only by Class 8 diesel truck population; these trucks idle for an average of 6 hours per day; they consume 0.8 to 1.2 gallons of diesel per hour during idling; and that a 80 (by 2010) or 100 (by 2020) percent reduction of diesel idling from these Class 8 trucks will be achieved. The cost analysis will assume a 5-year lifetime for idling technology equipment, applied to 80 percent of Class 8 vehicles starting in 2008 and 90 percent of Class 8 vehicles starting in 2015, at a cost of $6,000 per vehicle and a $4.80 per gallon diesel cost. Program administration costs, enforcement costs, and fines have not been factored into the cost analysis. Reduced vehicle maintenance costs have not been

factored into the analysis. Track improvements and intermodal terminal expansion will occur over 10 years beginning in 2009.

Policy Description:

Mode-Shifting policies and strategies

Advanced Technologies for more fuel efficient heavy duty engines and vehicles

Policy Design:

Goal levels:

Timing:

Parties Involved:

Implementation Mechanisms

Related Policies/Programs in Place

Florida Department of Environmental Protection is undertaking rulemaking related to idling reduction for heavy duty vehicles.

62-285.420 Heavy-1 Duty Vehicle Idling Reduction.
(1) Applicability. This rule applies to any heavy-duty diesel engine powered motor vehicle. For the purposes of this rule:

(a) Heavy-duty diesel engine powered motor vehicle means a motor vehicle:
1. With a gross vehicle weight rating equal to or greater than 8,500 pounds;
2. Used on roads for the transportation of passengers or freight; and
3. Serving a commercial, governmental, or public purpose.

(b) Gross vehicle weight rating means the value specified by the manufacturer as the maximum design loaded weight of a single vehicle.

(2) Requirement. Owners or operators of heavy-duty diesel engine powered motor vehicles are prohibited from idling for more than five consecutive minutes. Idling is the continuous operation of a vehicle's main drive engine while the vehicle is stopped.

Additional rulemaking information and documents may be found at:
http://www.floridadep.org/air/rules/ghg/heavy_duty.htm

Estimated GHG Savings and Cost Per Ton

Table 9.

	2010	2020	Units
GHG Emission Savings			$MMtCO_2e$
Net Present Value (2006–2020)			$ Million
Cumulative Emissions Reductions (2006–2020)			$MMtCO_2e$
Cost-Effectiveness			$/MtCO_2e$

GHG = greenhouse gas; $MMtCO_2e$ = million metric tons of carbon dioxide equivalent; $/MtCO_2e$ = dollars per metric ton of carbon dioxide equivalent.

Data Sources:

Quantification Methods: TBD

Key Assumptions: TBD

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