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**Transportation and Land Use Technical Work Group
Summary List of Mitigation Options**

	Mitigation Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2008–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2008–2020			
TLU-1	Compact and Transit-Oriented Development Bundle	<i>Not Quantified</i>					Pending
TLU-2	Alternatives to Single Occupancy Vehicles (SOVs)	<i>Not Quantified</i>					Pending
TLU-3	Vehicle Emissions Reductions Incentives	<i>Not Quantified</i>					Pending
TLU-4	Pay as You Drive Insurance	<i>Not Quantified</i>					Pending
TLU-5	Alternative Fuels and Infrastructure	<i>Not Quantified</i>					Pending
TLU-6	Regional Intermodal Transportation System – Freight and Passenger	<i>Not Quantified</i>					Pending
TLU-7	Commuter Choice/Parking Cash-out	<i>Not Quantified</i>					Pending
TLU-8	Plug-in Hybrids	<i>Not Quantified</i>					Pending
TLU-9	Fuel Tax Funding Mechanism	<i>Not Quantified</i>					Pending
	SECTOR TOTAL AFTER ADJUSTING FOR OVERLAPS						Pending

	Mitigation Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2008–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2008–2020			
	REDUCTIONS FROM RECENT POLICY ACTIONS						Pending
	SECTOR TOTAL PLUS RECENT POLICY ACTIONS	TBD	TBD	TBD	TBD	TBD	Pending

TLU-1 Compact and Transit-Oriented Development Bundle

Mitigation Option Description

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

Mitigation Option Design

Goals:

- Support and promote public and private planning and development practices, including smart growth planning and infrastructure provision that reduce the number and length of trips and expand travel modes in Vermont.
- Reduce projected increase in VMT by **15%** statewide by 2020. [Note: AOT projects gasoline + diesel consumption to increase 38% through 2020.]

[Discussion (to be deleted or moved after establishing goal):

- North Carolina state Climate Action planning process is about to adopt a goal of 10% reduction in VMT growth from option “TLU 1a Land Development Planning”.
- New Mexico adopted a goal of reducing growth in VMT by 11% through “Infill, Brownfield Re-development; Transit-Oriented Development; Smart Growth Planning, Modeling, Tools; Multimodal Transportation Bundle; and Promote LEED for Neighborhood Development.
- Arizona adopted a goal of reducing growth in VMT by 11% through a similar set of bundles.
- Oregon has for several years been implementing a goal of no increase in per-capita metropolitan-area, non-commercial VMT.]

Timing: Have policies in place to achieve that VMT goal by 2010.

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

Other: Under Development.

Implementation Mechanisms

Mechanism 1: Implement Growth Center Law (Act 183)

- a. Fund and carry out recommendations of the growth center natural resource lands “working group”

- b. Staff and fund the growth center Planning Coordination Group
- c. Expand and fund the growth center “incentives”
- d. Ensure state infrastructure provision supports growth centers

Mechanism 2: Act 250 Climate Change Revisions

- a. Incorporate Act 183 smart growth planning principles in Act 250
- b. Strengthen criterion 5 – traffic, by including multi-modal options
- c. Incorporate site design standards that promote transit and other alternative transportation modes
- d. Strengthen criterion 9H – costs of scattered development
- e. Strengthen criterion 9J – public utility services
- f. Clarify criterion 9L - rural growth areas

Mechanism 3: Enact ANR Sewer Rule

Require that grants or loans for sewer expansions be awarded to projects that support smart growth.

Mechanism 4: Implement Act 200 Planning Process

- a. Enforce state agency planning to require all state agencies that have programs that have an impact on land use to coordinate those plans with community and regional plans.
- b. Incorporate climate change/smart growth principles in local and regional plans and bylaws

Mechanism 5: Transportation Policy

- a. Adopt a statewide “fix it first” policy targeting funding to fix and maintain existing roads and bridges.
- b. Target spending to areas that support smart growth
- c. Focus corridor management planning along transportation corridors that are or can be served by transit; include all stakeholders, especially landowners, developers and local decision-makers, in order to promote smart growth development;
- d. Expand transit service and infrastructure
- e. Incorporate bike and pedestrian improvements into all transportation projects
- f. Increase public transportation commuter routes prioritizing such services from compact development and village centers to employment centers.
- g. Program entire annual apportionment of Congestion Mitigation/Air Quality (CMAQ) federal funds towards CMAQ activities.

Mechanism 6: Capital Construction/State Buildings/School Construction

- a. Require that all leases and new building investments avoid sprawl locations
- b. Move offices in existing sprawl locations to downtown areas
- c. Keep new schools out of sprawl locations. Consider the location of a school as part of any state school construction funding decision.

Mechanism 7: Interchange Development

- a. Require state agencies to take action to avoid sprawl development at highway interchanges

Mechanism 8: Vermont Housing and Conservation Board

- a. Make smart growth locations a requirement for housing project eligibility
- b. Continue funding at the statutory levels to protect farmland and provide for affordable housing

Related Policies/Programs in Place

1. Act 250 – State land Use and Development Law
2. Act 200 and the Municipal and Regional Planning and Development Law (Chapter 117)
3. Act 183 – Growth Center Law - Through planning, regulatory and financial incentives, and state investment policy this 2006 law seeks to guide future development into designated growth centers so as to bring vitality to existing communities and enhance environmental quality in the countryside.
4. Downtown Law – Provides state assistance to communities to help with their downtown revitalization efforts. State agencies are required to give priority to downtowns in their subsidy programs.
5. ANR Sewer Rule – State funding of sewage treatment projects to be used for projects that serve designated growth centers.
6. Brownfields Law – Designed to facilitate clean-up of vacant, contaminated sites and implement productive re-use projects.
7. VTRANS Policies/Programs – Need input from Gina, Chuck, Polly et al – Corridor Management Planning
8. CCMPO Policies/Programs – Scott
9. Vermont Housing and Conservation Board – Funds acquisition of farm/forest land other open space lands and policy on agricultural lands mitigation
10. Vermont Economic Development Authority (VEDA) – Created to expand employment and raise per-capita income through the creation and expansion of industrial sites, businesses, farm assistance.

11. Vermont Economic Progress Council (VEPC) Programs – Administers several economic incentive programs (e.g. income tax credits, property-based tax incentives, and limited sales tax exemptions).

12. Development Cabinet Law (3 V.S.A. § 2293) – Established a mechanism to assure collaboration among state agencies to support economic development while conserving and promoting Vermont’s traditional settlement patterns, working and rural landscape, strong communities and healthy environment.

13. Executive Order #15 (1985) – Requires state government to give priority for locating its activities in historic and other existing buildings.

14. Executive Order #7 (2001) – Requires that all state agencies, as appropriate, foster land conservation around interstate interchanges and work to ensure that any development around the interchanges be consistent with 24 VSA §4302.

Types(s) of GHG Reductions

Primarily CO₂

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-2 Alternatives to Single Occupancy Vehicles (SOVs)

Mitigation Option Description

Shift passenger transportation mode choice to lower-emitting choices. Travel via single occupancy vehicle is the single largest contributor to GHG emissions in Vermont. Ensure that transportation/modes are linked/integrated with land use development plans. (see TLU-1)

Mitigation Option Design

Goals:

- Expand VMT savings oriented, convenient, reliable, frequent, Commuter/home to work routes and ridership.
- Expand/create regional connections/links to maximize inter-regional commutes by means other than SOV.
- Improve coordination of modes of transportation and transportation programs.
- Strategically fund and link Transit/Rideshare/Bike-Ped and Park and Ride facilities.
- Expand individual and workplace participation in Rideshare carpool and vanpool programs.
- Improve bike and pedestrian infrastructure both as feeders and as stand-alone modes.
- **Quantitative goals: Increase statewide non-SOV mode split by 50% by 2020.**

[Discussion: 2000 statewide journey-to-work mode split:

SOV 75.5%, Carpool 12%, Walk 5.7%, Work at home 5.7%, Transit 0.7%, Other 0.4%]

Timing:

- Vermont's present investments in Transit and Rideshare can be quickly enhanced/coordinated/expanded/re-directed to help reach emission reduction goals.
- Climate Change information and marketing of alternative modes to facilitate shift in choices/transportation behaviors can happen quickly.
- Infrastructure improvements and more complex policy initiatives will occur over a 2-5 year period.

Parties Involved: VTrans, regional planning commissions, MPO, municipalities, transit providers, human service transportation interests, inter-state transportation services, rider organizations, environmental groups.

Other: Under Development.

Implementation Mechanisms

- Maximize capacity of existing public transit programs and operations that work to reduce VMT and emissions. Use performance evaluations of existing transit routes and cost of service data to guide/evaluate public transit services and invest or reinvest in services that have greatest potential to reduce VMT.
- Use existing Public Transit organizations to evaluate/coordinate/plan services that get more people on to one ride whether that is a volunteer driver vehicle, a van or bus.
- Coordinate between among Public Transit Provider Regions to deliver improved inter-region VMT reducing commuter service.
- Configure Rideshare program to better promote/market both carpooling and vanpooling under a statewide coordinated inter-regional program.
- Coordinate Rideshare, Transit, Park and Ride, Bike-Ped and inter-state transportation planning and investment.
- Develop statewide GIS grounded data base to coordinate all transportation options/facilities/programs. Web based access to all modes, all inter-connection opportunities etc.
- Develop and fund marketing strategy promoting alternative modes where modes are ready to accept additional usage.
- Plan to provide range of incentives to car pool/van pool/transit users/alternative mode users.
- Coordinate changes in land use planning to maximize use of alternative modes.
- Adopt land use practices/policies to prevent/discourage construction of major VMT generating outside of public transit service areas. Use incentives to encourage “smart growth”.
- Target State Infrastructure funding to projects/communities/growth center projects that meet smart growth goals for transportation and VMT reduction.
- Fund the transportation-related programs in this mitigation option with monies generated by other mitigation options that may be in place or adopted for the purpose of addressing global warming.
- Adopt strategies/programs/funding mechanisms to make alternative mode use easy.
- Adopt strategies to make use of public transit easy and affordable. Expand UVM program of swiping student passes for free access to public transit to all business/employment centers/state government, etc.
- Investigate/evaluate then implement a mix of policies and funding strategies (including tax credit strategies) that target successful VMT and emission reduction projects/programs for additional funding.

Related Policies/Programs in Place

- Vermont Rideshare Program is administered by VTrans and promotes car and van pooling statewide.

- VTrans Public Transit Section administers FTA 5311 and 5310 funding for provision of public transit services. VTrans also administers Congestion Mitigation and Air Quality (CMAQ) funding which is primarily use to fund new commuter routes.
- Local Transportation Facilities Program is responsible for the development of Enhancement Projects, Bicycle and Pedestrian Facilities, Safe Routes to School Projects, Park-n-Rides, Scenic Byways and "Local" Projects.
- Smart Growth laws passed in recent years (see TLU-1) are designed to promote/facilitate VMT reduction by development of projects/communities that are oriented toward use of public transit and other alternative modes.

Types(s) of GHG Reductions

Primarily CO₂

Estimated GHG Savings and Costs per MtCO_{2e}

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-3 Vehicle Emissions Reductions Incentives

Mitigation Option Description

The recent rise in gasoline prices – coupled with the introduction of fuel-saving hybrid-electric vehicles – has caused many would-be car buyers to place more emphasis on fuel efficiency when making vehicle purchases. The New England states could further reinforce consumers' willingness to purchase more fuel-efficient vehicles by providing financial incentives.

One alternative is to finance incentives through fees charged to purchasers of less-efficient vehicles. This approach – known colloquially as a “feebate” plan – has been under discussion in Rhode Island, Maine and Connecticut. Under such an approach, the state would calculate the fee or rebate a vehicle purchaser would pay or receive based on the vehicle's fuel efficiency or its emissions of greenhouse gases. Purchasers of the most-efficient vehicles, such as hybrids, would receive the largest incentives; those purchasing the least-efficient vehicles, such as large SUVs and sports cars, would pay the greatest fees.

Mitigation Option Design

Goals:

To reduce overall GHG emissions from new automobiles purchased in the state.

- By having price signals reflect emissions levels and thus have emissions level more directly enter buying decisions.
- By sending a signal to manufacturers to produce increasingly low-emitting vehicles for the market.
- By creating a dedicated revenue stream for promotion of low emitting or no emitting GHG transportation alternatives e.g., hybrid tax credits, transit infrastructure.

To raise funds for State of Vermont to provide funds for transportation-related projects that reduce GHG, through a mechanism that is directly tied to a significant source of GHG emissions from cars and trucks.

Timing: Should be implemented as soon as possible.

Parties Involved:

- DMV.
- Agencies that distribute and spend the revenue.

Other: Under Development.

Implementation Mechanisms

For consumers to be informed, information will need to be made more readily available. Manufacturers currently are required to label the level which the vehicles emissions are certified to, and the fuel economy rating. While the fuel economy information is readily available, vehicle emissions certification is not as available/visible. Vehicle emissions data can be compiled and converted to a score that provides an “Index” of the vehicle’s environmental and energy ‘footprint’. This score would relate directly to a tax rate, which would also be advertised to consumers. This simple “Index” and correlating tax rate information would allow for informed choices by consumers.

There are numerous issues that must be resolved for a state to implement an incentive program; specifically, which vehicles will receive incentives and how great those incentives will be, whether the incentive will be given out directly or passed along as a reduction in the vehicle sales tax, and whether the incentive will be given at the time of purchase or the time of registration.

Because the response of manufacturers to the program is critical, a regional or multi-state vehicle incentive plan with consistent provisions and aggressive targets would likely be more effective than a piecemeal state-by-state approach. New England states should work together to devise an incentive program designed to significantly reduce gasoline use and carbon dioxide emissions from vehicles and to reward New Englanders who make vehicle choices that contribute to achieving the region’s climate protection goals.

Related Policies/Programs in Place

Depending on whether vehicle manufacturers opt to provide more fuel-efficient choices for consumers in response to the program, the impact on overall fuel economy and vehicle emissions could be significant. One recent analysis conducted for the Rhode Island greenhouse gas stakeholder process estimated that a feebate program could reduce gasoline consumption (and therefore global warming emissions) from light-duty vehicles by between 5 percent and 31 percent below business-as-usual levels by 2020.¹

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

¹ Regional Economic Models, Inc., *Combined Economic Impact of Enacting a Feebates Program in Rhode Island, Connecticut, Massachusetts, Maine*, 31 December 2004.

Gas Guzzler Charge scenarios based on 2005 DMV information
 Provided by VPIRG, 3-28-07

Alt #1	Surcharge	Number of Vehicles	Estimated Revenue
40 MPG or better	-200	478	-95,600
32 to 39 MPG	-50	8	-400
25-31 MPG	0	5,507	0
20 to 24	100	13,598	1,359,800
19 MPG or less	500	18,798	9,399,000
Vehicles with GVWR of more than 8,500 lbs	500	4,374	2,187,000
TOTAL		42,763	12,849,800

Alt #2	Surcharge	Number of Vehicles	Estimated Revenue
40 MPG or better	-100	478	-47800
32 to 39 MPG	-25	8	-200
25-31 MPG	0	5,507	0
20 to 24	100	13,598	1,359,800
19 MPG or less	250	18,798	4,699,500
Vehicles with GVWR of more than 8,500 lbs	500	4,374	2,187,000
TOTAL		42,763	8,198,300

Alt #3	Surcharge	Number of Vehicles	Estimated Revenue
40 MPG or better	0	478	0
32 to 39 MPG	0	8	0
25-31 MPG	0	5,507	0
20 to 24	100	13,598	1,359,800
19 MPG or less	250	18,798	4,699,500
Vehicles with GVWR of more than 8,500 lbs	500	4,374	2,187,000
TOTAL		42,763	8,246,300

Alt #4	Surcharge	Number of Vehicles	Estimated Revenue
40 MPG or better	0	478	0
32 to 39 MPG	0	8	0
25-31 MPG	0	5,507	0
20 to 24	0	13,598	0

19 MPG or less	100	18,798	1,879,800
Vehicles with GVWR of more than 8,500 lbs	200	4,374	874,800
TOTAL		42,763	2,754,600

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-4 Pay as You Drive Insurance

Mitigation Option Description

Pay-As-You-Drive (PAYD) pricing converts a portion of insurance to a variable cost with respect to vehicle travel, so premiums are directly related to mileage. PAYD makes insurance more actuarially accurate and allows motorists to save money when they reduce their mileage. The less you drive the more you save.

Mitigation Option Design

Goals:

1. Change fixed costs of automobile ownership to incremental costs directly related to mileage driven.
2. Reduce the cost differential between a SOV trip and a public transit trip.
3. Direct financial reward for individuals who reduce VMT.

Timing: Direct the Commissioner of Banking, Insurance, Securities & Health Care to develop ASAP regulations allowing and requiring companies offering auto insurance in Vermont to offer PAYD.

Parties Involved: VT Department of Banking, Insurance, Securities & Health Care Administration, Insurance Division; insurance companies.

Other: Under Development.

Implementation Mechanisms

1. Develop strategies for implementing “pay as you drive insurance”
 - a. Payment mechanism – how do policy purchasers pay for a product with a variable cost? Most current insurance policies involve a fixed payment at the beginning of the coverage period.
 - i. Fixed-fee up front, with a re-imbursement (or additional payment) at the end of the policy period.
 - ii. Shorter policy periods (one month instead of 6 months to a year). Monthly insurance is billed similar to a utility.
 - iii. Purchase insurance that is valid up to a certain mileage, instead of a particular date.
 - iv. Review applicable technologies.
 - b. Insurance type
 - i. Discrete premium levels – premiums are set within specific ranges for mileage driven.
 - ii. Pay by the mile – using a linear rate that does not change as mileage increases

- iii. Pay by the mile – using a non-linear rate that increase as mileage increases. This payment scheme must be carefully developed to insure that when a person is faced with the choice of using 2 vehicles to make a trip that the logical and cost effective choice is the most fuel efficient vehicle.

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

Primarily CO₂

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-5 Biofuels Bundle

Policy Description

This policy option seeks to increase market penetration of biofuels in Vermont by a mixture of policies (voluntary and/or mandatory) to achieve feasible goals. Offset fossil fuel use (gasoline) with use of starch-based and cellulosic ethanol and offset petrodiesel use with biodiesel.

Replacing gasoline and petrodiesel with ethanol and biodiesel respectively, can reduce GHGs to the extent that the ethanol and biodiesel are produced with lower GHG content.

This option is linked with policy options AFW-12: In-State Liquid Biofuels Production. This option seeks to develop the demand for biofuels, whether produced locally or out-of-state, while Options AFW-12 pursue the GHG benefits that would be achieved beyond the TLU-5 option by promoting in-state production of ethanol and biodiesel using feedstocks and production methods with greater GHG benefits than the likely business as usual national market production methods (e.g., conventional starch-based ethanol).

Policy Design

The goals for this policy should be phased in to utilize biofuels to replace the specified percentages of gasoline and diesel consumed for transportation throughout Vermont by the specified years, as shown under Goal Levels, below. The goals of this policy can be achieved through a combination of a renewable fuels standards, financial incentives, outreach, and market-based mechanisms.

Goal Levels and Timing:

- The goal levels and timing for biofuels implementation are shown in the table below.
- The Governor and the Legislature would have the authority to change these targets (up or down) based on technical and/or economic feasibility.
- The Governor and Legislature could also set intermediate targets.

Phase	Year	Represents percentage of total diesel used in state (in 2006)	Gallons of biodiesel used in Vermont	Represents percentage of total gasoline used in state (in 2006)	Gallons of ethanol used in Vermont
1	2010	5%	12,000,000	10%	33,000,000
2	2015	10%	24,000,000	15%	49,000,000
3	2020	20%	47,000,000	20%	65,000,000
4	2028	25%	60,000,000	25%	82,000,000

Parties involved:

- State of Vermont.
- Fuel retailers.
- Fuel wholesalers.
- Business owners.
- Municipal and institutional fleet managers.
- Car dealers.
- Biofuels producers.
- Vermont Biofuels Association.
- Alternative vehicle advocates.
- Private vehicle owners.

Implementation Mechanisms**Information and education**

Use information and education outreach to focus on voluntary methods of biofuels expansion. Provide the public with information on the use of and effects of using ethanol in their existing vehicles. Target information and outreach about biodiesel use and effects to trucking and shipping companies, as well as smaller owner/operators in the State. Information should also be provided on where these vehicles can be purchased and their environmental and fuel-saving benefits.

Technical assistance

Provide technical assistance through vehicle dealers, consumer technical support groups, biofuels trade and advocacy groups and public demonstrations.

Funding mechanisms, market-based mechanisms, and incentives

Pursue DOE and State funding for more renewable fuel pumps throughout the State and for introducing appropriate infrastructure throughout the State. Some federal tax incentives currently exist for the purchase of alternative fuel vehicles. When the federal incentives expire, examine the feasibility/need to continue such incentives for alternative fuel vehicles.

- *Reduce or eliminate the motor fuels tax on biodiesel and ethanol (E85).* Develop a system to provide for monthly credit for biodiesel and E85 blended fuel that would be equivalent to the state motor fuels tax owed on the biofuels portion of the fuel blend.

Monthly tax credit would be claimed on same form (Biodiesel and Fuel Alcohol Providers Form) as marketers currently file with VT DMV Motor Fuel Tax Division to pay fuel tax. This would reduce pump price of Biofuels as marketers would pass bulk of credit on to consumer in order to be competitive. Credit could be paid for out of General

Fund. Credit would be revenue neutral as it would be equal to the tax that would have been paid by marketers for biofuel portion of blend.

- *Develop a \$0.25/gallon credit for biodiesel and ethanol use in Vermont registered vehicles.*

Monthly tax credit would be claimed on same form (Biodiesel and Fuel Alcohol Providers Form) as marketers currently file with VT DMV Motor Fuel Tax Division to pay fuel tax. This would reduce price of Biofuels as marketers would pass bulk of credit on to consumer in order to be competitive. Credit could be paid for out of General Fund. Credit would not be revenue neutral as the state would be providing incentive for fuel sold to non-taxable entities (local and state government) as well as sales to taxable entities. However, only the biofuel portion of blended fuel would be eligible for .25 cent credit. For example a B20 blend would get a .05 cent credit.

Codes and standards

This measure should include a mandated Renewable Fuel Standard (RFS), corresponding to the penetration rates listed above. The RFS should include a cost trigger, so that if the cost of alternative fuels exceeds conventional fuels by more than a specified amount, the RFS would be temporarily removed. The cost trigger should be based on costs over a period of time, and not spot prices.

Voluntary and or negotiated agreements

- Provide financial incentives for renewable fuels distributors.
- Provide state funds and/or loan guarantees for construction of renewable fuels distribution facilities.

Pilots and demos

- Show example of existing multi-fuel pumps in Vermont which provides a model for dispensing three alternative fuels: B20 biodiesel, E85 ethanol and E10. The State's experience with these vehicles should be publicized.
- State invests in "VT-Green" Tourism through expanded use of Vermont produced biofuels, linking producer farms with motorcoach tours using biofuels.

Research and development

- Link in-state biofuels production from a variety of sources with expanded use of biofuels through public demonstrations.
- The State advocates for significant federal funds for research and development to commercialize cellulosic ethanol technology and processes. This will be required for the ethanol targets for 2020 and beyond to be met.
- Analyze and quantify range of cost benefits that accrue to renewable fuels vehicle owners.

- Research on production of renewable electricity and hydrogen will be required in order to implement a cost effective process.

Related Policies/Programs in Place

The Energy Policy Act of 2005 includes provisions requiring an increasing volume of renewable fuel to be included in the gasoline sold in the United States starting in 2006 with 4 billion gallons, increasing to 7.5 billion gallons by 2012. In this Act, renewable fuel includes motor vehicle fuel produced from grain, starch, vegetable, animal, or other biomass material, cellulosic biomass ethanol, waste derived ethanol, and biodiesel.

The program also requires refiners, blenders and importers to use a minimum volume of renewable fuels each year between 2007 and 2012. This year, 4.7 billion gallons — or 4 percent of all fuel sold or dispensed to U.S. motorists — will need to be blended with ethanol, biofuels or other renewable fuel sources.

Types(s) of GHG Reductions

Primarily CO₂

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD
- **Quantification Methods:**

CO₂ emissions are reduced by offsetting the use of petroleum-derived gasoline and diesel. In order to assess the CO₂ benefit of using ethanol, the energy requirements of producing ethanol from starch needs to be compared to the energy requirements of producing gasoline. Current research indicates that starch-based ethanol production provides up to 18-29% reduction in CO₂ from starch-based ethanol production compared to gasoline. To assess the benefits of using biodiesel, the overall energy required to produce biodiesel (e.g., life-cycle costs and benefits) must be compared to the energy requirements of producing fossil fuel diesel. Hill et al (2006) report that the energy available from biodiesel produced from soybeans is 93% greater than the fossil energy consumed in producing it. This biodiesel reduces lifecycle GHG emissions by as much as 41% compared with petroleum diesel.

- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-6 Regional Intermodal Transportation System – Freight and Passenger

Mitigation Option Description

The option addresses: inter-city rail and bus service, Vermont and regional rail and air freight, commuter rail, and all inter-modal connections for passengers and freight.

The option will decrease GHG emissions and the state and the region's VMT by increasing the access (location), frequency, travel time, and quality of service for passenger rail and inter-city bus service. The options will also decrease GHG emissions by providing adequate inter-modal connections – including bike, pedestrian, transit, shuttle service and parking facilities at all nodes – and increasing the use of rail for both in-state and regional freight movement. The environmental benefits will help drive an adequate subsidy for all modes.

Mitigation Option Design

Goals: [PG urges goals to be set high]

- Decrease growth in intercity VMT within Vermont (including VT portion of multi-state travel) by **20%** percent by 2020.
- Increase rail freight in Vermont by ?? percent.

[Discussion: From 1992 to 2002, freight rail traffic that originated and terminated in Vermont declined by 21 percent. Freight that originated in Vermont, however, increased from 430,000 tons in 1992 to 764,360 tons in 2002, which is primarily attributable to the increase in shipments from Omya, Inc. in Florence. It is projected that freight rail tonnage will increase between 44 and 55 percent between now and 2020 or approximately 2.4% annually during the next five years.

State rail plan calls for 2% annual increase. So, baseline calls for 29% increase by 2020. A target higher than that would have to come from the TWG.

- Increase passenger rail service by ?? percent by 2020.

Discussion: State rail plan calls for 3% annual increase.

[http://www.vermontrailroads.com/Documents/VT_SR&PP.pdf] So, baseline calls for 46% increase by 2020. **A target higher than that would have to come from the TWG.**

- Increase inter-city bus service by ?? percent.

Discussion: A quick review of VTrans' "Public Transportation Policy Plan" did not find a current goal for intercity bus use.

Achieve these goals by maintaining and improving inter-city bus and rail, freight and commuter rail services, and the necessary inter-modal connections and the efficiency and emissions cleanliness of equipment through the following policies, programs, and mechanisms:

- Replace Amtrak engines with more efficient Diesel Multiple Units.
- Improve the frequency of service and travel time of Vermont’s current Amtrak routes.
- Increase the marketing of the state’s current Amtrak routes.
- Expand passenger rail service to VT’s western corridor.
- Improve inter-city bus service throughout the northeast region.
- Improve inter-city bus service in the Rt. 7 corridor thorough public/private partnerships.
- Improve passenger rail connections to Montreal and Boston.
- Determine the demand necessary to justify commuter rail in certain corridors and work to provide the service, including, but not limited to, piggybacking commuter and inter-city rail services.
- Provide adequate inter-modal (transit, bike, pedestrian, shuttle bus, etc.) connections at all railroad stations, airports, and bus stops.
- Target improved railroad station and airport inter-modal connections for large institutions, companies, and the VT travel industry.
- Provide parking facilities at railroad and bus stations and airports.
- Improve rail infrastructure to serve all freight needs.
- Identify and provide necessary freight modal transfer stations within Vermont and the region.
- Work with municipalities to plan and regulate land use to accommodate rail and bus infrastructure and service.

Timing: Achieve by 2010.

Parties Involved: VTrans, Amtrak, FTA, US Congress, VT transit providers, Private bus companies, railroad owners, airport commission and directors, municipalities, private industry.

Implementation Mechanisms

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per MtCO_{2e}

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-7 Commuter Choice/Parking Cash-out

Policy Description

- Provide employer education, especially for large employers, including the State of Vermont.
- Develop state legislation to encourage activities.
- Improve broadband telecommunication facilities.
- Work to have towns revise parking policies/requirements.
- Expand transit service and marketing.

Policy Design

Goals:

- Shift commuters from SOVs to alternative modes of transportation.
- Ensure employer support and participation.
- Have state commit XX dollars to the program by 2010.
- **Goals:**
 - **All employers in Vermont over 250 employees offer a commuter benefits program and/or parking cash out.**
 - **All employers of a X type offer CB (all colleges and universities / all government units over a certain size....**

[Discussion: 15% of employers nationally offer a commuter benefits program.²]

Timing: Implement by 2010.

Parties Involved: VTrans, regional planning commissions, CCMPO, municipalities, large employers, state legislature.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Potential that similar programs are implemented by TMAs: CATMA, on behalf of the Hill Institutions in Burlington, and UVTMA, centered around the White River Junction VT and Lebanon NH area.

² Society for Human Resource Management, Benefits Survey Report, June 2006.

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-8 Plug-In Hybrids

Mitigation Option Description

Plug-in hybrid vehicles are hybrid electric vehicles that are equipped with a larger battery pack than standard hybrids and with the capability to provide a range of all-electric (zero-emission) transportation through the ability to plug into grid-supplied electricity from a standard outlet. Generally, early plug-in hybrids are expected to provide 20-60 miles of battery-supplied fuel before the internal combustion engine is needed. Most consumer roundtrips are fewer than 60 miles, so plug-in hybrids could create significant reductions in petroleum use and related greenhouse gas emissions. However, the technology is in its early stages, and its effects on Vermont's electrical supply and distribution system need be quantified and analyzed.

Mitigation Option Design

Goals:

- Establish a market for plug-in hybrid vehicles, and ensure that sales are [10%] above levels encouraged by the “Zero Emission Vehicle” requirements of the California Low Emission Vehicle Standards that Vermont has adopted.
- Ensure the use of plug-in hybrid vehicles has no adverse affect on the electrical supply and distribution system.
- Maximize the potential for efficient use of the electrical distribution system, mitigating adverse effects to electric ratepayers or the system.

Timing: Various policies should be implemented at different times depending of the progress of the technology.

Parties Involved:

- State Agencies: The Department of Public Service, VTrans, Buildings and General Services.
- The Vermont Public Service Board.
- Electric Distribution Companies.
- VELCO.
- EVermont.
- UVM UTC.
- Legislators.

Other: Under Development.

Implementation Mechanisms

Research and Development, Demand and Impact Assessments:

- The State should create a public/private partnership to assess consumer demand for plug-in vehicles and the potential impact of plug-in electric vehicles on electric load serving entities and transmission providers, considering efficiencies gained through a higher load factor, the increase in total demand and the resulting emissions, and increased pressure on the transmission and distribution system.
- The State should collaborate with electric utilities to create a rate design that will facilitate the use of plug-in hybrids (overnight off-peak pricing)

State Lead by Example:

- Vermont should join the national “Plug-in Partners” campaign started by the City of Austin, Texas in 2005 in order to communicate to auto manufacturers that there is already a market for plug-in hybrid vehicles.
- The State should use its fleet to demonstrate plug-in vehicles as they become available

Incentives/Rebates:

- Establish a favorable environment for plug-in hybrid associated businesses in Vermont through production or investment tax credits
- As plug-in hybrid vehicles become commercially available, the State should provide incentives and/or rebates to auto dealers, utilities, and/or consumers to encourage purchase of these vehicles by mitigating initial incremental costs.

Related Policies/Programs in Place

The California Low Emissions Vehicle (LEV) Standards have been adopted by Vermont. The LEV program includes a technology forcing “Zero Emission Vehicle” ZEV sales mandate beginning in Vermont in model year 2007 and phasing in through 2018. The ZEV sales requirement increases from 10 percent to 16 percent during this time period. The ZEV program allows manufacturers two paths to meet the ZEV requirements. The conventional path requires the delivery of ZEV vehicles. A second “alternative compliance” path allows the manufacturers to meet the requirements with a combination of ZEVs, advanced-technology partial zero-emission vehicles (AT-PZEVs), and partial zero-emission vehicles (PZEVs). Plug-in Hybrid vehicles qualify as PZEVs, and are therefore encouraged under this program.

The US Department of Energy has, as part of its “Advanced Energy Initiative,” created a research and development plan for plug-in hybrid electric vehicles (PHEVs). The near term focus is on adapted technology, an electric range of 10-20 miles (with reduced performance) or a full performance “charge depleting” range of 20 miles. The mid-term focus (3-5 years) is on an electric range of 20+ miles or a charge depleting range of 40 miles, both a full performance. The long-term development focus (5-10 years) targets meeting the goal of 40+ miles of electric range at full performance. The DOE doesn’t choose between electric ranges or charge depleting ranges as neither technology is developed enough to determine its full potential. Some in the industry believe that battery technology can be achieved sooner than the DOE targets.

Types(s) of GHG Reductions

TBD

Estimated GHG Savings and Costs per MtCO_{2e}

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

TLU-9 Fuel Tax Funding Mechanism

Mitigation Option Description

A per-gallon fee or tax charged per gallon of liquid fuel sold at the pump.

- Goal is to fund transportation-related policies that reduce GHG emissions rather than to reduce consumption and emissions directly.
- **Amount: 2¢/gallon.** Would not vary by carbon content or by fuel. (Two reasons: the goal is revenue-raising, not pricing carbon; and simplicity of both analysis and implementation.)

Although the main goal is not to price carbon, this mitigation option would raise revenue (with which to reduce GHG emissions) from transportation fuels in part to reflect some of the health and GHG costs of carbon in transportation fuels.

Mitigation Option Design

- Fund options other than single-occupant vehicle driving.
- Most likely the options detailed in TLU-2.

Timing: Immediate. (No phase-in.)

Parties involved: All fuels.

[**Note:** The PG simultaneously agreed that this option was not aimed at reducing emissions directly, but then also held open the possibility of using this option as an implementation strategy in a Cap and Trade program. Using it as such an implementation option would require a different option design, starting with higher amounts. Develop a TLU-9a and 9b?]

Other: None Cited.

Implementation Mechanisms

Fund the options detailed in TLU-2.

Related Policies/Programs in Place

See TLU-2.

Types(s) of GHG Reductions

Primarily CO₂

Estimated GHG Savings and Costs per MtCO₂e

TBD

- **Data Sources:** TBD

- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD