



**NEW MEXICO
CLIMATE CHANGE
ADVISORY GROUP**

FINAL REPORT
December 2006

Executive Summary

Recognizing the profound implications that global warming and climate variation could have on the economy, environment and quality of life in the Southwest, New Mexico Governor Bill Richardson signed Executive Order 05-33 on June 5th, 2005, establishing the New Mexico Climate Change Advisory Group (CCAG).¹ The Governor directed the CCAG to prepare a report that includes a projection of the State's future GHG emissions and policy recommendations for reducing New Mexico's total greenhouse gas emissions to 2000 levels by the year 2012, 10% below 2000 levels by 2020 and 75% by 2050.

The New Mexico Environment Department (NMED) organized the process on behalf of the Governor. NMED assembled 37 stakeholders, representing a broad range of interests and expertise, and the CCAG met six times from July 2005 to October 2006. During this same period, five sector-based technical work groups (TWGs) of the CCAG developed initial recommendations in the areas of: Energy Supply (ES); Residential, Commercial, Industrial and Waste Management (RCI); Transportation and Land Use (TLU); Agriculture and Forestry (AF); and Cross-Cutting Issues (CC). With oversight from NMED, the CCAG followed a consensus-building process designed and implemented by the non-profit Center for Climate Strategies (CCS). Applying a design similar to those used in other successful state climate initiatives, CCS provided both facilitation services and technical analysis to the CCAG in formulating its recommendations.

CCAG Policy Recommendations and Impacts

The CCAG offers 69 policy recommendations to the Governor to help meet the GHG emissions goals in Executive Order 05-33. Figure EX-1 below presents:

- Projected growth in New Mexico's GHG emissions² (blue line).
- Emission targets in the Executive Order (red line).
- Projected emissions if the CCAG's recommendations are fully implemented (green line).

As the figure illustrates, the CCAG's recommendations would more than meet the Governor's targets, and are projected to reduce GHG emissions by approximately half, from 70 MMTCO_{2e} in the reference case forecast to 34 MMTCO_{2e} by 2020. Table EX-1 (appearing below Figure EX-1) provides the numeric estimates underlying Figure EX-1.

¹ Appendix A contains the Executive Order.

² The "reference case" projection of emissions was developed during the CCAG process, along with the inventory of historical emissions since 1990, as set forth in detail in Chapter 2.

Figure EX-1

Annual GHG Emissions: Reference Case Projections, Executive Order Targets, and CCAG Recommendations

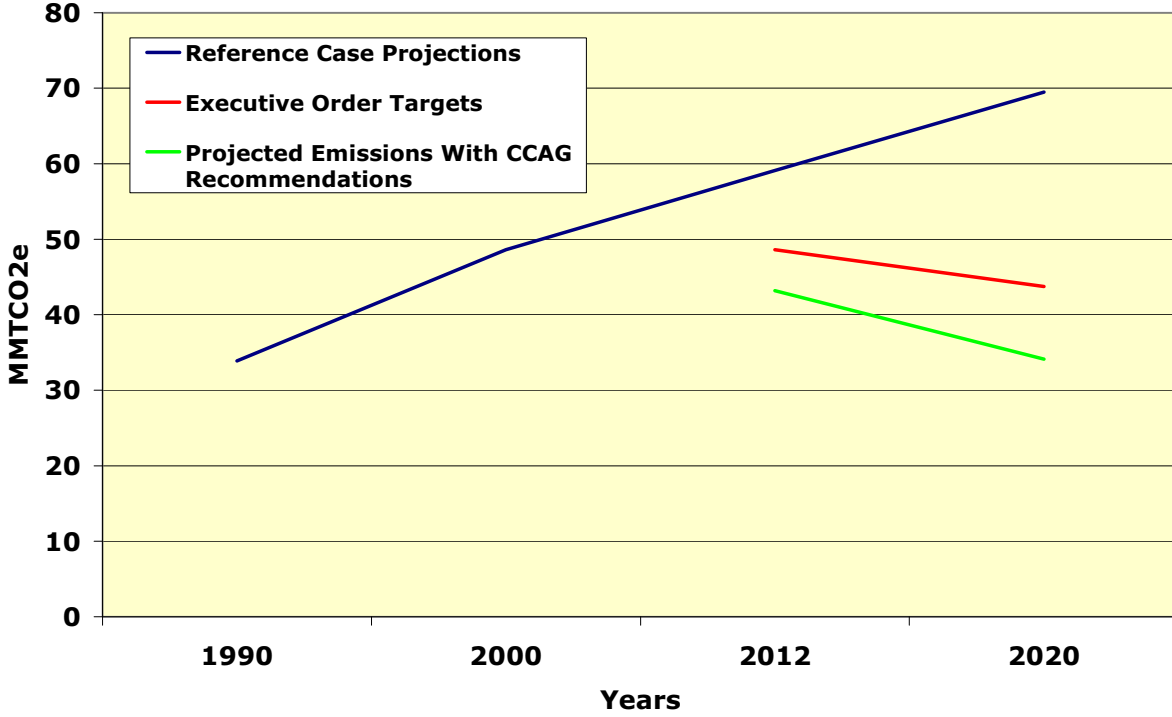


Table EX-1. Annual Emissions: Reference Case Projections, Executive Order Targets, and Impact of CCAG Recommendations

ANNUAL EMISSIONS	1990	2000	2012	2020
REFERENCE CASE PROJECTIONS	33.9	48.6	59.1	69.5
EXECUTIVE ORDER TARGETS ^a			48.6	43.7
<i>GHG REDUCTIONS FROM CCAG RECOMMENDATIONS</i>			-15.9	-35.4
ANNUAL EMISSIONS WITH CCAG RECOMMENDATIONS			43.2	34.1

^a Targets aim to reduce New Mexico GHG emissions to 2000 levels by 2012, and 10% below 2000 levels by 2020.

Table EX-2 summarizes the emissions and economic impacts of CCAG recommendations across sectors of the economy.

Table EX-2. Summary by Sector of Estimated Impacts of CCAG Recommendations

Sector	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)
	2012	2020	Total 2007–2020		
CROSS-CUTTING ISSUES	<i>Non-quantified enabling policies</i>				
RESIDENTIAL, COMMERCIAL AND INDUSTRIAL	3.7	9.4	66.0	-630	-18
ENERGY SUPPLY	6.7	14.3	109.9	258	7
TRANSPORTATION AND LAND USE	3.1	6.8	50.5	-1,669	-36
AGRICULTURE AND FORESTRY	2.5	4.9	41.1	-198	-5
TOTAL (includes all adjustments for overlaps and recent policy actions)	15.9	35.4	267.5	-\$2,239	

The CCAG’s recommendations are summarized below in Table EX-3, followed by short descriptions of each recommendation. Detailed descriptions and analysis of these recommendations are presented in Chapters 3 through 7 of this report, and in the Appendices. Cumulative GHG reductions from 2007-2020 are estimated at 267 MMTCO₂e. The recommendations are projected to create net economic savings of over \$2 billion for the State’s economy over the period 2007-2020.³

As discussed in Chapter 1, the Governor’s goals are consistent with the levels and framework of goals set by other states, including those in the West, that are implementing GHG reduction strategies. The CCAG’s recommendations also complement other efforts underway in New Mexico, especially the Governor’s many initiatives to make it the “Clean Energy State.” This report also points to numerous co-benefits that would result from implementation of CCAG-recommended policies.

³ This estimate is calculated on a net present value basis using a discount rate of 5%. It does not account for recommendations for which cost estimates were not available.

Table EX-3

Summary of CCAG Policy Recommendations by Sector

Explanatory Note on “Level of Support” column: UC=Unanimous Consent. Majority=Simple majority. Obj’s=number of objections. Total number of options=69 due to counting both ES-1b and ES-1c.

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007-2020			
	CROSS-CUTTING ISSUES						
CC-1	State Greenhouse Gas Reporting	<i>Non-quantified enabling policy</i>					UC
CC-2	State Greenhouse Gas Registry	<i>Non-quantified enabling policy</i>					UC
CC-3	State Climate Public Education and Outreach	<i>Non-quantified enabling policy</i>					UC
	RESIDENTIAL, COMMERCIAL AND INDUSTRIAL						
RCI-1	Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Electricity	0.2	1.0	5.5	-\$98	-\$18	UC
RCI-2	Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Natural Gas and Other Fuels	0.03	0.2	1.0	-\$55	-\$55	UC
RCI-3	Regional Market Transformation Alliance	0.1	0.5	2.9	-\$79	-\$27	UC
RCI-4	State Appliance Standards	0.1	0.3	2.1	-\$97	-\$46	UC
RCI-5	Green Power Purchasing	0.3	0.1	2.3	\$15	\$7	UC
RCI-6	Rate Design (Including Time of Use Rates, Increasing Block Rates, and Seasonal Use Rates)	0.3	0.3	3.6	-\$141	-\$40	UC
RCI-7A	Improved Building Codes	0.9	2.4	16.6	-\$200	-\$12	UC
RCI-7B	Solar Hot Water-ready and Solar-PV-ready Codes for New Buildings	<i>Not quantified</i>					UC
RCI-7C	Solar Hot Water Systems as an Element of Building Codes for New Buildings	<i>Not quantified</i>					UC
RCI-8A	Building Energy Performance Requirements for State-funded and Other Government Buildings (“Reach Codes”)	0.01	0.04	0.2	0.2	\$1	UC
RCI-8B	Building Energy Performance Promotion and Incentives for Energy Performance Enhancements (Attaining “Reach Codes”) in Non-Government Buildings (Including Existing Buildings)	0.3	1.3	7.4	-\$16	-\$2	UC
RCI-9	Government Agency Requirements and Goals (including procurement) – Focus on operations	0.04	0.2	0.9	-\$18	-\$20	UC

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007–2020			
RCI-10	Education and Outreach for Building Professionals	<i>Not quantified</i>					UC
RCI-11	Consumer Education Programs	<i>Not quantified Jointly considered with CC TWG</i>					UC
RCI-12	Increased Emphasis on Energy and Environmental Consideration in Higher Education						UC
RCI-13	Incentives and Promotion for Renewable Energy and Clean Combined Heat and Power	<i>Jointly considered with Energy Supply TWG</i>					UC
RCI-14	Regulatory/Legislative Grid, Pricing, and other Policies to Support Distributed Generation						UC
RCI-16	Participation in Regional (or National) Industry Emissions Cap and Trade Programs	<i>Jointly considered with Energy Supply TWG</i>					UC
RCI-17	Voluntary Emissions Targets	0.3	0.7	4.6	<i>Not quantified</i>		UC
RCI-18	Use of Alternative Gases (Non-Energy Emissions, Indus. Process Gases)	<i>Not quantified</i>					UC
RCI-19	Solid Waste Recycling, Source Reduction, and Composting	<i>Not quantified</i>					UC
	Scenario A: Financial/Technical Support	0.2	0.5	3.6	<i>Not quantified</i>		UC
	Scenario B: Financial/Technical Support and Mandatory Recycling	0.5	1.1	8.4	<i>Not quantified</i>		UC
	ENERGY SUPPLY						
ES-1	Mandate(s) for Renewable Energy (RPS, etc.)						
	Scenario B: 10% in 2011, 1% increase/year to 2021	1.1	2.6	17.8	\$102	\$6	UC
	Scenario C: 10% in 2011, 2% increase/year to 2021	<i>See ES-4 below</i>					Majority (9 Obj's)
ES-2	Financial Incentives for Distributed Renewables	0.02	0.4	1.6	\$164	\$105	UC
ES-3	Renewable Energy Transmission and Storage	<i>Not quantified</i>					UC
ES-4	RPS with Financial Incentives for Centralized Renewables	1.2	4.2	26.0	\$215	\$8	UC
ES-5	R&D including Energy Storage	<i>Not quantified</i>					UC
ES-6	Advanced Coal/Fossil Technologies (e.g., IGCC with carbon capture)	0.8	4.3	22.7	\$650	\$29	UC
ES-7	Nuclear Power	<i>Not quantified</i>					UC
ES-8	Incentives and Barrier Reductions for Combined Heat & Power (CHP)	0.3	0.9	6.1	\$26	\$4	UC

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007–2020			
ES-9	Demand-Side Management, Energy Efficiency, and Integrated Resource Planning (IRP)	<i>Jointly considered with RCI TWG (RCI-1)</i>					
ES-10	Transmission Capacity and Corridors	<i>Not quantified</i>					UC
ES-11	CO ₂ Capture and Storage or Reuse (CCSR) in Oil and Gas Operations	1.6	3.0	25.1	<i>Not quantified</i>		UC
ES-12	Methane Reduction in Oil and Gas Operations: BMPs and PROs	2.7	3.4	35.3	<i>Not quantified</i>		UC
ES-13	CO ₂ Reduction from Fuel Combustion in Oil and Gas Operations	0.6	1.4	10.6	<i>Not quantified</i>		UC
ES-14	GHG Cap and Trade	<i>Not quantified</i>					UC
ES-15	Generation Performance Standard	1.2	3.8	24.3	\$522	\$21	Majority (9 Obj's)
ES-16	Clean Energy Development for Electric Cooperatives	<i>Non-quantified enabling policy</i>					UC
TRANSPORTATION AND LAND USE							
TLU-1	State Clean Car Program	0.4	1.9	10.4	\$1,207	-\$117	UC
TLU-2	Low Rolling Resistance Tires	0.5	0.6	5.5	\$506	-\$92	UC
TLU-3	Low-GHG Operation of State Fleet Vehicles	<i>Not quantified</i>					UC
TLU-4	Pay-As-You-Drive Insurance	0.2	1.0	5.0	Zero net cost		UC
TLU-5	Incentive/Disincentive Options Bundle	<i>Not quantified</i>					UC
TLU-6	Alternative Fuels Use	0.4	1.7	9.1	-\$119	-\$13	UC
<i>VMT Reduction Bundle TLU-7 to TLU-11</i>							
TLU-7	Infill, Brownfield Re-development	1.2	1.3	13.4	<i>Zero net costs or positive cost savings</i>		UC
TLU-8	Transit-Oriented Development						UC
TLU-9	Smart Growth Planning, Modeling, Tools						UC
TLU-10	Multimodal Transportation Bundle						UC
TLU-11	Promote LEED for Neighborhood Development						UC
TLU-12	Targeted Open Space and Croplands Protection	<i>Considered in Agriculture and Forestry TWG (F-1 and A-8)</i>					
TLU-13	Diesel Retrofits	<i>Incorporated as part of TLU-5</i>					
TLU-14	Truck Stop Electrification/Anti-Idling	0.4	0.7	6.3	\$23	\$4	UC

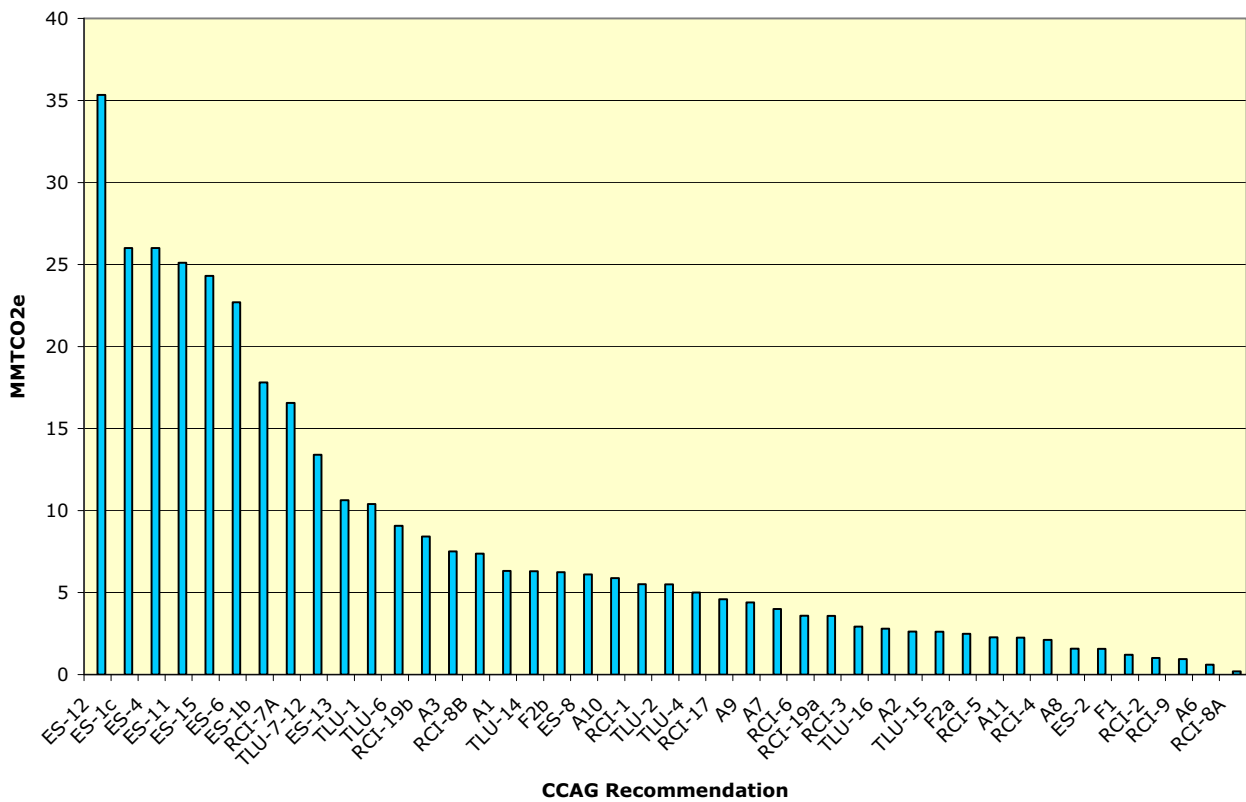
	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007-2020			
TLU-15	Intermodal Freight Initiatives	0.1	0.5	2.6	<i>Not quantified</i>		UC
TLU-16	Lower Speed Limits	0.2	0.3	2.8	<i>Not quantified</i>		UC
AGRICULTURE AND FORESTRY							
F-1	Forestland Protection from Developed Uses	0.1	0.1	1.2	\$46	\$22	UC
F-2a	Forest Health & Restoration - Residential Lands	0.2	0.2	2.5	-\$115	-\$46	UC
F-2b	Forest Health & Restoration – Other Lands	0.5	0.5	6.3	-\$92	-\$15	UC
A-1	Manure Energy Utilization	0.3	0.8	6.3	\$29	\$3	UC
A-2	Biomass Feedstocks for Electricity or Steam Production	0.2	0.3	2.6	-\$198	-\$76	UC
A-3	Ethanol Production	0.5	1.0	7.5	\$20	\$3	UC
A-6	Conservation Tillage/No-Till	0.1	0.1	0.6	\$14	\$15	UC
A-7	Convert Agricultural Land to Grassland or Forest	0.4	0.4	4.0	\$27	\$7	UC
A-8	Reduce Permanent Conversion of Agricultural Land and Rangeland to Developed Uses	0.1	0.2	1.6	\$97	\$62	UC
A-9	Programs to Support Organic Farming	0.2	0.4	4.4	\$2	\$0.5	UC
A-10	Programs to Support Local Farming/Buy Local	0.3	1.1	5.9	\$1	\$0.2	UC
A-11	Biodiesel Production	0.1	0.3	2.3	<i>Not quantified</i>		UC
	TOTAL AFTER ADJUSTING FOR OVERLAPS AND RECENT POLICY ACTIONS	16	35	267	-\$2,239		n/a

Perspectives on Policy Recommendations

There is a large variation in the GHG reductions associated with various options. Figure EX-2 presents the estimated tons of reductions for each policy recommendation for which estimates were available, expressed as a cumulative figure for the period 2007-2020.

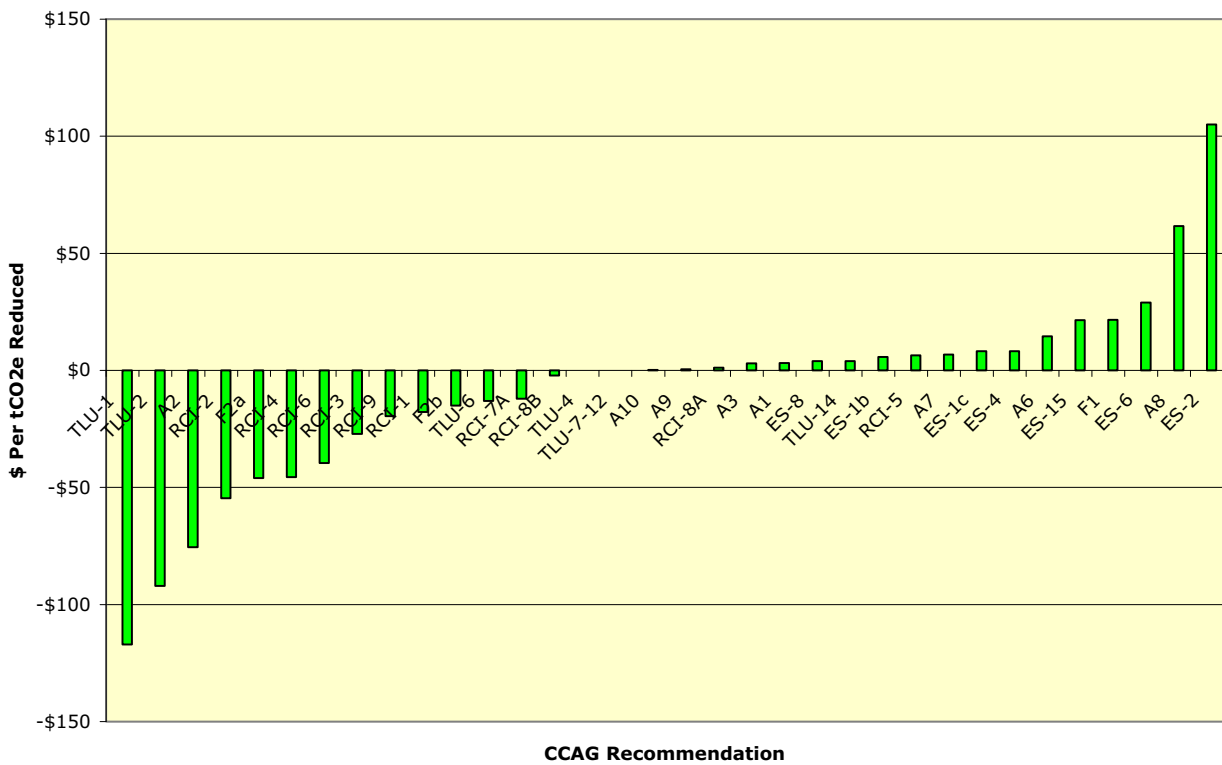
Figure EX-2

CCAG Policy Recommendations Ranked by Cumulative GHG Reductions, 2007-2020



There is also variation in the cost (or cost savings) per ton of reduction associated with various options. Figure EX-3 presents the estimated dollars per ton cost (or cost savings, depicted as a negative number) for each policy recommendation for which cost estimates were available. This measure is calculated by dividing the net present value of the cost of the option by the cumulative GHG reductions, all for the period 2007-2020.

Figure EX-3
CCAG Policy Recommendations Ranked by Dollars per Ton



Chapter 6

Transportation and Land Use

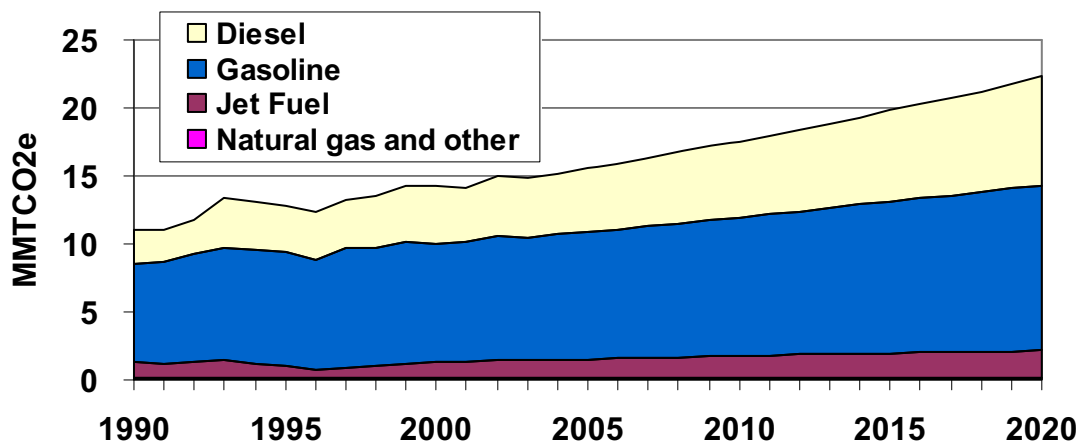
Overview of GHG Emissions

The transportation sector is a major source of GHG emissions in New Mexico – currently accounting for about 18% of the State’s gross GHG emissions. The transportation technologies and fuels used are key determinants of those emissions, along with population, economic growth, and various land use policies that all affect the demand for transportation services. GHG emissions from the transportation sector totaled about 14 MMtCO₂e in 2000.

Figure 6-1 shows historical and projected Transportation and Land Use (TLU) GHG emissions by fuel and source, and illustrates their rapid growth. TLU emissions are expected to roughly double from 1990 from 2020. New Mexico studies suggest on-road vehicle miles traveled (VMT) will continue to grow faster than the population, and rapid growth in freight VMT is also expected.

Subsequent to the compilation of the inventory and projections, Congress enacted the 2005 Energy Policy Act which contained a provision for a national renewable fuel standard that will likely increase the use of biofuels in New Mexico. This was classified as a “recent action” and was accounted for in the TLU TWG analysis.

Figure 6-1. Historical and Projected GHG Emissions from the Transportation and Land Use Sector, New Mexico, 1990 to 2020



Key Challenges and Opportunities

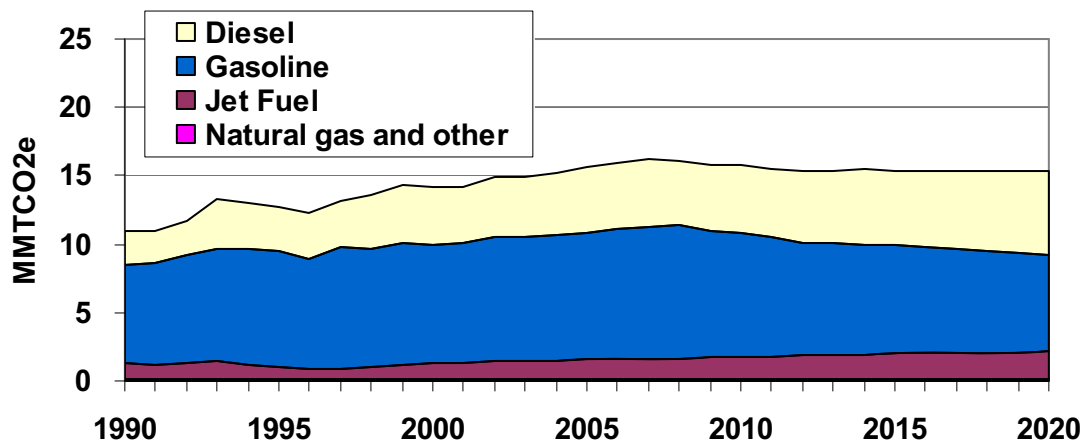
The principal means to reduce TLU emissions include improving vehicle fuel efficiency, substituting gasoline and diesel with lower-emission fuels, modal switches to lower-emission means of travel, and various strategies to decrease the growth in fuel use and VMT.

In New Mexico and in the nation as a whole, vehicle fuel efficiency has improved little since the late 1980s, yet many studies have documented the potential for substantial increases consistent with maintaining vehicle size and performance. The use of biofuels with lower GHG emissions is growing in New Mexico and larger market penetration is possible. New Mexico also has taken some steps to increase transit options and encouraging Smart Growth.

Overview of Policy Recommendations and Estimated Impacts

The CCAG recommends a set of 15 policy options for the Transportation and Land Use sector that offer the potential for major economic benefits and emissions savings. As summarized in Figure 6-2, these policy recommendations could lead to emissions reductions from reference case projections of 6.7 MMtCO₂e per year by 2020, cumulative savings of nearly 50 MMtCO₂e from 2007 through 2020, and net cost savings of over \$1.6 billion to the New Mexico economy through the year 2020 on a net present value basis (NPV).¹ The weighted average cost of saved carbon from the policy options for which quantitative estimates of both costs and savings were prepared was -\$36 per metric ton of CO₂ equivalent.

Figure 6-2. Impact of Policy Recommendations on GHG Emissions from the Transportation and Land Use Sector, New Mexico²



The estimated impacts of the individual policies are shown in Table 6-1 below. The CCAG policy recommendations described briefly here (and in more detail in Appendix I to this Report) result not only in significant emissions and costs savings, but offer a host of additional benefits

¹ The net cost savings are based on fuel expenditures, operations, maintenance, and administrative costs, and amortized, incremental equipment costs. All NPV analyses here use a 5% real discount rate.

² The figure includes the effect of the national Renewable Fuel Standard but it is too small to appear graphically.

as well. These benefits include (but are by no means limited to) reduced local air pollution, more livable, healthy communities, and economic development and job growth from in-state biofuel production.

In order for the TLU policy options recommended by the CCAG to yield the levels of savings described here, the options should be implemented in a timely, aggressive, and thorough manner. Notably, the State Clean Car program must clear several hurdles before New Mexico or any other state can adopt it, including EPA approval of the original California Clean Car Program (that other states can then opt into) and a court challenge to the underlying notion of regulation of GHG emissions from vehicles. If for any reason, New Mexico is not able to implement the Clean Car Program, other options could play a larger role. For example, the policies to be studied under the Incentives/Disincentives Options Bundle (TLU-5) could improve fuel efficiency through some combination of “feebates”, vehicle excise taxes that vary with fuel economy, and consumer labeling. Feebate proposals usually have two parts: 1) a fee on relatively high emissions/lower fuel economy vehicles; and 2) a rebate or tax credit on low emissions/higher fuel economy vehicles. A multi-state approach to feebates is recommended here because of the drawbacks of New Mexico (or any state) acting alone in this area.

Greater alternative fuel use (TLU-6) can be accomplished through a combination of voluntary and mandatory measures. The Renewable Fuel Standard recommended as part of TLU-6 can increase the use of ethanol and biodiesel, and the incentives recommended in Chapter 7 (Options A-3 and A-11) can promote in-state production of these fuels through methods with lower lifecycle GHG emission. Use of zero emission vehicles running on electricity or hydrogen made from renewable sources can dramatically reduce GHG emissions.

To be most effective, the group of policies aimed at VMT reductions (TLU-7 through TLU-11) will require change at every level of government, and as such will be most effective with focused leadership by the State, including training, outreach, and technical assistance to local governments.

**Table 6-1. CCAG Recommended Policy Options and Results
for the Transportation and Land Use Sector**

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007–2020			
	TRANSPORTATION AND LAND USE						
TLU-1	State Clean Car Program	0.4	1.9	10.4	-\$1,207	-\$117	UC
TLU-2	Low Rolling Resistance Tires	0.5	0.6	5.5	-\$506	-\$92	UC
TLU-3	Low-GHG Operation of State Fleet Vehicles	<i>Not quantified</i>					UC
TLU-4	Pay-As-You-Drive Insurance	0.2	1.0	5.0	Zero net cost		UC
TLU-5	Incentive/Disincentive Options Bundle	<i>Not quantified</i>					UC
TLU-6	Alternative Fuels Use	0.4	1.7	9.1	-\$119	-\$13	UC
<i>VMT Reduction Bundle TLU-7 to TLU-11</i>							
TLU-7	Infill, Brownfield Re-development	1.2	1.3	13.4	<i>Zero net costs or positive cost savings</i>		UC
TLU-8	Transit-Oriented Development						UC
TLU-9	Smart Growth Planning, Modeling, Tools						UC
TLU-10	Multimodal Transportation Bundle						UC
TLU-11	Promote LEED for Neighborhood Development						UC
TLU-12	Targeted Open Space and Croplands Protection	<i>Considered in Agriculture and Forestry TWG (F-1 and A-8)</i>					
TLU-13	Diesel Retrofits	<i>Incorporated as part of TLU-5</i>					
TLU-14	Truck Stop Electrification/Anti-Idling	0.4	0.7	6.3	\$23	\$4	UC
TLU-15	Intermodal Freight Initiatives	0.1	0.5	2.6	<i>Not quantified</i>		UC
TLU-16	Lower Speed Limits	0.2	0.3	2.8	<i>Not quantified</i>		UC
	SECTOR TOTAL AFTER ADJUSTING FOR OVERLAPS	3.0	6.7	49.4	-\$1,669	-36	
	REDUCTIONS FROM RECENT POLICY ACTIONS ^a	0.1	0.1	1.1			
	SECTOR TOTAL PLUS RECENT POLICY ACTIONS	3.1	6.8	50.5	-\$1,669	-36	

^a As noted earlier in the Chapter, the only recent policy action included in the analysis is the national renewable fuel standard enacted in 2005.

Transportation and Land Use Sector

Policy Descriptions

The TLU sector includes emissions and mitigation opportunities related to vehicle technologies, fuel choices, transit options, and demand for transportation services.

TLU-1 State Clean Car Program

The CCAG recommends that New Mexico adopt the State Clean Car Program (also known as the “Pavley” standards or California GHG Emission Standards) in order to reduce GHG emissions from new light-duty vehicles. The standards, which must still be approved by US EPA, would take effect in Model Year 2011 (calendar year 2010). Other Clean Car Program elements include standards requiring reductions in smog- and soot-forming pollutants, and promoting introduction of very low-emitting technologies into new vehicles.

New cars and light trucks in all states must comply with Federal emission standards, and, generally speaking, states have the choice of adopting a stronger set of standards applicable in California. In 2005, California finalized a set of standards that would require reductions of GHG emissions of about 30% from new vehicles, phased in from 2009 to 2016, through a variety of means. Eleven states (11) already have adopted the California Clean Car Program standards: California, Connecticut, Maine, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont and Washington.

TLU-2 Low-Rolling Resistance Tires

The CCAG recommends that New Mexico 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.

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 (CAFE) 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. An appropriate State agency would initiate a fuel efficient tire replacement program. The program could include consumer education, product labeling, and minimum standards elements. These programs would be developed under a rule development process that would incorporate the best scientific information, including the results from tests of tires conducted by the tire manufacturers, the California Energy Commission, and other data reviewed by the National Academy of Sciences.

TLU-3 Low-GHG Operation of State Fleet Vehicles

The CCAG recommends that New Mexico strengthen its commitment to reduce GHG emissions due to operation of state-owned vehicles by enacting legislation that codifies the provisions of Executive Order 05-049, and requires that the State increase its use of biofuels in the fleet of State vehicles to match the annual targets set forth in Option TLU-6 (Alternative Fuels Use). This is an enabling option that would have the State government lead by example, ensuring that its own fleet of vehicles meets or exceeds the targets set for the State as a whole.

TLU-4 Pay-As-You-Drive Insurance

The CCAG recommends that New Mexico change the state insurance regulations to allow Pay-As-You-Drive (PAYD) insurance, and initiate and promote an aggressive pilot of PAYD in 2008. PAYD insurance changes part of vehicle insurance payments from fixed charges to per-mile charges. By allowing people to save money by changing their driving decisions, PAYD reduces VMT and emissions. Assuming this pilot recommended here is successful, market penetration could increase to 100% by 2020. This could happen either through competitive pressure (increasing numbers of companies offer it in order to stay competitive) or through a change in state policy mandating PAYD at some point after it has been shown to work.

TLU-5 Incentive/Disincentive Options Bundle

The CCAG recommends that New Mexico further study and develop policy options that create incentives for the purchase and operation of vehicles that emit low levels of GHGs (and disincentives for the purchase and operation of vehicles that emit high levels of GHGs). The range of policies to be studied and developed include:

- A multi-state “feebate” program, including the neighboring states of California and Arizona.
- 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.
- A consumer labeling program that provides buyers with better information on the GHG emissions of new vehicles.
- Incentives for diesel retrofits that would encourage the replacement of high-emitting diesel truck engines with newer, less polluting engines.

Together, these incentives could change the vehicle fleet technology mix through a combination of demand- and supply-side changes.

TLU- 6 Alternative Fuels Use

The CCAG recommends that New Mexico expand the availability and use of alternative fuels and expand the use of hybrid vehicles, low speed vehicles, and zero emission vehicles for transportation in New Mexico. The mechanisms for achieving this would be combination of a renewable fuels standard (RFS), financial incentives, outreach, and market-based mechanisms. The RFS would operate according to the table below:

Phase	Year	Percentage of Gasoline to be Replaced by Ethanol	Percentage of Diesel to be Replaced by Biodiesel
1	2009	5%	2%
2	2012	10%	10%
3	2020	20%	20%
4	2050	50%	30%

In the near term, the policy also targets increasing sales of hybrid vehicles and partial ZEVs, while sales of ZEVs are targeted to meet the longer-term goals. Plug-in electric vehicles equipped with batteries would also serve as storage capacity for wind and solar power through grid interconnection (V2G). The CCAG also recommends that New Mexico should build appropriate production capacity for renewables-generated electricity and hydrogen fuels for transportation purposes in New Mexico.

TLU-7 Infill, Brownfield Re-development

The CCAG recommends that New Mexico increase its efforts to reuse land that is already developed but is now vacant, underused, or even mildly polluted, and meet the growing demand by a larger number of households comprised of singles, working parents and single parents for housing located close to services, jobs and transit. New Mexico should move beyond current policies in this area, and:

- Use fiscal, tax and other financing mechanisms to remove barriers to and otherwise support recycling of existing buildings and underused land.
- Adapt planning policies and regulations to give infill and brownfield sites priority for development over sprawling sites at the edges of communities. Include New Mexico government and educational units in these adapted policies and regulations, so that state government buildings, universities, and public schools do not contribute to sprawl.

TLU-8 Transit-Oriented Development

The CCAG recommends that New Mexico expand efforts to supportive of building of compact development around transit stops and clustering employment centers around transit in ways that allow meet transportation needs to be met by foot, bicycle, or transit. New Mexico should promote and expand Transit-Oriented Development (TOD) with strong implementation of the policies recommended in The Report of the Governor’s Task Force on Our Communities, Our Future:³

- *Tax Increment Financing (TIF) Districts:* The state can expand TIF programs through the extension of its credit resources.
- *State Funding Programs:* Provide state funds for affordable housing and parks, both of which help make TODs successful.

³ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005. <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF> .

- *Support of Local Governments:* Amend local government enabling laws and provide technical assistance to help local governments take maximum advantage of transit investments.
- *Location of State Facilities:* Locate state facilities (including schools and universities) near transit facilities.
- *State Targeting of Infrastructure Investments:* Legislatively appropriated capital outlay funds, the State Public Project Revolving Loan Fund, and other state-funded infrastructure initiatives should be used for projects that encourage walkable and traditional communities, and are supportive of transit.

TLU-9 Smart Growth Planning, Modeling, Tools

The CCAG recommends that New Mexico expand its efforts in the areas of Smart Growth planning, modeling, and tools, and thus allow, support, and encourage location-efficient growth in communities that are proximate to household needs and amenities (such as jobs, shopping, school, services, entertainment, etc.) as opposed to growth in areas that are not proximate and require greater travel distance and have less mode choice. Smart growth allows for mixed land uses, a range of housing opportunities, and multiple transportation options including pedestrian/bike access. These policies reduce GHG emissions by giving municipalities the tools they need to shift development patterns and reduce vehicle trips and total vehicle miles traveled, while avoiding mandates. Similar to TLU-8, the CCAG recommends that New Mexico should continue to implement and expand the Smart Growth-supportive policies recommended in The Report of the Governor’s Task Force on Our Communities, Our Future (see TLU-8 above).

TLU-10 Multi-Modal Transportation Bundle

The CCAG recommends that New Mexico should implement the 2025 Statewide Multimodal Transportation Plan in ways that reduce GHG emissions. The New Mexico 2025 Statewide Multimodal Transportation Plan establishes objectives and implementation strategies that aim to shift the State’s focus from roads to an integrated, multimodal system. New Mexico should put special emphasis on:

- Making GHG-optimal use of federal Congestion Mitigation Air Quality funds;
- Expanding transit infrastructure (rail, bus, BRT);
- Improving existing transit service and support facilities,
- Improving transit promotion and marketing (including tax-free and employer-paid Commuter Benefits, and Parking Cash Out);
- Improving bike and pedestrian infrastructure;
- Exploring additional commuter rail using existing rail corridors;
- Reviewing all proposed transportation projects for multi-modal flexibility (e.g., add or reserve room for Bus Rapid Transit) or light rail if feasible);
- Conducting research into new transportation technologies and urban planning techniques;
- Supporting and promoting policies that improve transportation system performance through non-transportation actions, such as a 4-day work-week and telecommuting.

TLU-11 Promote LEED for Neighborhood Development

The CCAG recommends that New Mexico recognize the lower emissions and reductions in other public costs of development meeting “LEED-ND” standards. The LEED (Leadership in Energy

and Environmental Design) Green Building Rating System® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. The “LEED for Neighborhood Development (LEED-ND)” rating system will integrate the principles of smart growth, urbanism, and green building into the first national standard for neighborhood design. LEED-ND will emphasize smart growth aspects and neighborhood design of development while incorporating a selection of the most important green building practices. LEED-ND ratings will include measurements of a development’s compact design, proximity to transit, mixed use, mixed housing type, and pedestrian- and bicycle- friendliness.⁴ New Mexico should:

- Support municipalities in quantifying the local benefits of LEED-ND developments, and lowering development fees appropriately;
- Require LEED-ND compliance for developments involving state facilities or funding;
- Support the New Mexico building and real estate industries and the non-profit US Green Building Council in promoting LEED-ND to the public and others.

TLU – 14, Truck Stop Electrification/Anti-Idling

The CCAG recommends that New Mexico develop and implement a statewide ordinance banning idling by heavy-duty vehicles in most situations. The State should also set up truck stop electrification stations at key truck stops and truck rest areas along the major highways in New Mexico.

This policy option involves reducing the amount of time that vehicles idle through the combination of a statewide anti-idling ordinance and by promoting and expanding the use of technologies that reduce long-term heavy-duty vehicle idling, with an emphasis on encouraging the use of innovative truck stop electrification. Anti-idling control measures reduce fuel consumption and emissions from stationary freight vehicles (potentially wasted energy). With truck stop electrification, truck drivers can shut off their engines and obtain heating, cooling, electrical outlets, and communication and entertainment options through a delivery tube provided in electrified truck stop spaces that connect to the truck through a window adapter. In addition to truck stop electrification, other available technologies that reduce heavy-duty vehicle idling include automatic engine shut down/start up system controls; direct fired heaters (for providing heat only); and auxiliary power units.

TLU-15 Intermodal Freight Initiatives

The CCAG recommends that New Mexico implement policies and programs that result in the shifting of the transport of freight goods from the roadway system to rail. This should include evaluating the feasibility of restoring abandoned rail lines to increase the attractiveness of using rail for local shipments.

Carrying freight by rail rather than truck can significantly reduce emissions and fuel consumption, while at the same time reducing congestion on major roadways. A number of small abandoned rail lines already exist in New Mexico. A primary goal of this measure is to restore those lines, which will allow freight to be carried by rail directly to a number of warehouses and industrial sites in existing developed areas. This would also provide an incentive to reduce sprawl from these businesses. Electrifying rail should also be considered.

⁴ <http://www.usgbc.org/LEED>.

New Mexico currently has 2,151 miles of railroad in operation. In many cases, particularly for long distance freight, freight can be carried by rail more economically and at lower GHG emission levels than over the existing roadway system. This policy is designed to transfer a portion of the freight carried over the roadway system to rail wherever possible.

TLU-16 Reduced Speed Limit for Commercial Trucks

Reduced vehicle speeds increase fuel economy, reduce CO2 emissions, and improve safety. The CCAG recommends that New Mexico consider various options to reduce speed limits in the state including trucks only (60 mph) and all traffic (60 or 65 mph).

Appendix I

Transportation and Land Use

Policy Recommendations

Overview

The Transportation and Land Use sector includes GHG mitigation opportunities related to vehicle technologies, fuel choices, transit options, and demand for transportation services. The CCAG recommends a set of 13 policy options for the TLU sector that offer the potential for major GHG emissions reductions from the reference projection. As summarized in the table below, these 13 policy recommendations could lead to emissions savings from reference case projections of 6.7 MMtCO₂e per year by 2020 and cumulative savings of nearly 50 MMtCO₂e from 2007 through 2020. The weighted average cost of saved carbon from the policy options for which quantitative estimates of both costs and savings were prepared was -\$36 per metric ton of CO₂ equivalent, meaning that there is a net savings to the New Mexico economy in implementing these options. A notable recent policy action affecting TLU was the passage of the national Renewable Fuel Standard in 2005, however, its annual impact is estimated at only 0.1 MMtCO₂e per year.

For each recommended TLU policy, this technical appendix provides details on design, analysis, quantification of impacts, and other related information. (See Appendix E for explanation of the general methods applied.) When these TLU policies were quantified, some policies were considered to have overlapping impact. To avoid double-counting of GHG emission reductions, the following steps were taken:

- **Light-duty sector:** Implementation of the light-duty measures would cause overlap with each other. For example, the State Clean Car Program (TLU-1) reduces per-vehicle CO₂ emissions while the VMT Reduction Bundle (TLU-7 through TLU-11) reduces the overall Vehicle-miles Traveled (VMT) from the light-duty sector. Thus, the VMT that would be applied to TLU-1 is reduced by the VMT Reduction Bundle while the per-mile CO₂ reduction for the VMT Reduction Bundle would be reduced by TLU-1. The same reasoning applies to Low Rolling Resistance Tires (TLU-2) and Pay-As-You-Drive Insurance (TLU-4). The sum of the product of the fraction of emissions remaining after each individual measure (TLU-1, TLU-2, TLU-4, and TLU-7 through TLU-11) was applied to the reference case projected emissions and produced the total fraction of the reference case emissions that would be expected to remain with these measures applied in combination. In 2020, these four measures provide a total reduction to the light-duty CO₂ emissions of 39% when applied individually. When applied in combination and accounting for the overlap, they reduce 2020 reference case projected light-duty CO₂ emissions by 34%.
- **Freight sector:** Implementation of the freight measures would also cause overlap with each other. The intermodal freight initiatives (TLU-15) would reduce activity from diesel freight vehicles. This, in turn, would lower the starting activity of the anti-idling measure (TLU-14) and the Class 8 reduced speed measure (TLU-16). To avoid double-counting, the VMT reduced from the intermodal freight initiatives was converted to a corresponding amount of

reduced fuel consumption. This fuel consumption was then subtracted from the starting diesel fuel consumption values for both the anti-idling calculations and the Class 8 truck reduced speed measure. The emission reductions from these measures were then recalculated using a revised baseline diesel consumption.

- **Fuel overlap:** The reductions in fuel consumption achieved as described above by the light-duty sector and the freight sector would both affect the amount of alternative fuels projected to be used due to TLU-6. Thus, the reduction in fuel consumption from the light-duty sector was subtracted from the starting gasoline consumption used in the ethanol consumption calculations and in the hybrid/ZEV calculations. The emission reductions from ethanol and hybrids/ZEVs were recalculated using this revised baseline gasoline consumption. Similarly, the baseline diesel fuel consumption for the biodiesel portion of TLU-6 was first revised to account for the reduction in baseline diesel fuel consumption from the freight sector measures. The biodiesel consumption and emission reductions were then recalculated from this revised baseline.

Transportation and Land Use Sector Summary Table of Policy Options

	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2007–2020 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2012	2020	Total 2007–2020			
	TRANSPORTATION AND LAND USE						
TLU-1	State Clean Car Program	0.4	1.9	10.4	-\$1,207	-\$117	UC
TLU-2	Low Rolling Resistance Tires	0.5	0.6	5.5	-\$506	-\$92	UC
TLU-3	Low-GHG Operation of State Fleet Vehicles	<i>Not quantified</i>					UC
TLU-4	Pay-As-You-Drive Insurance	0.2	1.0	5.0	Zero net cost		UC
TLU-5	Incentive/Disincentive Options Bundle	<i>Not quantified</i>					UC
TLU-6	Alternative Fuels Use	0.4	1.7	9.1	-\$119	-\$13	UC
<i>VMT Reduction Bundle TLU-7 to TLU-11</i>							
TLU-7	Infill, Brownfield Re-development	1.2	1.3	13.4	<i>Zero net costs or positive cost savings</i>		UC
TLU-8	Transit-Oriented Development						UC
TLU-9	Smart Growth Planning, Modeling, Tools						UC
TLU-10	Multimodal Transportation Bundle						UC
TLU-11	Promote LEED for Neighborhood Development						UC
TLU-12	Targeted Open Space and Croplands Protection	<i>Considered in Agriculture and Forestry TWG (F-1 and A-8)</i>					
TLU-13	Diesel Retrofits	<i>Incorporated as part of TLU-5</i>					
TLU-14	Truck Stop Electrification/Anti-Idling	0.4	0.7	6.3	\$23	\$4	UC
TLU-15	Intermodal Freight Initiatives	0.1	0.5	2.6	<i>Not quantified</i>		UC
TLU-16	Lower Speed Limits	0.2	0.3	2.8	<i>Not quantified</i>		UC
	SECTOR TOTAL AFTER ADJUSTING FOR OVERLAPS	3.0	6.7	49.4	-\$1,669	-36	
	REDUCTIONS FROM RECENT POLICY ACTIONS ^a	0.1	0.1	1.1			
	SECTOR TOTAL PLUS RECENT POLICY ACTIONS	3.1	6.8	50.5	-\$1,669	-36	

^a As noted earlier in the Chapter, the only recent policy action included in the analysis is the national renewable fuel standard enacted in 2005.

TLU-1 State Clean Car Program

Policy Description:

Adopt the State Clean Car Program (also known as the “Pavley” standards or “California GHG emission standards”) in order to reduce the net emissions of GHGs from vehicle operation.

Policy Design:

New cars and light trucks in all states must comply with Federal emission standards, and, generally speaking, states have the choice of adopting a stronger set of standards applicable in California. In 2005, California finalized a set of standards that would require reductions of GHG emissions of about 30 percent from new vehicles, phased in from 2009 to 2016, through a variety of means.¹ The standards must still be approved by USEPA, and face a court challenge.

Implementation Mechanisms

Regulatory program beginning with vehicle model year 2011.

Types(s) of GHG Benefit(s):

Principally CO₂ reductions with some reduction also in N₂O, CH₄, and refrigerant losses.²

Related Policies/Programs in place:

None.

Estimated GHG Savings and Costs Per Ton:

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.4	1.9	MMtCO ₂ e
Net Present Value (2007-2020)		-\$1,207	\$ million
Cumulative Emissions Reductions (2007-2020)		10.4	MMtCO ₂ e
Cost-Effectiveness		-\$117	\$/tCO ₂ e

- **Data Sources:**

¹ For detailed information see: <http://www.arb.ca.gov/cc/ccms/ccms.htm>.

² See: http://www.arb.ca.gov/cc/factsheets/cc_isor.pdf

- CCS, Draft New Mexico Greenhouse Gas Inventory and Reference Case Projections, July 2005.
 - Mary Braun, Tony Dutzik, Jeanne Bassett, *A Blueprint For Action: Policy Options to Reduce New Mexico's Contribution to Global Warming*, New Mexico PIRG Education Fund, Spring 2006 (hereafter "NM PIRG report").³
 - Elizabeth Ridlington, Tony Dutzik, and Christopher Phelps, *Cars and Global Warming: Policy Options to Reduce Connecticut's Global Warming Pollution from Cars and Light Trucks*, Spring 2005 (hereafter, "Conn. PIRG report").
- **Quantification Methods:** The New Mexico PIRG report used results from a model of a light duty vehicle fleet to compare the difference between base case emissions and emissions with fleet penetration over time of vehicles that meet lower GHG emissions standards consistent with California regulations. That model, developed by the national PIRG organization, was used to estimate emission reductions in Arizona and Connecticut as well as New Mexico. A CCS review of the PIRG model found that it calculated light duty vehicle fuel use and emissions using a valid and reasonable methodology.⁴

CCS compared the PIRG model results to results for New England states and California that were obtained using comparable modeling methods. CCS found that while all three modeling efforts were valid, reasonable, and comparable, some of the PIRG model assumptions and methods were relatively conservative, while the California and New England modeling results were relatively optimistic. CCS further refined the PIRG model results consistent with a middle range scenario that produced results less conservative than the PIRG results and less optimistic than the California and New England results. While PIRG projected a 13.7% reduction in light duty vehicle emissions with this policy for Arizona, a CCS refinement estimated a 15.5% reduction in emissions for Arizona. CCS applied this same refined percentage reduction in emissions to the CCAG reference case for New Mexico to obtain a net estimated reduction of 1.9 MMTCO₂e in 2020.

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

Key Uncertainties:

Fleet turnover rates for light duty vehicles and future patterns of consumer purchase choices between passenger cars and light duty trucks (i.e. SUVs).

Contributing Issues:

Reductions in criteria air pollutants.

³ <http://nmpirg.org/NM.asp?id2=23686>

⁴ See discussions in NM PIRG report, pp. 20-22, 49-51.

Feasibility Issues:

The GHG emissions standards in the State Clean Car Program can be met with existing 'off-the-shelf' automotive technologies that are already in the marketplace.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None identified.

TLU-2 Low-Rolling Resistance Tires

Policy Description:

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.

Policy Design:

- **Goal levels:** Require that replacement tires be LRR tires achieving an average 4.5% gain in fuel economy.
- **Timing:** The requirement would begin in 2008.
- **Parties:** State government, industry

Implementation Mechanisms

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 resistance of the various tires consumers can purchase have significant variations depending on tread design, composition, cross-section geometry, and inflation pressure.

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 would exempt certain classes of tires that sell in low volumes, including specialty and high performance tires.

An appropriate State agency would initiate a fuel efficient tire replacement program. The program could include consumer education, product labeling, and minimum standards elements. These programs would be developed under a rule development process that would incorporate the best scientific information, including the results from tests of tires conducted by the tire manufacturers, the California Energy Commission, and other data reviewed by the National Academy of Sciences.

The minimum standard is likely to be less stringent than the energy efficiency of original tires provided by the automobile manufacturers on new purchase vehicles. 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.

Related Policies/Programs in Place:

In October of 2003, California adopted the world’s first fuel-efficient replacement tire law. AB 844 is a “first-of-its-kind” law requiring energy efficient tires. AB 844 directed the California Energy Commission (CEC) to develop a State Efficient Tire Program. Specifically, AB 844 requires the CEC to: (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 is scheduled to begin in January 2007.

Estimated GHG Savings and Cost Per Ton:

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.5	0.6	MMtCO ₂ e
Net Present Value (2006-2020)		-\$506	\$ million
Cumulative Emissions Reductions (2006-2020)		5.5	MMtCO ₂ e
Cost-Effectiveness		-\$92	\$/tCO ₂ e

- **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; and NM PIRG report.
- **Quantification Methods:** CCS evaluated and compared a series of existing assessment, 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 percent is technically and economically feasible.
- Tires and their rolling resistance characteristics can have a meaningful effect on vehicle fuel economy and consumption.
- Although traction may be affected by modifying a tire’s tread to reduce rolling resistance, the safety consequences are probably undetectable.
- Reducing the average rolling resistance of replacement tires promises fuel savings to consumers that exceed associated tire purchase costs...”

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 efficient tires would reduce gasoline consumption by 1.5 to 4.5 percent, saving the typical driver \$50 to \$150 over the 50,000-mile life of the tires. Consumers would save more than \$470 million annually at current retail prices or approximately \$1.4 billion over the three-year lifetime of a typical set of replacement tires.

The NM PIRG report presents estimates for potential carbon dioxide emission reductions from a low-rolling resistance replacement tire program. The NM PIRG report estimate for GHG reductions from a fuel efficient tire program is 0.25 MMtCO₂e in 2020.

CCS estimated the reduction in GHG emission from this policy using the New Mexico Greenhouse Gas Inventory and Reference Case Projections as a baseline. Using an emission reduction factor of 4.5% (the upper end of the range of reported fuel conservation due to LRR replacement tires), the estimated emissions reduction is 0.6 MMtCO₂e in 2020, and the cumulative emissions reduction for 2007-2020 would be 6.4 MMtCO₂e.

- **Key Assumptions:** The analysis assumes a LRR replacement tire program begins in 2008. The emissions reductions from LRR replacement tires are the result of gasoline conservation, creating a cost savings for consumers. The present value of the cumulative net costs to New Mexico of an LRR replacement tire program through 2020 is -\$506 million (a negative number indicating net savings). This cost estimate is sensitive to the average price of fuel.

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 new purchase light duty vehicles.

Contributing Issues:

Reductions in criteria air pollutants.

Feasibility Issues:

Some CCAG members raised questions about potential safety and performance compared to conventional tires. The 2006 National Academy of Sciences study of LRR replacement tires reported that “the committee could not find safety studies or vehicle crash data that provide insight into the safety impacts associated with large changes in traction capability, much less the smaller changes that may occur from modifying the tread to reduce rolling resistance.”

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-3 Low-GHG Operation of State Fleet Vehicles

Policy Description:

This policy option strengthens New Mexico's commitment to reduce GHG emissions due to operation of the vehicles owned by the state. Executive Order 05-049⁵ (9/23/05) has put the State on a path toward increasing the efficiency of, and use of alternative fuels in, the fleet of State-owned vehicles. Relevant sections of that order require the following:

- By 2010, 15% of fuel used in state vehicles must be biofuels.
- Immediately, 75% of all vehicles must be flex-fuel or hybrid.
- Immediately, new vehicles must have the highest fuel economy for the intended use.

This option aims at both fuel efficiency and use of biofuels in the State fleet.

Policy Design:

The CCAG recommends that New Mexico enact legislation that codifies the provisions of Executive Order 05-049, and requires that the State increase its use biofuels in the fleet of State vehicles to match the annual targets set forth in Option TLU-6 (Alternative Fuels Use). This is an enabling option that would have the State government lead by example, ensuring that its own fleet of vehicles meets or exceeds the targets set for the State as a whole.

- **Goal Levels and Timing:** Where the fuel and vehicle-type requirements of TLU-6 are higher than Executive Order 05-49, the State vehicle fleet would conform to the higher requirements (e.g., hybrid purchases would be 10% of new vehicles in 2010, and use of ethanol and biodiesel would rise to 20% in 2020)
- **Coverage of parties:** New Mexico state government agencies.

Implementation Mechanisms

Administrative order and full State cabinet participation.

Types(s) of GHG Benefit(s):

CO2 reductions

Estimated GHG Savings and Costs Per Ton:

GHG reductions and costs for this enabling option are incorporated into those reported under TLU-6, Alternative Fuels Use.

Key Uncertainties:

⁵ http://www.governor.state.nm.us/orders/2005/EO_2005_049.pdf.

None identified.

Contributing Issues

Reductions in criteria air pollutants.

Feasibility Issues:

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-4 Pay-As-You-Drive Insurance

Policy Description

Pay-As-You-Drive (PAYD) insurance program: changes part of vehicle insurance payments from fixed charges to per-mile charges. By allowing people to save money by changing their driving decisions, PAYD reduces VMT and emissions.

Policy Design

The CCAG recommends that New Mexico change insurance regulations to allow PAYD insurance, and initiate and promote an aggressive pilot of PAYD in 2008. This could happen either through competitive pressure (increasing numbers of companies offer it in order to stay competitive) or through a change in state policy mandating PAYD at some point after it has been shown to work.

- **Goal Levels and Timing:** Assuming this pilot is successful and the State promotes PAYD, market penetration could increase to 100% by 2020.
- **Coverage of parties:** New Mexico state government agencies, insurance companies.

A New Mexico PAYD policy would:

- *Continue to set rates by existing class of driver.* Allow rates to be set—as most insurance rates are—for classes of drivers. PAYD rates would be charged within classes, so that a driver in that class (for example, "rural") traveling the average distance would pay the same under PAYD as before.
- *Use existing technology.* The necessary equipment for remote mileage readings is standard on an increasing number of new cars (such as GM OnStar-equipped vehicles). Add-on equipment to relay mileage automatically has been cost-effectively added in several pilot projects. All MY1996 vehicles and newer have OBD (on-board diagnostics) that already electronically monitor mileage that can be quickly downloaded via transponder. Finally, current odometers are sufficiently tamper-proof to support yearly mileage readings with no additional technology.

Implementation Method(s):

Authorization and pilot project, followed by evaluation and promotion.

Related Policies/Programs in Place:

None cited.

Types(s) of GHG Benefit(s):

CO₂ reductions.

Estimated GHG Savings and Costs Per Ton:

	2012	2020	Units
GHG Emission Savings	0.2	1.0	MMtCO ₂ e
Net Present Value (2006-2020)		No net cost	\$million
Cumulative Emissions Reductions (2006-2020)		5.0	MMtCO ₂ e
Cost-Effectiveness		No net cost	\$/tCO ₂ e

Data Sources, Methods, and Assumptions:

CCS examined the NM PIRG report and compared its model results for estimated reductions in vehicle miles of travel with other studies of PAYD policies, including those produced by the Economic Policy Institute and Resources for the Future (RFF). NM PIRG conducted an analysis of the potential GHG reductions from a PAYD automobile insurance policy. CCS found that the NM PIRG estimates were comparable with other estimates, which ranged from 8 to 20%. As a result, the NM PIRG results for estimated reductions in vehicle miles of travel and greenhouse gas emissions reductions fell within the lower range of the comparable estimates. That is, the emissions reduction estimates are conservative.

Key Uncertainties:

Experience with pilot programs suggests enthusiastic reception by many customers. Any of these pilots could be useful sources of models for a New Mexico pilot project.⁶

Nonetheless, the effects of PAYD insurance on driver behavior when expanded to the entire driving population are subject to some significant uncertainty.

Contributing Issues:

- Reductions in criteria air pollutants
- Reductions in crashes from reduced VMT.
- Increase in insurance rate equity.

⁶ For additional information see: Kevin Maney, “For a price, would you let car insurer along for the ride?”, *USA Today*, 8/3/05. http://www.usatoday.com/money/industries/technology/maney/2005-08-03-car-monitoring_x.htm; Todd Litman, “Pay-As-You-Drive Vehicle Insurance: Converting Vehicle Insurance Premiums Into Use-Based Charges” <http://www.vtpi.org/tm/tm79.htm>; Dean Baker, “Insurance By the Mile”, *Harper’s Magazine*, June, 2006. <http://harpers.org/bb-insurance-by-the-mile-2838238.html>; Ian W.H. Parry, “Is Pay-As-You-Drive Insurance: a Better Way to Reduce Gasoline than Gasoline Taxes?”, Resources for the Future (www.rff.org/Documents/RFF-DP-05-15.pdf), 2005. See also the discussion in the NM PIRG report (pp. 24-26).

Feasibility Issues:

While PAYD can be designed to have no relative impact on rural drivers compared to today's rate structures, until detailed implementation proposals are developed, concerns about potential disproportionate impacts on rural drivers will remain.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-5 Incentive/Disincentive Options Bundle

Policy Description

The four components studied and developed under this option would create financial incentives for the purchase and operation of vehicles that emit lower levels of GHG.

Policy Design

The CCAG recommends that New Mexico further study and develop policy options that create incentives and disincentives for the purchase and operation of vehicles with varying fuel economy. The range of policies to be studied and developed include:

1. *Feebates*. A multi-state “feebate” program, including the neighboring states of California and Arizona. Feebate proposals usually have two parts: a) a fee on relatively high emissions/lower fuel economy vehicles; and b) a rebate or tax credit on low emissions/higher fuel economy vehicles.
2. *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.
3. *Labeling*. A consumer labeling program that provides buyers with better information on the GHG emissions of new vehicles.
4. *Incentives for Diesel Retrofits*. Such incentives would encourage the replacement of high-emitting diesel truck engines with newer, less polluting engines.

Together, these incentives could change the vehicle fleet technology mix through a combination of demand- and supply-side changes.

- **Goal levels:** Prepare a detailed study of options and impacts.
- **Timing:** Complete in 2007.
- **Parties:** Industry, NMED, NM DMV, NM Department of Taxation and Revenue

Implementation Mechanisms

Existing analysis shows that 90% of the benefits of feebate programs are likely to arise from the manufacturing (supply side) response rather than the consumer (demand side) response. Because individual states such as New Mexico have a small share of the national new vehicle market and thus are unlikely to have a significant influence on the supply side by themselves, states in the southwest have been exploring coordinated multi-state programs. A consistent set of feebate programs across multiple states may include a large enough share of the US market to have a more significant effect on supply side decisions made by automobile manufacturers.

With that in mind, incentives and disincentives that should be studied and developed include:

1. *Feebates*. A "Multi-State LDV GHG Fee and Rebate Study and Pilot Program" would consider the expected impacts of individual state feebate programs as well as coordinated or consistent multi-state programs. Ideally, such a multi-state study would include a number of western states in order to assess boundary issues as well as coordination issues. Initial analysis suggests that the New Mexico new car market, may be too small a share of the market to have an effect on the types of vehicles that manufacturers put into the marketplace. A consistent set of feebate programs across multiple states may include a large enough share of the U.S. market to have a more significant effect on supply side decisions made by automobile manufacturers. The study would also identify and assess the actual benefits and costs of a pilot feebate program to be implemented at the county or metropolitan level in the western United States.
2. *Excise Taxes*. Examine options similar to Bill 2438 in the 2005 Massachusetts legislature⁷ Which directs the Secretary of Taxation and Revenue to set a variable excise tax on new passenger vehicles ranging from 0 to 10 percent, based on the vehicle's CO2 emission rate. The tax would be lowest on the lowest emitting vehicles and highest on the highest emitting vehicles, subject to certain guidelines and constrained by maintaining the current average excise tax of 3 percent (an annual adjustment of the schedule of taxes would maintain this average). One option would be to link the excise tax structure so that it is set at zero for vehicles that comply with the European Union GHG standards.⁸ New Mexico currently has a zero excise tax for hybrid cars.
3. *Labeling*. Examine options similar to an EU program begun in 2001, and a recent proposal by a researcher at Resources for the Future.⁹ It would require dealers to place a GHG label on each new vehicle that includes the estimated amount of CO2 (in pounds) produced annually and places the vehicle into one of five distinct groupings from "best" to "worst."
4. *Incentives for Diesel Retrofits*. Heavy-duty diesel engine emission standards were strengthened with the 2004 model year and will be even more stringent starting in the 2007 model year. However, a number of older, dirtier engines will still be in the fleet due to the long durability of heavy-duty truck engines. Retrofit controls can be applied to these older engines to reduce their emissions. These engines can also be rebuilt with engines meeting the latest emission standards, or retired and replaced by a newer, cleaner truck. Additionally, the use of biodiesel in these older engines can be used to reduce GHG emissions. Examine options that focus on heavy-duty diesel engines used by small owners/operators, as larger, national fleets typically require more rapid turn-over of heavy-duty diesel engines. Financial incentives and small business assistance could be used to assist small owners/operators to apply for grants or loans available for retrofitting or replacing their heavy-duty diesel engines, or converting their engines to run on biodiesel fuel. The focus would be on engines that otherwise would continue to be in use for a number of additional years.

⁷ <http://www.mass.gov/legis/bills/house/ht02/ht02438.htm>

⁸ For a discussion of EU standards, see Pew Center, *Comparison of Passenger Vehicle Fuel Economy & GHG Emission Standards Around the World*, 12/04, http://www.pewclimate.org/global-warming-in-depth/all_reports/fuel_economy/index.cfm, pp. 11-12.

⁹ <http://www.rff.org/rff/News/Features/Combating-Global-Warming-One-Car-at-a-Time.cfm>.

Related Policies/Programs In Place

While feebate proposals have been described in academic studies, there has been no implementation of a full feebate program in the United States. While there are individual 'gas guzzler tax' and tax incentives for hybrid vehicle purchases, there is not yet any history of an on-the-ground example of a comprehensively implemented feebate program.

Types(s) of GHG Benefit(s):

All GHG exhaust emissions through reduced fuel consumption.

Estimated GHG Savings and Costs per Ton

Not estimated. Following the study called for here, the State could develop quantifiable options.

Key Uncertainties

Both the United States Department of Energy and the Canadian Transport Ministry have studied the potential impacts of national level feebate programs in recent years. While these studies have informed the debate about the advantages and disadvantages of national feebate programs, there remains considerable uncertainty about the potential benefits and costs of state or multi-state level feebate programs. There is an important need for a greater understanding of the potential effects of single state or multi-state feebate programs on the types of vehicles that manufacturers put into the marketplace.

Contributing Issues

None identified.

Feasibility Issues:

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-6 Alternative Fuels Use

Policy Description

This policy option involves expanding the availability and use of alternative fuels and hybrid vehicles, low-speed vehicles (LSVs), and zero emission vehicles (ZEVs) in New Mexico through a renewable fuels standard, various incentives, and outreach. Alternative fuels include ethanol, biodiesel, electricity, and renewable hydrogen fuels. The zero emission vehicles would primarily utilize electricity and hydrogen made from verifiable renewable sources (i.e., solar, wind, and biomass generation). However, it should be noted that using electricity from coal-fired utility plants to recharge electric vehicles would still provide significant GHG reductions over a typical gasoline-fueled vehicle. In the near term, the policy also targets increasing sales of hybrid vehicles and partial ZEVs, while sales of ZEVs are targeted to meet the longer-term goals. Plug-in electric vehicles equipped with batteries would also serve as storage capacity for wind and solar power through grid interconnection (V2G). Use of these fuels is intended to offset fossil fuel use (e.g., gasoline and diesel).

This option is linked with AF Options A-3 and A-11 on Biofuels Production. This option seeks to develop the demand for biofuels, whether produced locally or out-of-state, while Options A-3 and A-11 look at the incremental GHG benefits that would be achieved beyond the TLU-6 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 CCAG recommends that New Mexico should expand the availability and use of alternative fuels and expand the use of hybrid vehicles, low speed vehicles, and zero emission vehicles for transportation in New Mexico. The CCAG also recommends that New Mexico should build appropriate production capacity for renewables-generated electricity and hydrogen fuels for transportation purposes in New Mexico.

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 New Mexico by the specified years, as shown under Goal Levels, below. The policy also includes targets for hybrid vehicle, low speed vehicle, and zero emission vehicle sales and the implementation of a New Mexico “Multi-Fuel Corridor,” composed of a full range of alternative energy refueling options located every 120 miles on New Mexico’s highways. Home electric charging is already technically feasible. Public recharging facilities would be made available along this “Multi-Fuel Corridor” as the population of electric vehicles increases. Home hydrogen appliances and hydrogen fueling stations will also be encouraged as part of the “Multi-Fuel Corridor” through market and financial incentives as the population of hydrogen vehicles increases.

These goals of this policy would be achieved through a combination of a renewable fuels standard, 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 of New Mexico would have the authority to change these targets (up or down) based on technical and/or economic feasibility. The Governor could also set intermediate targets.

Phase	Year	Percentage of Gasoline to be Replaced by Biofuels	Percentage of Diesel to be Replaced by Biofuels
1	2009	5%	2%
2	2012	10%	10%
3	2020	20%	20%
4	2050	50%	30%

The goal levels and timing for hybrid vehicle, low-speed vehicle (LSV), and zero emission vehicle (ZEV) sales are as follows:

Phase	Year	Percentage of New Vehicle Sales
1	2010	10% Hybrids/LSVs
2	2015	20% Hybrids/LSVs
3	2018	20% ZEVs/LSVs
4	2040	40% ZEVs/LSVs

The goal levels and timing for developing a New Mexico “Multi-Fuel Corridor are as follows:

Phase	Year	Goal
1	2010	8 stations located along I-25 and I-40
2	2015	15 additional stations installed along major non-interstate roads
3	2020	15 additional stations along other NM highways

- **Coverage of Parties:** State of New Mexico, fuel retailers, fuel wholesalers, business owners, car dealers, biofuels producers, and alternative vehicle advocates and private vehicle owners.

Implementation Mechanisms

Information and education: Use information and education outreach to focus on voluntary methods of alternative fuel expansion and on incentives and cost benefits of zero emission vehicle acquisition. 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. Publicize the locations of dispensing stations that are part of the “Multi-Fuel Corridor.” Provide information on flex-fuel vehicles, hybrids, and zero emission vehicles as well as information on where these vehicles can be purchased. Low speed vehicles and neighborhood electric vehicles are restricted to speeds of up to 25 mph and are only allowed on roads with a maximum speed limit of 35 mph (i.e., local roads). In addition, neighborhood electric vehicles have a limited range of 20-30 miles. Nonetheless, such vehicles are ideal for local travel and New Mexico consumers should be provided with information about these vehicles, emphasizing their ability to replace gasoline vehicle trips for frequent, short distance, local trips. 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 and public demonstrations.

Funding mechanisms and or incentives: Pursue DOE and State funding for more alternative fuel pumps throughout the State and for introducing appropriate infrastructure throughout the State. Existing multifuel pump in Santa Fe provides model for dispensing three alternative fuels: B20 biodiesel, E85 ethanol, and E10. Create additional fuels options for electric and hydrogen-fuels vehicles. Expect energy investors in power and hydrogen production. Some federal tax incentives currently exist for the purchase of hybrid vehicles. When the federal incentives expire, examine the feasibility/need to continue such incentives for hybrids, ZEVs, and flex-fuel vehicles using State funds.

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. Additionally, production issues should be included in the trigger, such as water use in growing corn (or other crops) for the biofuels, such that the production of the biofuels does not increase GHG emissions or cause other resource problems.

Voluntary and or negotiated agreements: Provide financial incentives for alternative fuels distributors. Provide state funds and/or loan guarantees for construction of alternative fuels distribution facilities. Also, provide grow receipts tax exemptions, production tax credits and reduction in excise taxes on alt fuel sales.

Market based mechanisms: Provide payment structure for electric vehicle owners to sell stored power back to grid when needed (V2G). Provide special dedicated roads, preferential road access and parking benefits for neighborhood electric vehicles and other ZEVs.

Pilots and demos: Show example of existing multifuel pumps in Santa Fe which provides a model for dispensing three alternative fuels: B20 biodiesel, E85 ethanol and E10. Provide demonstrations of ZEVs charging, fueling and operating in New Mexico. State fleet vehicles meeting the flex-fuel and hybrid requirements under TLU-3 should be considered a pilot/demo program using the highest penetrations possible of these vehicles in the State fleets. The State's experience with these vehicles should be publicized

Research and development: Pursue in-state biofuels production from a variety of sources. The State should push for significant federal funds for research and development needed to commercialize cellulosic ethanol technology and processes as 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 alt 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.

Albuquerque currently implements an oxygenated fuel program as part of its carbon monoxide maintenance plan. This oxygenated fuel uses ethanol to provide a 2.7% oxygen content by weight in gasoline sold in the Albuquerque area from November 1 through February 28. As a result, ethanol currently accounts for approximately 1.7% of the volume of gasoline sold throughout New Mexico year-round.

Types(s) of GHG Reductions

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.¹⁰ This biodiesel reduces lifecycle GHG emissions by as much as 41% compared with petroleum diesel.

¹⁰ See Data Sources below.

ZEVs will also reduce N₂O, CH₄, and criteria and toxic pollutant emissions. Electric vehicle research showed that in Arizona where 67 percent of power plants are coal-fired, electric vehicles would reduce greenhouse gases such as CO₂ by 71 percent. Likewise, a study conducted by the Union of Concerned Scientists found that electric vehicles in the Northeast would reduce CO emissions by 99.8 percent, volatile organic compounds by 90 percent, NO_x by 80 percent, and CO₂ by as much as 60 percent.

According to the California Air Resources Board, electric vehicles in the LA Basin produce 98% fewer hydrocarbons, 89% fewer oxides of nitrogen, and 99% less carbon monoxide than gasoline vehicles when power plant emissions are taken into account. The LA Dept of Water and Power has determined that electricity generation sufficient to power 100,000 miles of EV driving produces less than 100 pounds of pollutants compared to 3,000 pounds produced by gasoline vehicles.

Estimated GHG Savings and Costs per Ton CO₂e

The table below shows the total CO₂e reductions associated with implementing the program described above in the Program Design section. The results are also shown broken down by the component programs (e.g., ethanol, biodiesel, hybrids/LSVs, and ZEVs/LSVs). Note that some of these reductions would be attributable to the use of biofuels as a result of the national Renewable Fuel Standard (RFS) in the Energy Policy Act of 2005. The total emission reductions attributable to the RFS versus the incremental reductions attributable to TLU6 are broken out in the table below.

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings			MMtCO ₂ e
- Ethanol	0.1	0.3	
- Biodiesel	0.2	0.6	
- Hybrids/LSVs	0.1	0.6	
- <u>ZEVs/LSVs</u>	<u>0.0</u>	<u>0.1</u>	
Total for TLU-6	0.4	1.7	
Recent Action: National Renewable Fuel Standard	<u>0.1</u>	<u>0.1</u>	
Total Savings from Alternative Fuels	0.5	1.8	
Net Present Value (2006-2020)			\$million
- Ethanol		<i>Zero net cost</i>	
- Biodiesel		<i>Zero net cost</i>	
- Hybrids/LSVs		-119	
- <u>ZEVs/LSVs</u>		<u>not quantified</u>	
Total for TLU-6		-\$119	

Cumulative Emission Reductions	MMtCO ₂ e
- <i>Ethanol</i>	2.0
- <i>Biodiesel</i>	4.1
- <i>Hybrids/LSVs</i>	2.7
- <u><i>ZEVs/LSVs</i></u>	<u>0.2</u>
Total for TLU-6	9.1
Recent Action: National Renewable Fuel Standard	<u>1.4</u>
Total Savings from Alternative Fuels	10.5
Cost-Effectiveness (\$/ton)	
- <i>Ethanol</i>	<i>Zero net cost</i>
- <i>Biodiesel</i>	<i>Zero net cost</i>
- <i>Hybrids/LSVs</i>	-\$44
- <u><i>ZEVs/LSVs</i></u>	<u><i>not quantified</i></u>
Average for TLU-6 (ethanol, biodiesel, and hybrids/LSVs)	-\$13

- **Data Sources:**

Environmental, Economic, and Energetic Costs and Benefits of Biodiesel and Ethanol Biofuels, Jason Hill, et. al., University of Minnesota, published in Proceedings of the National Academy of Sciences of the United States of America, volume 103, no. 30, July 25, 2006.

Well-to-Wheels Analysis of Advanced Fuel/Vehicle Systems— A North American Study of Energy Use, Greenhouse Gas Emissions, and Criteria Pollutant Emissions, General Motors, Argonne National Lab, and Air Improvement Resource, Inc., May 2005.

“Documentation of Inputs to Macroeconomic Assessment of the Climate Action Team Report to the Governor and Legislature,” California Climate Action Team, January 2006.

“State and Federal Standards for Mobile-Source Emissions,” National Research Council of the National Academies, Washington, DC, 2006.

- **Quantification Methods:** Well-to-wheels CO₂e emission factors from a recent Argonne National Laboratory Study were used to estimate the benefits of offsetting conventional gasoline with starch-based ethanol in the amounts specified by the ethanol goals. Well-to-wheels emission factors take into account the energy required to produce, process, and transport each fuel type (i.e., starting with the oil well for gasoline and the crop for starch-based ethanol). Based on this source of information, the use of starch-based ethanol to replace gasoline is assumed to reduce CO₂e by 18.3%.

The quantity of diesel fuel projected to be replaced in New Mexico with biodiesel was estimated based on the penetration rates of the above goals. A reduction in CO₂ emissions of 41% was applied to the quantity of diesel fuel replaced by biodiesel. (Hill, et al, July 2006).

For zero-emission vehicles, the number of light-duty vehicles and trucks that would be replaced by hybrids or ZEVs was calculated by assuming that 6.5% of these vehicles registered in New Mexico each year are new vehicles (based on data from “Motor Vehicle Facts and Figures”). Starting in 2010, 10% of new LDVs and LDTs were assumed to be hybrids or ZEVs, increasing to 20% ZEVs by 2020. A 100% reduction was applied to the CO₂ emissions corresponding to the shift from conventional vehicles to the portion of travel at zero-emissions, assuming the zero-emission vehicles are powered by a clean fuel source. Full ZEVs were assumed to be phased in over time. Thus, from 2010 to 2014, the 10% sales target for ZEVs was assumed to be met by vehicles running on electric or clean power 40% of the time (e.g. hybrids). From 2013 to 2014, this percentage was increased to 60 percent of the time and from 2015 through 2017, it was increased to 80%. Starting in 2018, it was assumed that 100% of the ZEV target was met with 100% electric or clean fuel vehicles. Incremental costs per vehicle for hybrids were obtained from the National Research Council (NRC) report cited above, based on costs developed by CARB. For hybrids, an incremental cost of \$1,200 per vehicle was assumed for 2010 and 2011. In 2012, the incremental per vehicle cost of hybrids decreases to \$700 per vehicle.¹¹ These costs were multiplied by the number of hybrids or ZEVs sold in each year. Total gasoline fuel savings costs were then calculated and subtracted from the total vehicle costs in each year. Fuel savings were based on a range of gasoline costs of \$2.40 per gallon to \$3.40 per gallon.

- **Key Assumptions:** This policy option assumes that the ethanol and biodiesel demand will be met with fuels available from a national market. Therefore, it is expected that the ethanol would be produced with starch-based production and the emission factors used here reflect that. Option A3 considers additional benefits that might be achieved by producing the ethanol in-state with a variety of lower GHG-producing methods.

Key Uncertainties

Some uncertainty remains regarding the ethanol production life-cycle emission factors as well as the availability of ethanol and biodiesel at the levels needed by this policy. The availability of ZEVs to meet the market penetration goals set above is uncertain at this time.

Contributing Issues

EPA has reported that the use of B20 biodiesel can lead to a 21% reduction in HC, 11% reduction in CO, and a 10% reduction in PM. Toxic emission reductions can also be significant. However, some brands of biodiesel can lead to increased exhaust emissions of NO_x and some air toxics, depending on feedstock and blend level. EPA reports a 2% increase in NO_x emissions for B20 blends. In contrast, certain brands of biodiesel, such as Blue Sun Biodiesel B20, can reduce NO_x emissions by 4 to 5 percent, according to a recent analysis performed by the

¹¹ ZEV costs were not included in the cost estimate due to their highly speculative nature. The NRC report estimated the incremental cost of a ZEV vehicle, starting in 2018, at \$17,000 per vehicle. Given that TLU-6 does not contain any mandates for ZEVs, and if this large incremental cost holds true in 2018, it is unlikely that ZEVs will achieve any significant market penetration. More likely, incremental costs will be lower (with technological progress), and some penetration will occur due to promotional efforts and rising fuel costs.

National Renewable Energy Laboratory. Effects on newer diesel vehicles are likely to be different. An increased penetration of biofuels and ZEVs reduces our foreign fossil fuel dependency.

Feasibility Issues

Members of the CCAG have expressed concern over the land and water resources needed to produce the amount of biofuels required by this policy option.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

Transportation and Land Use Technical Work Group Quantification of Options 7 Through 11 (VMT Reduction Options)

This section quantifies Options TLU-7 through TLU-11 as a group. These policy options are distinct because they work on different parts of the transportation-land use system, but they all reduce vehicle miles traveled (VMT). The policy designs proposed under each TLU policy option are for the most part distinct. There is some apparent overlap because the same policy tools can be applied in different places and in different ways. However, while the policy tools can be applied individually, they are mutually supportive and in many cases interdependent. For example, Transit-oriented Development (TLU-8) requires transit (TLU-10). Quantification of the GHG impacts of this group of policy options is easier, and the results more robust, if the options are “bundled together”. The detailed policy descriptions are presented below.

The literature on these strategies suggests that they can result in a range of reduction in VMT of 2%-11%, on a statewide basis. Assuming aggressive implementation, the CCAG has applied a goal at the upper end of this range (11%) as New Mexico’s projected VMT reduction. This results in the GHG savings in the table below for 2012, 2020, and cumulative for 2007-2020. The first year of impact was assumed to be 2010.

Estimated GHG Savings and Costs per Ton:

	2012	2020	Cumulative 2007-2020	Units
GHG Emission Savings	1.2	1.3	13.4	MMtCO ₂ e
Net Present Value (2007-2020)			Net benefits	\$ million
Cost-Effectiveness			Net benefits	\$/tCO ₂ e

- **Data Sources:** CCS, New Mexico Greenhouse Gas Inventory and Reference Case Projections, 1990-2020, 2006, and extensive Smart Growth literature.
- **Quantification Methods:** Modified New Mexico reference case forecast for 2008-2020 using 11% reduction in VMT.
- **Key Assumptions**
 - The value used for reduction in VMT.
 - Assumes “de minimus” increases in GHG emissions from increased use of alternate transit modes.

- Assumes that infrastructure savings from more compact development offset other costs, following every recent study of total infrastructure costs associated with conventional versus compact development.¹²

Goal levels: Target a reduction in growth in VMT from passenger vehicles of 11% in the years 2010-2020 through a combined approach utilizing a number of programs that fall under those listed above.

Key Uncertainties

Sensitivity of VMT growth to policy shifts.

Contributing Issues

Benefits include reduced infrastructure costs, avoided health care costs from reduced air pollution and increased walking/biking, and other quality-of-life aspects. There will be front-end costs of program development and implementation for brownfields, infill, and transit-oriented development programs, at a minimum to change state regulations. Most successful programs will likely require dedicated resources to fund staff, administrative expenses, promotion, education, etc., on an annual basis. There are a variety of federal funding sources that may assist with the initial establishment of a program or to fund environmental activities for a specific project. In general, successful local and state programs have a dedicated source of funds for the program.

Many successful programs have used financial incentives to jump-start private sector investment. As the market increasingly embraces Smart Growth, these become less necessary. Most federal brownfields programs are not available directly to the private sector; therefore, the most effective programs nationwide provide local or state financial assistance.

Policy descriptions for TLU-7 to TLU-11 appear below.

¹² For example, see: Mark Muro and Robert Puentes, *Investing in a Better Future: A Review of the Fiscal and Competitive Advantages of Smarter Growth Development Patterns*, Brookings Institution, March 2004, http://brookings.edu/metro/publications/200403_smartgrowth.htm.

TLU-7 Infill, Brownfield Re-development

Policy Description

Reuse land that is already developed but is now vacant, underused, or even mildly polluted. Meet the growing demand by a larger number of households comprised of singles, working parents and single parents for housing located close to services, jobs and transit. These policies will reduce emissions by reducing both number of automobile trips per household and their length.

Infill and brownfield re-development can also conserve New Mexico's scarce natural resources, especially water. CCAG members feel that people who live and develop land in New Mexico must have an awareness about conservation of water and land. Compact growth can consume 45% less land than perimeter development, and can cut water use by 75% per capita. Infill and brownfield re-development policies emphasize growth that supports a healthy community.

Policy Design

The CCAG recommends that New Mexico should move beyond baseline policies to:

1. Use fiscal, tax and other financing mechanisms to remove barriers to / support recycling of existing buildings and underused land.
 2. Adapt planning policies and regulations to give infill and brownfield sites priority for development over sprawling sites at the edges of communities. Include in these adapted policies and regulations New Mexico government and educational units, so that state government buildings, universities, and public schools do not contribute to sprawl.
- **Goals:** Reduction in passenger vehicle VMT of 11% in the years 2010-2020 per earlier section titled "Quantification of Options 7 Through 11 (VMT Reduction Options)."
 - **Timing:** There are no barriers to beginning to implement each of these recommendations immediately.
 - **Parties:** State agencies, MPOs, local jurisdictions

Implementation Mechanisms

Information and education: Encourage all municipalities to engage in a visioning process, often done through comprehensive planning, to agree on long-range goals and a vision for itself. Goals might include addressing housing shortages, adding open space and parks, or kick-starting economic development in overlooked areas of town. Encourage communities consider infill/brownfield redevelopment first to absorb growth.

Educate cities about the public and private benefits of infill and brownfield redevelopment.

Technical assistance: Target and map potential sites and districts where infill/brownfield cleanup is needed or appropriate, and set quantifiable goals for the number of units desired for target areas. Those areas can then be rezoned for residential or light commercial uses that are compatible with residential infill.

Local governments (with state support) can prepare codes for required performance (in energy, accessibility, parking, etc.) but allow for more flexibility in methods of achieving that performance. In addition, government can streamline entitlement/permit processes for smaller projects.

Support community land trusts and/or other non-profits to purchase land that can be developed.

Funding mechanisms and or incentives: The state works with MPOs and local jurisdictions to establish and fund (where necessary) local infill and Brownfields recycling programs, including, for example:

- Location efficient mortgage programs recognize that infill housing allows consumers to choose more efficient transportation options, increasing their house purchasing power.
- Tax increment financing: a city-designated and voter-approved redevelopment district sets up a TIF district to finance improvements to public space. Debt is repaid over a 20-year period from the increment of new property and gross receipts taxes from private development in the district.
- Development (or impact) fees can be set to strongly encourage infill and discourage sprawl, by making the differential fees for infill development drastically less. For instance, Albuquerque through its Planned Growth Strategy has established a variable rate impact fee system. Projects located within the close-in areas pay a minimal percentage of total fees, while projects near the edge of the urbanized area pay maximum fees. This fee reduction helps level the playing field between infill and outer-edge sprawl sites.
- Other funding mechanisms and incentives include:
 - Offer predevelopment grants and loans to explore project feasibility on tough sites;
 - Assist with land acquisition and assemblage, write-downs and loans;
 - Advance loans against committed, but not funded, equity or debt

Codes and standards: State support for development of local urban design codes, tied to the local government's comprehensive plan.

Market based mechanisms: To help level the playing field, offer a variety of developer incentives and disincentives to encourage infill and brownfield redevelopment, such as fee waivers, fast track planning, exactions, no or low impact fees, and waiving off street parking requirements. Mechanisms should address not only type of development, but also form: for example, constructing infill buildings such that they obscure off street parking lots. .

Pilots and demos: Offer incentives and technical support to both local governments and private institutions for actions that reduce traffic congestion and parking demand, such as Commuter Benefits (pre-tax and employer-paid transit passes), parking cash out, live-where-you-work home mortgages, location efficient mortgage, and complete shower facilities for bicyclists

Reserve five percent of a city's capital improvement program pay for needed upgrades and repairs to sidewalks, so that existing and new residents and employees can easily navigate neighborhoods and downtown by foot.

Related Policies/Programs in Place

Policies emerging from the Governor’s Task Force on Our Communities, Our Future.¹³ NM ED has a “Targeted Brownfields Assessment Program.”¹⁴

Types(s) of GHG Reductions

All GHG exhaust emissions through reduced fuel consumption.

Estimated GHG Savings and Costs per MTCO_{2e}

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Key Uncertainties

None identified.

Contributing Issues

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

¹³ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005.
<http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

¹⁴ www.lgd.state.nm.us/PLAN/PDF/ENV2.PDF

TLU-8 Transit-Oriented Development

Policy Description

Support shifts to lower emitting mode choices by building compact development around transit stops to meet daily needs by foot, bicycle, or transit and/or by clustering employment centers around transit stops. TOD requires transit; this option is ideally paired with TLU-10, Multi-modal Transportation Bundle.

Policy Design

The CCAG recommends that New Mexico should continue to implement, and expand, the TOD-supportive policies recommended in The Report of the Governor’s Task Force on Our Communities, Our Future:¹⁵

1. *Tax Increment Financing (TIF) Districts.* The state can expand TIF programs through the extension of its credit resources.
2. *State Funding Programs.* Provide state funds for affordable housing and parks, both of which help make complete communities and reduce driving to complete daily activities.
3. *Support of Local Governments.* Amend local government enabling laws and provide technical assistance to give local governments modern, effective tools they need to plan for and enable complete, resource-efficient, and livable communities.
4. *Location of State Facilities.* Locate state facilities in existing communities, and in the centers of new communities.
5. *State Targeting of Infrastructure Investments.* Criteria for legislatively appropriated capital outlay funds, the State Public Project Revolving Loan Fund, and other state-funded infrastructure initiatives should be reviewed and amended to ensure that they are used for projects that encourage walkable and traditional communities.

These goals from the Governor’s Report can be further developed to become implementable. For example: State and municipalities establish priority funding areas to target state and local public funds to TOD districts as appropriate for growth. Redirect at least [25] percent of new housing and other development assistance to TOD districts.

- **Goals:** Reduction in passenger vehicle VMT of 11% in the years 2010-2020 per earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”
- **Timing:** There are no barriers to beginning to implement each of these recommendations immediately.
- **Parties:** State agencies, MPOs, local jurisdictions

Implementation Mechanisms

¹⁵ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005. <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

See above.

Related Policies/Programs in Place

TOD-supportive policies will help New Mexico maximize the return on the investment it is now making in transit:

“What makes TODs relevant now is that New Mexico is embarking on one of the most exciting and extensive transportation revolutions in its history. The Governor’s commuter rail project soon will be running through downtown Albuquerque between Belen and Bernalillo in its first phase, and continuing on to Santa Fe in its second phase.

“In addition, the City of Albuquerque recently started a rapid transit bus system, going east and west on Central through the city. The intersection of First and Central in downtown Albuquerque will be the best-served transit location in New Mexico by the end of 2005 when the commuter train starts rolling.

“There are numerous opportunities for TODs in New Mexico, including a number that are being started now before the commuter rail system is operational.”¹⁶

See status of the “Livability Grants for Communities, Regions, and the State” and other recommendations in the report of the Governor’s Task Force on Our Communities, Our Future.¹⁷

Types(s) of GHG Reductions

All GHG exhaust emissions through reduced fuel consumption. Additional benefits from reduced building energy use, from more compact development.

Estimated GHG Savings and Costs per MTCO_{2e}

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Key Uncertainties

None identified.

Contributing Issues

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

¹⁶ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005, p. 16. <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

¹⁷ Ibid.

Unanimous consent.

Barriers to Consensus:

None.

TLU-9 Smart Growth Planning, Modeling, Tools

Policy Description

Smart growth planning, modeling, and tools includes allow, support, and encourage location efficient growth in communities that are proximate to household needs and amenities (such as jobs, shopping, school, services, entertainment, etc.) as opposed to growth in areas that are not proximate and require greater travel distance and have less mode choice. Smart growth allows for mixed land uses, a range of housing opportunities, and multiple transportation options including pedestrian/bike access

These policies reduce GHG emissions by giving municipalities the tools they need to shift development patterns and reduce vehicle trips and total vehicle miles traveled, while avoiding mandates.

Policy Design

As in TLU-8, The CCAG recommends that New Mexico should continue to implement, and expand, the Smart Growth-supportive policies recommended in The Report of the Governor’s Task Force on Our Communities, Our Future (same as TLU-8):¹⁸

1. *Tax Increment Financing (TIF) Districts.* The state can expand TIF programs through the extension of its credit resources.
2. *State Funding Programs.* Provide state funds for affordable housing and parks, both of which help make complete communities and reduce driving to complete daily activities.
3. *Support of Local Governments.* Amend local government enabling laws and provide technical assistance to give local governments modern, effective tools they need to plan for and enable complete, resource-efficient, and livable communities.
4. *Location of State Facilities.* Locate state facilities in existing communities, and in the centers of new communities.
5. *State Targeting of Infrastructure Investments.* Criteria for legislatively appropriated capital outlay funds, the State Public Project Revolving Loan Fund, and other state-funded infrastructure initiatives should be reviewed and amended to ensure that they are used for projects that encourage walkable and traditional communities.

These goals from the Governor’s Report can be further developed to become implementable. For example: State and municipalities establish priority funding areas appropriate for growth, which would receive to state and local public funds first.

- **Goals:** Reduction in passenger vehicle VMT of 11% in the years 2010-2020 per earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”
- **Timing:** There are no barriers to beginning to implement each of these recommendations immediately.

¹⁸ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January 2005, <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

- **Parties:** State agencies, MPOs, local jurisdictions

Implementation Mechanisms

1. Inform and educate developers on the state’s current building code for the rehabilitation of older buildings.
2. Make maintenance of infrastructure a priority (“Fix it First”). Revise any state infrastructure programs (transportation, water, sewer) that fund new systems but not maintenance or upgrades for existing systems.
3. Replace “average cost pricing” for utility services with rate structures that charge full marginal costs for both new infrastructure and for roads, water, sewer, electricity, and telephone service delivery.
4. Use the broad set of state discretionary funding to reward localities that plan, zone and build for higher density development
5. Establish regional service agreements that assign responsibility to a single regional agency for major public services (transportation, water, sewers) in ways that reduce costs, improve intergovernmental coordination and support Smart Growth.
6. Encourage municipalities to designate areas for development where public infrastructure will be provided, and limit development outside these areas or require developers to pay the incremental costs for infrastructure in non-designated areas.
7. Encourage and/or incentivize localities to adopt zoning practices, such as Form Based Codes (FBC), that result in compact mixed-use, walkable communities.
8. Abolish or reduce minimum parking requirements in zoning codes, and allow localities to establish parking maximums.
9. Reduce or eliminate acreage standards for K – 12 schools.
10. Amend state law to allow governmental agencies and governmental entities to indemnify each other when they are engaged in common projects. This would encourage certain innovative projects in the transportation arena to go forward.

Note: Some mechanisms are similar to policy design elements in TLU-8 (TOD), but would be applied more broadly in this TLU option.

Related Policies/Programs in Place

Policies emerging from the Governor’s Task Force on Our Communities, Our Future.¹⁹

Types(s) of GHG Reductions

All GHG exhaust emissions through reduced fuel consumption.

Estimated GHG Savings and Costs per MTCO_{2e}

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Key Uncertainties

Inherent uncertainty in forecasting VMT reductions connected to these policies.

Contributing Issues

¹⁹ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005. <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-10 Multimodal Transportation Bundle

Policy Description

The New Mexico 2025 Statewide Multimodal Transportation Plan establishes objectives and implementation strategies that aim to shift the State’s focus from roads to an integrated, multimodal system. This option lays out several key actions that a) are required to realize the potential for GHG reductions implicit in the State’s plan b) will help further develop a multimodal transportation system, and c) ensure that that system is used efficiently.

Support shifts in passenger transportation mode choice (auto, bus, rail, bike, pedestrian, etc.) to lower emitting choices, and ensure that transportation serves smart growth development (see TLUs-7, 8, and 9).

Policy Design

The CCAG recommends that New Mexico should implement the 2025 Statewide Multimodal Transportation Plan in ways that reduce GHG emissions through policies including:

1. Make GHG-optimal use of CMAQ funds;
 2. Expand transit infrastructure (rail, bus, BRT);
 3. Improve existing transit service and support facilities,
 4. Improve transit promotion and marketing (including tax-free and employer-paid Commuter Benefits, and Parking Cash Out);
 5. Improve bike and pedestrian infrastructure;
 6. Explore additional commuter rail using existing rail corridors;
 7. Review all proposed transportation projects for multi-modal flexibility (e.g., add or reserve room for BRT or light rail if feasible);
 8. Conduct research into new transportation technologies and urban planning techniques;
 9. Support and promote policies that improve transportation system performance through non-transportation actions, such as a 4-day work-week and telecommuting.
 10. Amend state law to allow governmental agencies and governmental entities to indemnify each other when they are engaged in common projects. This would encourage certain innovative projects in the transportation arena to go forward.²⁰
- **Goals:** Reduction in passenger vehicle VMT of 11% in the years 2010-2020 per earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”
 - **Timing:** There are no barriers to beginning to implement each of these recommendations immediately.

²⁰ Under current law, an agency desiring to use the property or facilities of another agency cannot provide indemnification. This prevents the common use or joint project from going forward, or it requires the acquisition of expensive insurance coverage which is otherwise not necessary. A CCAG member cited proposed bike/pedestrian pathways as an example of projects that have faced this hurdle in New Mexico.

- **Parties:** Department of Transportation, Regional Transportation Districts, Metropolitan Planning Organizations, Regional Planning Organizations, municipalities.

Implementation Mechanisms

Information and education: Expand the State’s use of Intelligent Transportation Systems (2025 Plan, p. 21)

Technical assistance: Provide ample technical assistance to MPOs, RPOs, and RTDs for implementation of all aspects of the plan, including application of site assessment tools identifying multimodal needs and opportunities within the Strategic Transportation Corridors identified in the plan. (2025 Plan, p. 14)

Promote transportation performance measures that explicitly balance mobility and access. Discourage measures based solely on speed-based level of service. (*not explicit in plan, but balance of mobility and access results in less sprawl and VMT*)

Funding mechanisms and or incentives:

- **RTDs** – Aggressively support and aid the creation of Regional Transportation Districts (RTDs). New Mexico has authorized created of RTDs that are a critical means of expanding mass transit. RTDs can sell bonds for capital projects, and member governments can levy taxes for operation and maintenance (subject to voter approval). (2025 Plan, p. 9, 37)
- **Expand Rail Service** – secure funding for rail passenger service to central New Mexico (within Albuquerque metro area and between it and Santa Fe) by the end of 2008. (2025 Plan, p. 9)
- **Non-Motorized Facilities** - Improve and expand transportation facilities with pedestrian, bicycle, and transit-oriented features. (2025 Plan, p. 9)
- **Mode Shift** – Integrate needs analysis, planning, and funding to promote the shift of long distance freight from roads to rail or airfreight, including rail initiatives in Governor Richardson’s Investment Partnership (GRIP) (2025 Plan, p. 9, 15)

Related Policies/Programs in Place

Policies emerging from the Governor’s Task Force on Our Communities, Our Future.²¹

Types(s) of GHG Reductions

All GHG exhaust emissions through reduced fuel consumption.

Estimated GHG Savings and Costs per MTCO_{2e}

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Key Uncertainties

None identified.

²¹ “Livability! The Report of the Governor’s Task Force on Our Communities, Our Future”, January, 2005. <http://www.state.nm.us/clients/dfa/Files/LGD/PLAN/PDF/livability.PDF>.

Contributing Issues

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-11 Promote LEED for Neighborhood Development

Policy Description

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.²² The “LEED for Neighborhood Development (LEED-ND)” rating system will integrate the principles of smart growth, urbanism, and green building into the first national standard for neighborhood design.²³ LEED-ND will emphasize smart growth aspects and neighborhood design of development while incorporating a selection of the most important green building practices. LEED-ND ratings will include measurements of a development’s compact design, proximity to transit, mixed use, mixed housing type, and pedestrian- and bicycle-friendliness.

Policy Design

The CCAG recommends that New Mexico recognize the lower emissions and other public costs of development that will meet LEED-ND standards by:

1. Supporting municipalities in quantifying the local benefits of LEED-ND developments, and lowering development fees appropriately.
 2. Requiring LEED-ND compliance for developments involving state facilities or funding.
 3. Supporting the New Mexico building and real estate industries and the non-profit US Green Building Council in promoting LEED-ND to the public and others.
- **Goals:** Reduction in passenger vehicle VMT of 11% in the years 2010-2020 per earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”
 - **Timing:** There are no barriers to beginning to implement each of these recommendations immediately.
 - **Parties:** Metropolitan Planning Organizations, Regional Planning Organizations, municipalities.

Implementation Mechanisms

Information and education: Outreach to explain and promote LEED-ND.

Technical assistance: Provide ample technical assistance to MPOs and municipalities to help them fit LEED-ND into their planning and zoning approaches, and into any development impact fee structures.

Financial assistance to communities that want to meet LEED standards.

²² <http://www.usgbc.org/LEED>

²³ <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>

Related Policies/Programs in Place

New Mexico has no comprehensive system for rating the impacts of new developments.

Types(s) of GHG Reductions

- All GHG exhaust emissions through reduced fuel consumption.
- Reduced GHG emissions from electric power consumption, via lower air conditioning and water pumping demands.

Estimated GHG Savings and Costs per MTCO₂e

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Key Uncertainties

LEED-ND is being developed by a stakeholder process, as are all LEED standards. The current draft standard is still to be revised. The content of the final standard will determine its impact on emissions.

The timing of the final standard is also uncertain. A pilot is planned for 2007. The standard should be finally and implemented well before 2010, but exact schedule is uncertain.

Contributing Issues

See earlier section titled “Quantification of Options 7 Through 11 (VMT Reduction Options).”

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-14 Truck Stop Electrification/Anti-Idling

Policy Description

This policy option involves reducing the amount of time that vehicles idle through the combination of a Statewide anti-idling ordinance and by promoting and expanding the use of technologies that reduce long-term heavy-duty vehicle idling, with an emphasis on encouraging the use of innovative truck stop electrification. Anti-idling control measures reduce fuel consumption and emissions from stationary freight vehicles (potentially wasted energy). With truck stop electrification, truck drivers can shut off their engines and obtain heating, cooling, electrical outlets, and communication and entertainment options through a delivery tube provided in electrified truck stop spaces that connects to the truck through a window adapter. In addition to truck stop electrification, other available technologies that reduce heavy-duty vehicle idling include automatic engine shut down/start up system controls; direct fired heaters (for providing heat only); and auxiliary power units.

Policy Design

The CCAG recommends that New Mexico develop and implement a statewide ordinance banning idling by heavy-duty vehicles in most situations and set up truck stop electrification stations at key truck stops and truck rest areas along the major highways in New Mexico.

Develop and implement a statewide ordinance banning idling by heavy-duty vehicles in most situations. The ordinance should be designed to be easily enforceable by the appropriate state and local agencies. It is critical that a dedicated state funding stream for enforcement be identified for this measure to be successful in reducing vehicle idling and the resulting reductions in GHG emissions. The ordinance would also need to limit exemptions as much as possible, to make it easier to enforce. However, idling that occurs for public health and safety reasons (such as emergency vehicles) should be exempted from this rule.

Set up truck stop electrification stations at key truck stops and truck rest areas along the major highways in New Mexico. Electricity for powering these stations should come from clean sources, such as solar panels that would cover the trucks and also provide shade. Require truck stops to purchase renewable energy certificates. Coordinate this measure with Arizona and other neighboring States.

- **Goals:** Reduce fuel consumption from idling of heavy-duty diesel vehicles by 80% by year 2010, and by 100% by 2020.
- **Timing:** Have ordinance in place by 2008.
- **Coverage of parties:** Industry, NMED, Counties, truck stop owners.

Implementation Mechanisms

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

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

Funding mechanisms and or incentives: Propose legislation to partially fund idling technology loan grants for innovative truck stop electrification, focusing grants on high idling areas. A small tax on diesel fuel might be considered as a means for funding truck stop electrification. Tax credits may be available for installing electrification through the National Energy Bill. Truck stop owners could offer their own incentives for the use of electrification (e.g., credits for free hours of electrification with the purchase of a specified amount of diesel).

Voluntary and or negotiated agreements: Encourage participation in EPA's SmartWay Transport Partnership (or similar programs).

Codes and standards: Develop a statewide ordinance banning idling by heavy-duty diesel commercial trucks and buses

Pilots and demos: Investigate availability of funding for a pilot project demonstrating the use of solar-powered truck-stop electrification. Evaluate the effectiveness of the pilot program before implementing on a broader scale.

Related Policies/Programs in Place

There are currently no anti-idling ordinances in place in New Mexico for Class 8 diesel trucks. However, unattended delivery trucks are prohibited from idling in Albuquerque.

Types(s) of GHG Reductions

Reducing idling will reduce black carbon emissions, as well as all other GHG exhaust emissions (CO₂, CH₄, N₂O) through reduced fuel consumption. However, it is important to also ensure that any technologies used to reduce idling have lower emissions than the diesel truck idling emissions they are replacing.

Estimated GHG Savings and Costs per MTCO₂e

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.4	0.7	MMtCO ₂ e
Net Present Value (2006-2020)			\$million
-at \$2.40/gallon diesel		\$23	
-at \$3.40/gallon diesel ^b		\$-409	
Cumulative Emissions Reductions (2006-2020)		6.3	MMtCO ₂ e
Cost-Effectiveness			\$/tCO ₂ e
-at \$2.40/gallon diesel		\$4	
-at \$3.40/gallon diesel ^b		\$-65	

^b TLU TWG requested additional calculation at this fuel price assumption

- **Data Sources:**

American Transportation Research Institute, “Idle Reduction Technology: Fleet Preferences Survey,” February 2006 for technology costs.

EPA Smartway Transportation Partnership (<http://www.epa.gov/otaq/smartway/idlingtechnologies.htm#truck-mobile>) for technology costs.

“Analysis of Tehcnology Options to Reduce the Fuel Consumption of Idling Trucks,” ANL/ESD-43, Argonne National Laboratory, Transportation Technology R&D Center, June 2000 for information on technology impacts.

Data from EPA’s MOBILE6 model to estimate the proportion of CO2 emissions attributable to Class 8 trucks.

Data from USDOE/EIA *Annual Energy Outlook 2005* to estimate the amount of fuel consumed annually per truck.

- **Quantification Methods:** The estimated reduction in CO2 emissions from reduced idling was calculated based on estimating the portion of emissions and fuel consumption in the NM inventory that were attributable to Class 8 diesel trucks, estimating the portion of the total fuel consumption that would be consumed during idling, and applying a targeted reduction of 80 percent to this amount starting in 2008 and a reduction of 100 percent starting in 2015.
- **Key Assumptions:** This analysis will assume 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 assumes a 5-year lifetime for idling technology equipment, applied to 80 percent of Class 8 vehicles starting in 2008 and 100 percent of Class 8 vehicles starting in 2015, at a cost of \$6,000 per vehicle and a \$2.40 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.

Key Uncertainties

A small additional reduction in idling emissions could be achieved by buses, as well as other diesel trucks and gasoline vehicles and trucks that has not been quantified here.

The distribution of technology that would be selected by these trucks or fleets to reduce their emissions is highly uncertain. This will have a significant impact on the overall cost/cost savings of this measure. The use of these technologies will also cause a slight decrease in the CO2 and fuel consumption reductions achieved. The use of truck stop electrification would increase emissions from electricity generation.

Equipment cost and lifetime will vary by technology employed. The cost value selected was based on cost data summarized by American Transportation Research Institute, representing the capital costs of a variety of idle reduction technology. The cost of \$6,000 per vehicle represents a mix of higher and lower technology costs. The cost analysis does not take into account the number of vehicles that have already installed idle reduction technologies.

Contributing Issues

Reductions in idling will also reduce emissions of toxics, NOx, and PM. California estimates that 70 percent of toxic risk comes from diesel engines.

Idle emission reductions will reduce fuel consumption, thus leading to a cost benefit from reduced operating costs.

Additional costs are associated with on-board idle reduction technologies, but fuel savings over time typically lead to a net savings.

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-15 Intermodal Freight Initiatives

Policy Description

New Mexico currently has 2,151 miles of railroad in operation (AAR, 2005). In many cases, particularly for long distance freight, freight can be carried by rail more economically and at lower GHG emission levels than over the existing roadway system. This policy is designed to transfer a portion of the freight carried over the roadway system to rail wherever possible.

Policy Design

The CCAG recommends that New Mexico should implement policies and programs that result in the shifting of the transport of freight goods from the roadway system to rail. This should include evaluating the feasibility of restoring abandoned rail lines to increase the attractiveness of using rail for local shipments.

Carrying freight by rail rather than truck can significantly reduce emissions and fuel consumption, while at the same time reducing congestion on major roadways. A number of small abandoned rail lines already exist in New Mexico. A primary goal of this measure is to restore those lines, which will allow freight to be carried by rail directly to a number of warehouses and industrial sites in existing developed areas. This would also provide an incentive to reduce sprawl from these businesses. Electrifying rail should also be considered.

- **Goal Levels and Timing:** Reduce VMT from heavy-duty freight trucks by 5% in 2012 and by 15% in 2020 through the transfer of freight from the highways to rail.
- **Coverage of parties:** New Mexico Transit and Rail Bureau, New Mexico Department of Transportation, railway companies, shipping companies

Implementation Mechanisms

Information and education: Provide information to fleet carriers, shippers, retailers, and others involved in the diesel fleet industry indicating the economic benefits, as well as the environmental benefits, of shifting their loads from roadways to rail wherever possible. Emphasize the fuel savings benefits, reductions in toxic emissions, and reduced engine wear associated with reducing idling. Coordinate with EPA's SmartWay Transport program to highlight practical opportunities where rail can be better utilized and to encourage more efficient rail operations and technical innovation.

Technical assistance: Find funding sources and other resources needed to restore the currently-abandoned rail lines in New Mexico, where doing so would provide the ability to reduce additional truck VMT.

Funding mechanisms and or incentives: Investigate the feasibility of implementing a distance-based road fee for road freight to make rail a more attractive option.

Voluntary and or negotiated agreements: Encourage participation in EPA’s SmartWay Transport Partnership (or similar programs).

Pilots and demos: Develop pilot program to show the benefits and feasibility of electrifying rail. NMDOT should develop a pilot program to examine the feasibility of consolidated distribution points outside of major cities.

Related Policies/Programs in Place

The New Mexico 2025 Statewide Multimodal Transportation Plan lists several proposed/planned projects in the 2013 through 2025 timeframe that could make rail transport more feasible or attractive in New Mexico. This includes the construction of a rail/freight hub in the Las Cruces area, an intermodal rail/truck freight center in the Bernalillo/Belen area, and several other projects.

Types(s) of GHG Reductions

This measure would primarily reduce CO2 emissions through reduced heavy-truck VMT and fuel consumption; black carbon, N2O, and CH4 from the vehicle exhaust would also be reduced.

Estimated GHG Savings and Costs per MTCO₂e

The table below shows the GHG emission reductions that New Mexico could achieve by shifting 5% of Class 8 truck VMT loads to rail by 2012, increasing to 15% by 2020.

	<u>2012</u>	<u>2020</u>	<u>Units</u>
GHG Emission Savings	0.1	0.5	MMtCO ₂ e
Net Present Value (2006-2020)		Not estimated	\$million
Cumulative Emissions Reductions (2006-2020)		2.6	MMtCO ₂ e
Cost-Effectiveness		Not estimated	\$/tCO ₂ e

• **Data Sources:**

“Freight Railroads Operating in New Mexico: 2004,” Association of American Railroads, December 2005.

“Railroad Service in New Mexico: 2004,” Association of American Railroads, December 2005.

“Industry Options for Improving Ground Freight Fuel Efficiency—Technical Report,” prepared for USEPA by ICF Consulting, 2002.

“New Mexico 2025 Statewide Multimodal Transportation Plan,” New Mexico Department of Transportation.

“Revised Results on Quantification of New and Additional Strategies,” technical memorandum by ICF Consulting, March 11, 2003.

- **Quantification Methods:** For this analysis, it was assumed that the specified percentage of Class 8 diesel VMT would be eliminated and the loads from these vehicles would be shifted to rail. Reduction percentages for the years from 2008 through 2020 were interpolated linearly from the goals of 5% VMT reduction in 2012, 15% VMT reduction in 2020, starting with 0% VMT reduction in 2007. The CO₂ emissions corresponding to these VMT reductions were then multiplied by the CO₂ emission reduction of 56% (ICF, 2003). This emission reduction percentage is based on the replacement of truck trips of about 400 miles with rail.
- **Key Assumptions:** This analysis assumes that the truck trips being shifted to rail are on average about 400 miles. This gives an estimated benefit of a 56% reduction in GHG emissions. Trips of significantly shorter mileage would give a much smaller GHG reduction (e.g., 35% for 200 mile trips) while replacing trips of much longer mileage would provide a relatively small increase in GHG reduction percentage (up to a maximum of about 65% reduction for longer trips).

Key Uncertainties

The ability of the existing railways in New Mexico to handle the additional loads specified by this measure is unknown.

Contributing Issues

This measure will also lead to a reduction in diesel fuel consumption.

Feasibility Issues

None identified.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.

TLU-16 Reduced Speed Limits

Policy Description

By reducing vehicle speed, fuel economy can be increased, while reducing fuel consumption and CO2 emissions. This policy is targeted at reducing the speed limit for commercial trucks or for all vehicles.

Policy Design

The CCAG recommends that New Mexico consider various options to reduce speed limits in the state.

- **Goals:** Reduce Class 8 commercial truck traffic traveling above 60 or 55 mph on interstates, freeways, and major arterials by 50 percent. Additional scenarios examined:
 - Reduce speed limits for all vehicles to 60 mph in 2008.
 - Reduce speed limits for all vehicles to 65 mph in 2008.
- **Timing:** Begin enforcement of measure by 2008 with a 60 mph speed limit for Class 8 commercial trucks. Lower speed limit to 55 mph by 2015.
- **Coverage of parties:** NMDOT, state police

Implementation Mechanisms

Education/outreach: Provide information to the trucking industry and the general public about the fuel economy benefits obtained when reducing speeds from 70 mph to 60 or 55 mph. Emphasize fuel savings and safety aspects also.

Codes/standards: Have all interstates, freeways, and major arterials signed with a maximum speed of 60 or 55 mph for Class 8 commercial trucks. Significant enforcement resources will be needed to ensure the success of this measure.

Related Policies/Programs in Place

Current speed limits are as high as 75 mph, depending on the highway segment.

Types(s) of GHG Reductions

CO2, black carbon

Estimated GHG Savings and Costs per MTCO₂e

The CCAG asked CCS to provide separate estimates of two major quantifiable impacts: fuel savings and increased drive time. These are presented in the table below for 2012, 2020, and the net present value of these values over the 2006 through 2020 time frame. The CCAG did not feel it appropriate to combine these into a single NPV or \$/ton estimate, especially given a large non-quantifiable: reduced death and injury resulting from fewer accidents.

Scenario: Trucks Only	<u>2012^c</u>	<u>2020^c</u>	<u>Net Present Value</u>	<u>Units</u>
GHG Emission Savings	0.16-0.22	0.30-0.40		MMtCO ₂ e
Cumulative Emissions Reductions (2006-2020)		2.8-3.7		MMtCO ₂ e
Net Present Value				Million\$
-at \$2.40/gallon diesel				
• Value of Fuel Savings	\$39	\$72	\$452	
• Value of Increased Drive Time	\$47	\$101	\$592	
-at \$3.40/gallon diesel ^b				
• <i>Value of Fuel Savings</i>	\$55	\$102	\$641	
• <i>Value of Increased Drive Time</i>	\$47	\$101	\$592	

^bTLU TWG requested additional calculation at this fuel price assumption

^cLower bound estimates of MMT and NPV used in Summary table.

The CCAG requested information on the benefits of applying a 60 mph speed limit to all vehicles traveling on the highways, and a similar scenario at a 65 mph speed limit. The table below shows the results of analyses applying a 60 mph speed limit to all vehicles, starting in 2008 and one of applying a 65 mph speed limit to all vehicles starting in 2008. This includes the reductions from commercial trucks as well (e.g., this option could replace the commercial truck option, but is not incremental to the benefits of the commercial truck option). The values for fuel savings and increased driving time are broken out separately in the table below for 2012, 2020, and the net present value of these values over the 2006 through 2020 time frame.

Scenarios: All Vehicles, 60 and 65 mph	<u>2012</u>	<u>2020</u>	<u>Net Present Value</u>	<u>Units</u>
GHG Emission Savings				MMtCO ₂ e
-60 mph speed limit for all vehicles	0.54	0.65		
-65 mph speed limit for all vehicles	0.29	0.35		
Cumulative Emissions Reductions (2006-2020)				MMtCO ₂ e
-60 mph speed limit for all vehicles		7.3		
-65 mph speed limit for all vehicles		3.9		
Costs				Million\$
-60 mph speed limit for all vehicles				
-at \$2.40/gallon fuel				
• Value of Fuel Savings	\$136	\$165	\$968	
• Value of Increased Drive Time	\$240	\$298	\$1,575	
-at \$3.40/gallon fuel ^b				
• Value of Fuel Savings	\$193	\$234	\$1,371	
• Value of Increased Drive Time	\$240	\$298	\$1,575	
-65 mph speed limit for all vehicles				
-at \$2.40/gallon fuel				
• Value of Fuel Savings	\$73	\$89	\$520	
• Value of Increased Drive Time	\$111	\$138	\$727	
-at \$3.40/gallon fuel ^b				
• Value of Fuel Savings	\$104	\$126	\$736	
• Value of Increased Drive Time	\$111	\$138	\$727	

- **Data Sources:**

U.S. Department of Labor, Bureau of Labor Statistics, “Establishment Data; Hours and Earnings,” Table B-14 and “Employer Costs for Employee Compensation-December 2005,” Table 10.

U.S. Environmental Protection Agency, Office of Transportation and Air Quality, Smartway Transport Partnership, “A Glance at Clean Freight Strategies: Reducing Highway Speed,” EPA420-F-04-007, February 2004.

U.S. Environmental Protection Agency, Office of Transportation and Air Quality, MOBILE6 model, documented in “User’s Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model,” EPA420-R-03-010, August 2003.

Ang-Olson, Jeffrey and William Schroeer, “Energy Efficiency Strategies for Freight Trucking: Potential Impact on Fuel Use and Greenhouse Gas Emissions,” *Transportation Research Record 1815*, Transportation Research Board of the National Academy of Sciences, Washington, DC, 2002.

- **Quantification Methods:** At the direction of the CCAG, CCS estimated the value of fuel savings and increased driving time. The CCAG acknowledged the likelihood of an increase in safety due to lower speeds (thus fewer deaths and injuries).

Fuel Savings: The diesel fuel consumption from Class 8 diesel trucks was multiplied by 60 (low) or 80 (high) percent to account for the amount of fuel consumed at speeds above 60 mph from 2008 through 2014. Starting in 2015, the speed for Class 8 trucks was reduced to 55 mph. This fuel consumption was then multiplied by 50 percent to account for the expected penetration rate of this measure. This quantity was then multiplied by the percentage increase in fuel economy. The ratio of reduction in fuel consumption was then multiplied by the baseline CO₂ emissions to estimate the reduction in CO₂ from this measure. Fuel cost savings were calculated by multiplying the per unit fuel cost by the number of gallons reduced.

Increased Driving Time: This was estimated as the product of the increased time required for traveling the same distances at 60 mph (prior to 2015) or 55 mph (2015 and later) rather than 70 mph multiplied by the hourly trucking industry cost.

- **Key Assumptions:** 60 to 80 percent of Class 8 diesel truck travel (fuel consumption) is spent at speeds above 60 mph, assumed to be at 70 mph on average. 50 percent of this truck travel is assumed to be reduced to 60 mph or 55 mph (Ang-Olson and Schroeer).

Each one mile per hour reduction of speed from 70 mph to 55 mph yields a fuel economy increase of 0.1 miles per gallon (EPA) for heavy-duty diesel trucks.

Average hourly truck transportation wage is \$17.22/hour (BLS), with an industry average overhead rate of 1.48 (BLS).

Base fuel economy assumed to be 6.42 mpg (EPA MOBILE6 model); assumed to increase to 7.42 mpg with this measure.

Key Uncertainties

The ability to enforce a speed limit significantly lower than current policy is uncertain.

Contributing Issues

The CCAG was keenly aware that some members of the public would oppose lower speed limits, and also notes that research indicates that reducing the speed limit would lead to fewer accidents, along with some reductions in criteria pollutant emissions. There will likely be increased costs to the State of enforcing lower speed limits. Reducing speed is also likely to reduce truck maintenance costs.

Feasibility Issues

The CCAG has expressed some concern over safety issues related to a differential speed for trucks and cars.

Status of Group Approval:

Completed.

Level of Group Support:

Unanimous consent.

Barriers to Consensus:

None.