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**Transportation and Land Use (TLU)  
Technical Work Group**

**Summary List of Pending Priority Policy Options for Analysis**

Option No.	Policy Option	GHG Reductions (MMtCO <sub>2</sub> e)			Net Present Value 2009–2025 (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)	Level of Support
		2015	2025	Total 2009–2025			
TLU-1	Infrastructure for Plug-In Vehicles	<i>Not Yet Quantified</i>					Pending
TLU-2	Research and Development for Renewable Transportation Fuels	<i>Not Yet Quantified</i>					Pending
TLU-3	Smart Growth, Pedestrian, and Bicycle	<i>Not Yet Quantified</i>					Pending
TLU-4	Procurement of Efficient Fleet Vehicles (Passenger and Freight)	<i>Not Yet Quantified</i>					Pending
TLU-5	Promote and Facilitate Freight Efficiency	<i>Not Yet Quantified</i>					Pending
TLU-6	Improve and Expand Transit Service and Infrastructure	<i>Not Yet Quantified</i>					Pending
TLU-7	School and University Transportation Bundle	<i>Not Yet Quantified</i>					Pending
TLU-8	Alternative-Fuel Development and Expansion	<i>Not Yet Quantified</i>					Pending
TLU-9	Public Education	<i>Not Yet Quantified</i>					Pending
TLU-10	New Vehicle Standards: Tailpipe GHG and Fuel Economy	<i>Not Yet Quantified</i>					Pending

GHG = greenhouse gas; MMtCO<sub>2</sub>e = million metric tons of carbon dioxide equivalent; \$/tCO<sub>2</sub>e = dollars per metric ton of carbon dioxide equivalent.

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

## TLU-1. Infrastructure for Plug-In Vehicles

### Policy Description

Depending on the degree to which power generation in Arkansas relies on fossil fuels now and in the future, an increased introduction of plug-in hybrid electric vehicles (PHEVs) may reduce greenhouse gas (GHG) emissions in the state. The goal of this option is provide a set of actions that would further evaluate the benefits and feasibility of, and accelerate the deployment of, this technology; remove barriers to its more rapid adoption; and create initial incentives and provide for the integration of PHEVs with other systems, including the electric power generation grid and the transportation system.

### Policy Design

Review the forthcoming 3-year national study (which began in 2007) by the Electric Power Research Institute (EPRI), Ford Motor Company, and Southern California Edison (SCE),<sup>1</sup> which will develop and evaluate technical approaches for integrating PHEVs into the nation's electric grid system. Subsequently, after 2010, consider implementing some or all of the following:

- Direct the state to undertake a study to assess the impacts of plug-in fleets on the state's power infrastructure at various levels of market penetration, and to identify technology and system requirements to maximize use of off-peak and underutilized power resources. Ask the state to engage power utilities as partners in the study and to consider the future sources of power generation and their impacts on current and future GHG emissions from PHEVs.
- Because auto makers are preparing to introduce PHEVs by 2010, and because it will be advantageous for car owners to plug in at night, encourage utilities to install and compensated them for installing "smart meters" that allow for time-of-day pricing for PHEVs.
- Provide funding for state and local government conversions of standard hybrids to PHEVs. Set a goal for <xxx> conversions at <\$10,000> each, and allocate funding to reach that goal. Require that these vehicles be grid-aware and include funding for equipment to meet this requirement. Grid-aware vehicles include technologies that enable the flow of electricity to the vehicles to be managed by utilities, within parameters set by vehicle owners, so that utilities can minimize grid stress.
- Provide funding for school districts to acquire plug-in hybrid school buses.
- Through legislative action and/or executive order, commit the Arkansas state government to purchase PHEVs as they become commercially available, allowing purchase at a price premium to reflect carbon-reduction benefits and reductions in state expenditures on imported fuels.

<sup>1</sup> See Electric Power Research Institute press release on this study, "EPRI Joins Ford-SCE Analysis of Plug-In Hybrids on Grid," at:

[http://my.epri.com/portal/server.pt/gateway/PTARGS\\_0\\_39735\\_317\\_205\\_776\\_43/http%3B/uspalecp604%3B7087/publishedcontent/publish/2008\\_0327\\_3\\_ford\\_sce\\_plug\\_in\\_da\\_552054.html](http://my.epri.com/portal/server.pt/gateway/PTARGS_0_39735_317_205_776_43/http%3B/uspalecp604%3B7087/publishedcontent/publish/2008_0327_3_ford_sce_plug_in_da_552054.html).

- Direct the state to provide rate recovery for utility research and development investments in pilot tests of vehicle-to-grid systems.
- Fund the study of an assessment of PHEV charging needs in state parking facilities.
- Develop and fund at least one vehicle-to-grid pilot involving a fleet of public PHEVs parked in a state garage.
- Fund a study by the state to identify Arkansas companies and economic sectors with potential vehicle electrification markets, and develop a strategy to help Arkansas companies position themselves for success in those markets.

**Goals:** Review the 3-year national study (which began in 2007) by EPRI, Ford, and SCE, (estimated to be completed after 2010), and thereafter consider setting goals for other policy design options listed above.

**Timing:** As indicated above.

**Parties Involved:** TBD

**Other:** TBD – [as needed and approved by the TWG]

#### **Implementation Mechanisms**

TBD – [as approved by the TWG]

#### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

#### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

#### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

#### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

#### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

**Feasibility Issues**

TBD – [as needed and approved by the TWG]

**Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

**Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

**Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-2. Research and Development for Renewable Transportation Fuels

### Policy Description

This policy option would provide funding to assist in the development of low-carbon fuels that are not yet commercially viable, such as cellulosic ethanol, along with an accurate analysis and recommendations of which renewable fuels will be the best options for implementation at a regional, state, or city level.

The University of Arkansas Division of Agriculture (DOA) has expanded its involvement in research and education on biomass issues, especially biofuels. New faculty members have been hired, and others have redirected their efforts on these issues (e.g., plant breeding for alternative feedstock opportunities). DOA dedicated recent higher-education bond monies for capital improvements for new construction and renovation of the Rice Research and Extension Center at Stuttgart. Two laboratories in that facility have been designated as field biofuel laboratories. New resources are needed to expand both (1) the research and extension output in these areas, and (2) the capacity needed to work on by-products and co-products (e.g., increased uses for glycerin, a by-product of biodiesel production), new feedstocks, application of cellulosic technologies, marketing strategies, and policy information support systems. Support is needed for field stations to adapt to these changing crops in their research and education systems.

### Policy Design

During the 2007 Regular Session of the General Assembly, appropriations bills were passed to support research and extension in the area of biofuels and other biomass products. However, none of them was funded. DOA earmarked \$1 million from its general appropriation for this important area, but recent reductions in the fiscal year (FY) 2009–2010 forecast have caused those funds to be redirected to operational issues. To move the biofuel and biomass programs forward, the \$1 million of redirected funds needs to be replaced, and an additional \$3,254,708 must be provided to pay for classified and unclassified salaries, extra help, staff benefits, maintenance, and general operations.

**Goals:** The state will provide continuing annual funding in the amount of \$4,254,708 for program enhancement for biofuels and other biomass.

**Timing:** Legislation passed in the 2009 Regular Session, with funds available in FY2009–2010.

**Parties Involved:** University of Arkansas Division of Agriculture.

**Other:** TBD – [as needed and approved by the TWG]

### Implementation Mechanisms

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

House Bill No. 1379, dated 02/28/07, for an act to be entitled: An Act To Create the Arkansas Alternative Fuels Development Program.

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

### TLU-3. Smart Growth, Pedestrian, and Bicycle

#### Policy Description

This policy focuses on incentives and programs to encourage smart growth, including enhancing the pedestrian and bicycle infrastructure. Current land-use development practices increase vehicle travel by dispersing destinations, which separates activities and favors automobile travel over alternative modes. "Smart growth" planning by local, regional, and state governments refers to development that reduces sprawl and maximizes environmental, fiscal, and economic resources. It incorporates such planning tools as mixed use, open-space protections, downtown revitalization, brownfield redevelopment, infill development, transit-oriented development, and pedestrian and bicycle infrastructure. It seeks to preserve open, recreational, and agricultural space and to prevent sprawl, especially on the periphery of urban areas where sprawling development may otherwise occur.

It is difficult to envision a solution to either global warming or energy security that does not involve slowing the growth of transportation emissions. To date, the national discussion of climate and energy initiatives has focused on technological solutions—namely, developing more fuel-efficient vehicles or lower-carbon fuels. Experts recognize, however, that all such technological solutions will be overwhelmed by the continued growth in automobile travel, thanks to increasingly spread-out, car-dependent development patterns. During 1982–2002, these land-intensive development patterns caused U.S. development acreage to increase at twice the rate of U.S. population growth. This in turn caused per-capita vehicle miles traveled (VMT) to increase three times faster than America's population growth over that same period. It's no accident that VMT is increasing as we continue to build and develop more areas where residents have no realistic choice but to drive long distances each day to meet their daily needs. A 2002 study by Smart Growth America found that the degree of sprawl was the most significant cause of a high VMT rate.<sup>2</sup>

The good news is that we can make enormous progress simply by shaping future building to create communities where people can accomplish more by driving less. Numerous studies now demonstrate that when people are given the option to live in a less automobile-dependent place, they do indeed drive less. According to the report *Growing Cooler: The Evidence on Urban Development and Climate Change*, residents of more compact neighborhoods drive 20%-40% less on average, saving oil and reducing GHG emissions.<sup>3</sup> If we combine compact neighborhoods with increased investment in public transit of all shapes and sizes (policy option TLU-6), the resulting synergies can reduce dangerous emissions significantly.

<sup>2</sup> Reid Ewing, Rolf Pendall, and Don Chen, *Measuring Sprawl and Its Impact*, Washington, DC: Smart Growth America, 2002. Available at: <http://www.smartgrowthamerica.org/climate.html>.

<sup>3</sup> Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters, and Don Chen, *Growing Cooler: The Evidence on Urban Development and Climate Change*, Washington, DC: Urban Land Institute, 2008. Available at: <http://www.smartgrowthamerica.org/gcindex.html>.

## Policy Design

The Governor's Commission on Global Warming (GCGW) proposes several smart growth initiatives:

- *Downtown Revitalization*—Many U.S. towns and cities are crowded during business days, but deserted at night and on weekends because few people live there. Some cities have begun turning this problem around by revitalizing their downtowns. Downtown revitalization can be profitable (by reusing existing infrastructure); provide a better quality of life (by centralizing entertainment and retail, providing a critical mass for success); and improve the environment (by reducing VMT, providing sufficient density for walking, bicycling, and transit, reducing sprawling edge development, and preserving greenfields). Arkansas should provide economic development incentives and liberalized zoning and permitting processes (parking requirements, density restrictions, mixed-use restrictions, etc.) to encourage investment in central business districts.
- *Brownfield Redevelopment*—"Infill" development of all sorts reduces sprawl and VMT. Redeveloping brownfields (empty or underutilized industrial facilities and derelict properties in urban areas) has the additional advantage of improving the quality of life in city centers, which increases the number of downtown residents, workers, and visitors. Arkansas should provide economic incentives, liberalized zoning and land-use restrictions, and streamlined permitting processes, to encourage brownfield redevelopment. This can be a key factor in urban revitalization by providing new centrally located areas for residential, commercial, or mixed-use development. It also reduces average trip distances and encourages walking, bicycling, and public transit.
- *Infill Development*—Development of vacant or underused parcels of land within existing developed areas reduces average trip distances and saves public funds by taking advantage of existing infrastructure and public utilities. By increasing the local population density, it also encourages walking, bicycling, and public transit. Arkansas should provide economic incentives, liberalized zoning and land-use restrictions, and streamlined permitting processes, to encourage infill development.
- *Transit-Oriented Development (TOD)*—TOD is the creation of compact, mixed-use commercial or residential communities designed to maximize access to public transit (see TLU-6), while also creating a community attractive to pedestrians and bicyclists. TOD thus reduces VMT and the associated GHG emissions. Arkansas should provide economic incentives, liberalized zoning and land-use restrictions, and streamlined permitting processes, to encourage TOD.
- *Sprawl Reduction*—For smart growth policies to be most effective, the efforts must be regional or, better yet, statewide. If all municipalities in an area are not practicing smart growth, development may gravitate to greenfields at the edges of cities or between cities, resulting in sprawl. Arkansas should adopt a comprehensive plan to preserve open space on the edges of urban areas where sprawling development may otherwise occur, and to encourage regional cooperation in reducing sprawl. One approach would be to encourage

"green zones" at the edges of cities that would be permanently zoned for agricultural use only, and off limits to developers.<sup>4</sup>

- *Bike and Pedestrian Infrastructure*—Smart growth aims to encourage alternative (nonautomobile) transportation modes, especially walking and bicycling. This requires infrastructure aimed at pedestrians and bicyclers. Arkansas towns, cities, and counties should improve and construct sidewalks and bikeways, and the state should provide economic incentives to encourage such developments. These improvements are particularly needed in commercial areas without adequate sidewalks and in residential and other areas where pedestrian and bicycle safety is a concern. The attraction of bicycling and walking is greatly enhanced by facilities that are safe and that also "feel" safe to bicyclers and walkers. Bikeways can take the form of designated bike lanes on shared streets, or of trails that are separated from roadways except at crossings. The former are typically 4 or more feet wide. Separate bike trails are usually designed as multiuse trails that also serve joggers, strollers, skaters, etc.

Bikeways are not just for recreational use; they also serve commuters, shoppers, school children, and others. Indeed, real reductions in automobile VMT can occur by using bikeways for transportation. For example, in Scandinavian countries, despite the cold weather, 30% of all commuters travel by bicycle. Other infrastructure improvements could include bicycle parking and shower or locker amenities at places of employment. Cities, regional jurisdictions, and universities can institute "free bicycles" programs as is done in many U.S. and European cities. Arkansas should require "complete streets" policies, providing for systematic adoption of sidewalks and bikeways to help achieve these goals.

- *Smart Growth Planning, Modeling, and Tools*—Arkansas should provide state funding, information dissemination, and technical assistance to facilitate the adoption of smart growth planning processes, models, and tools by local and regional jurisdictions.

### Goals:

- By 2010, begin providing economic development incentives and liberalized zoning and permitting processes (parking requirements, density restrictions, mixed-use restrictions, etc.) to encourage investment in central business districts.
- By 2010, begin providing economic incentives, liberalized zoning and land-use restrictions, and streamlined permitting processes, to encourage brownfield redevelopment, infill development, and TOD.
- By 2010, develop and adopt a comprehensive plan to preserve open space on the edges of urban areas where sprawling development may otherwise occur, and to encourage regional cooperation in reducing sprawl.
- By 2015, require "complete streets" policies, providing for systematic adoption of sidewalks and bikeways.

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<sup>4</sup> For further discussion, see Smart Growth America, "Open Space & Farmland." Available at: <http://www.smartgrowthamerica.org/openspace.html>.

- By 2010, develop a program for information dissemination and technical assistance to facilitate the adoption of smart growth planning processes, models, and tools by local and regional jurisdictions.

**Timing:** See above.

**Parties Involved:** TBD

**Other:** TBD – [as needed and approved by the TWG]

### **Implementation Mechanisms**

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

## **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-4. Procurement of Efficient Fleet Vehicles (Passenger and Freight)

### Policy Description

Arkansas state and local government agencies should "lead by example" by enacting procurement policies, joining the U.S. Environmental Protection Agency's (EPA's) SmartWay Transport Partnership, and utilizing the SmartWay Upgrade Kits that result in lower-emitting vehicle fleets. The three primary components of the of the EPA SmartWay program are: (1) creating partnerships between shippers, carriers, and program sponsors; (2) reducing all unnecessary engine idling; and (3) increasing the efficiency of light-duty vehicles (LDVs), heavy-duty vehicles (HDVs), rail, and intermodal operations.

This policy option strengthens Arkansas' commitment to reduce GHG emissions through fuel efficiency in vehicles owned by the state, while also encouraging private and public agencies to develop incentive programs that might, for example, help with the initial costs of purchasing such vehicles.

### Policy Design

In leading by example, state government will ensure that its own fleet of vehicles meets or exceeds the targets set for the state as a whole, while providing available means for all public and private vehicles to also exceed these standards on a voluntary basis.

#### Goals:

- By 2010, identify barriers to purchasing hybrid vehicles, and research and develop solutions to procure hybrid or other lower GHG-emitting vehicles in the state.
- By 2010, ensure the overall state of Arkansas fleet considers the EPA fuel efficiency rating calculated over the life cycle of the vehicles purchased for the fleet.
- By 2015, ensure low-carbon fuels are purchased for the state motor pool fleet wherever they are available and if applicable for the vehicle type.
- By 2019, the state will have a goal of at least 70% of all HDVs and by 2014 at least 90% of all light-duty passenger vehicles are "fuel efficient," meeting, on average, a higher mile-per-gallon (mpg) target, for the state's HDV and LDV fleets.

**Timing:** See above.

**Parties Involved:** Arkansas state and local government agencies, private industries and fleets, trucking industry.

**Other:** TBD – [as needed and approved by the TWG]

### Implementation Mechanisms

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-5. Promote and Facilitate Freight Efficiency

### Policy Description

This policy focuses on promoting and facilitating freight efficiency through:

- Improving railroad infrastructure and rail yards;
- Increasing rail capacity, which may allow some freight to shift from trucks to rail;
- Providing economic assistance and regulatory streamlining for the improving intermodal rail yards and relieving rail freight bottlenecks;
- Providing electrification at truck stops to reduce idling;
- Supporting and promoting policies and legislation that improve regulatory oversight of the railroad industry;
- Providing plug-in power at port sites to enable vessels to turn off engines and reduce idling; and
- Supporting state and federal legislation to allow heavier tractor semi-trailer weights on highways.

### Policy Design

Improving freight efficiency by expanding the use of short-haul rail over trucking alternatives will require a fundamental shift in regulatory oversight of the railroads. This will require adopting federal legislation reforming the Surface Transportation Board (STB), reversing anticompetitive practices and creating an obligation to serve. The combination of mergers, bottleneck rules, paper barriers, and antitrust exemption creates an environment that often eliminates competition and alternatives for small or captive shippers.

The state should take an active role in influencing national rail policies that improve railroad infrastructure, increase rail capacity, and improve rail yards to improve intermodal options.

Technologies to reduce HDV idling are readily available and cost-effective for long-haul trucking, and include auxiliary power units and truck stop electrification. According to Argonne National Laboratory, long-haul trucks idle an average of 6 hours per day, or 1,830 hours per year, consuming 20 million barrels of diesel fuel. The use of existing technology can reduce fuel use by 90%. Today, nearly 2 million tractor-trailers are registered in the United States. Between 1990 and 2006, total truck tonnage increased by nearly 40%. It is estimated that truck tonnage in the United States will increase by almost 30% by 2018 to about 14 billion tons, up from nearly 11 billion tons in 2006. Because much of this traffic routes its way through the Arkansas, the state needs to focus on methods of “reducing the number of trucks needed to haul commerce,” as well as offer incentives to truck carriers that invest in low-emission engines.

Typical switcher locomotives idle 75% of the time, accounting for 27% of their total fuel use. Conversion to electrification may be impeded by both institutional factors and access—both

perceived and actual—to necessary infrastructure. A check of the U.S. Department of Energy (DOE) truck stop electrification site locator shows three facilities within a 100-mile radius of Little Rock.

Policies should also be supported that allow trucks to haul more material by weight to reduce the number of trucks needed to deliver goods.

**Goals:** Support passage of legislation by July 2009 that:

- Restores antitrust laws to the railroads.
- Reforms the STB in a manner that reverses anticompetitive rulings, protects the public interest, creates a proactive STB that will investigate unreasonable rail practices, and creates and enforces an obligation-to-serve standard.
- Requires timely investments in rail infrastructure, including increased rail capacity and rail yard enhancements to accelerate intermodal transportation and truck to short-haul rail.
- Establishes standards for truck stop electrification by August 2009 that determine the appropriate technology, such as Idle Aire or Shorepower systems. that will provide an alternative to idling or auxiliary power units. Establish a reasonable conversion period for transient vehicles and Arkansas-based organizations to retrofit and adapt their systems before assessing the need for restrictive ordinances.
- Completes a similar assessment of port facilities and rail-switching yards to determine the cost and benefits by mid-2010.
- Allows states to haul 97,000 pounds on six-axle trucks so that the same amount of freight can be transported on fewer trucks, reducing energy consumption and emissions.
- Allows longer tractor semi-trailers (double 48s) on highways to reduce VMT.
- Provides incentives to trucking companies that invest in the purchase of low-emission engines and lightweight tractor/trailer combinations.

**Timing:** See above.

**Parties Involved:** TBD.

**Other:** TBD – [as needed and approved by the TWG]

### **Implementation Mechanisms**

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-6. Improve and Expand Transit Service and Infrastructure

### Policy Description

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

### Policy Design

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

- Improve service frequency on selected existing intra-, and intercity transit routes.
- Support and encourage improvements in intra- and intercity bus service.
- Reduce travel times on selected existing transit routes (signal prioritization, exclusive lanes, etc.).
- Improve service quality on selected existing transit routes (safety, cleanliness, improvements to shelters/stations).
- Provide financing, regulatory relief, and the use of eminent domain to develop and expand transit service and infrastructure (commuter rail, light rail, bus).
- Offer incentives to potential passengers and provide loans and/or subsidies to operators (public or private) to offer improved and less expensive intercity bus service.
- Provide financing, regulatory relief, and the use of eminent domain to develop, publicly or privately, a high-speed intercity passenger rail system serving major urban areas. Provide additional financial assistance to improve services already provided by Amtrak on other routes.
- Reduce LDV urban VMT.

### Timing:

- Reduce LDV total VMT in urban areas from 2008 baseline growth by 1% per year starting in 2010 until 2025.
- Increase investment in transit service and infrastructure by 2015.

**Parties Involved:** TBD

**Other:** TBD – [as needed and approved by the TWG]

### Implementation Mechanisms

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

- Arkansas Statewide Long-Range Intermodal Transportation Plan 2007 Update.
- Regional long-range transportation plans, including the possibility of passenger rail in northwest Arkansas.

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-7. School and University Transportation Bundle

### Policy Description

In 1969, approximately 50% of students walked or biked to school; by 2001 this number was less than 16%; 25 % of auto commute trips take K-12 and college students to school. Parents are influenced to drive children to school by distance from school, an unsafe travel environment, fear of crime, and bad weather. This burns a lot of fossil fuel and teaches students to travel by car instead of healthier alternatives, such as walking, bicycling, busing, and car pooling. Public schools and colleges are well positioned to effect the changes in transportation habits that Arkansas needs if it is to reduce automobile use.

### Policy Design

This policy focuses on encouraging reduced transportation sector GHG emissions at schools, colleges, and universities through the following:

- K-12 schools will establish programs such as ridesharing; ridesharing clearinghouses; supervised walking to school, including "walking school buses"; safe routes to schools; and bicycling and mobility education that shows how people benefit from using alternative transportation and that makes it "cool" to walk, bicycle, or ride the bus. Buses are far safer than driving to school, especially when the car driver is a student. The federal Safe Routes to School program provides money for local sidewalks and crosswalks.<sup>5</sup>
- Schools can save dollars by reducing or abolishing student parking. Student parking should be neither free nor subsidized, but should reflect the true cost of the lot and land. Schools can restrict student parking to seniors only, or to outstanding students only. School-siting policies should favor small, centrally located schools to encourage alternative transportation, while minimizing driving distances. Arkansas' excessive minimum acreage requirements favor Greenfield sites, one-story buildings, big parking lots, and inefficient planning; they need to be revised. Within a 1-mile radius of any school, state and local planners should design streets and sidewalks for pedestrians, bicyclers, and children. Schools should factor in a transportation energy component in their calculation of building energy ratings. Arkansas could reduce student injuries and death while reducing GHGs by raising the legal driving age to 16 for a learner's permit, as 10 states have done, and to 17 for a full license, as New Jersey has done.
- K-12 is a critical time to teach children the environmental, health, and other consequences of automobile overuse. These consequences, and the importance of reducing driving and gasoline consumption, need to become a normal part of all environmental lessons in health, biology, physical science, and environmental science courses at all ages.

<sup>5</sup> See U.S. Department of Transportation, Federal Highway Administration, "Safe Routes to School." Available at: <http://safety.fhwa.dot.gov/saferoutes/>.

- Colleges can establish free bus programs for students, bicycle storage buildings, free student bicycles, and abundant multifamily housing on or near campus with services (food, drugstore, etc.) nearby. Student parking on campus should be neither free nor subsidized, but should reflect the true cost of the lot and land. Arkansas colleges can require first-year, or first- and second-year, students to live on campus, while requiring that their cars be stored in distant lots for out-of-town travel.

**Goals:**

- By 2012, K-12 schools will establish programs such as ridesharing; ridesharing clearinghouses; supervised walking to school, including "walking school buses"; safe routes to schools; and bicycling and mobility education that shows how people benefit from using alternative transportation and that makes it "cool" to walk, bicycle, or ride the bus.
- By 2012, high schools will establish programs to reduce or abolish student parking.
- By 2012, K-12 schools will develop a program to teach students about the environmental, health, and other consequences of automobile overuse.
- By 2012, colleges will establish more comprehensive commuting programs, such as free bus programs, expanded bicycle storage, free student bicycles, and abundant multifamily housing on or near campus with services (food, drugstore, etc.) nearby.
- By 2010, colleges will study and report on the environmental, health, financial, and other costs and benefits of requiring all freshmen to live on campus while leaving their cars in distant lots for out-of-town travel only.

**Timing:** See above.

**Parties Involved:** TBD.

**Other:** TBD – [as needed and approved by the TWG]

**Implementation Mechanisms**

TBD – [as approved by the TWG]

**Related Policies/Programs in Place**

Arkansas Safe Routes to School Program.

**Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

**Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-8. Alternative Fuel Development and Expansion

### Policy Description

Arkansas could adopt standards that require a certain amount or percentage of fuel sold in within the state to be alternative fuel (e.g., compressed, liquefied petroleum gas, ethanol, or biodiesel). This percentage could gradually increase over time. The state could help facilitate transition to alternative fuels by regulating quality standards for fuel blends.

### Policy Design

The GCGW could encourage state and national fuel industries to convert their products to contain suggested percentages of alternative fuels (that would produce less GHG emissions). The state could encourage industry and research universities to work together to create an Arkansas Alternative Energy Institute.

This policy could promote research and development related to biofuel/biodiesel production—for example, investigating the production biofuels from Arkansas-based biomass feedstocks, such as residues or by-products from agricultural production (crop residues, chicken fat, beef tallow), agricultural processing, forest or wood resources, forestry or wood production (not being utilized by pulp mill plants), or other cellulosic crops (e.g., switchgrass).<sup>6</sup> Such research could be linked to life-cycle analyses of feedstock production and conversion.

The GCGW does not wish to encourage the conversion of any human food sources, such as corn, to alternative fuels, because this is likely to increase the price of food. The GCGW also does not wish to encourage the production of alternative fuels that would lead to higher GHG emissions than are produced from petroleum-based fuels.

Arkansas could provide incentives to private industries to establish alternative-fuel infrastructures that could aid in the promotion of alternative-fuel use. The expense of equipment and installation may be offset by the increasing use of these alternative fuels. The biofuel/biodiesel production plants should optimally be situated within a 50–100-mile radius of their feedstocks, as feasible. The distributors of alternative fuels should be in convenient locations to be able to offer fuels at competitive prices.

To aid in biofuel development, state money could be used to establish partnerships with state and national laboratories that have already worked on some of the issues of biofuel conversion. This would bring knowledge of established production and conversion protocols into the state and develop processing parameters for Arkansas-specific feedstocks.

<sup>6</sup> A map showing the leading candidates for lignocellulose-based biofuel feedstocks can be found at: J.M. DiTomaso, J.N. Barney, and A.M. Fox, "Biofuel Feedstocks: The Risk of Future Invasions," *Cast Commentary*, QTA2007-1, November 2007. Available at: <http://www.cast-science.org/websiteUploads/publicationPDFs/Biofuels%20Commentary%20Web%20version%20with%20color%20%207927146.pdf>.

**Goals:**

- Increase the use of alternative fuels that emit less GHG in automobiles and other gasoline-powered vehicles by 6% by year 2015.
- Develop industries within the state that produce alternative fuels.

**Timing:** By 2012, the state or appropriate agency will:

- Develop incentives for industry to produce non-food-crop alternative fuels that reduce GHG emissions.
- Develop an industry/research university institute that will continually work toward reasonable solutions for non-food-crop alternative fuels.

By 2020, the state or appropriate agency will:

- Reduce GHG vehicle emissions by converting to fuels that burn much more efficiently, with the goal of the statewide use of alternative fuels of 6% by 2015.
- Work with the Arkansas Alternative Energy Institute to promote both biofuel production that controls GHG emissions and state industries that will provide “green” jobs for Arkansas workers.
- Establish legislation to set standards for biofuel production that meets federal and state regulations for GHG emission levels.

**Parties Involved:** Arkansas Department of Natural Resources, Arkansas Department of Transportation (DOT), DOA, Arkansas Economic Development Commission (including the Arkansas Energy Office), Arkansas Department of Labor, Arkansas Department of Forestry, U.S. Department of Energy.

**Other:** TBD – [as needed and approved by the TWG]

**Implementation Mechanisms**

House Bill No. 1379, listed below, may provide funding of some of the policy issues.

**Related Policies/Programs in Place**

House Bill No. 1379, dated 02/28/07, for an Act to be entitled: An Act To Create the Arkansas Alternative Fuels Development Program.

**Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

**Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-9. Public Education

### Policy Description

This policy option focuses on implementing public education programs to better inform the public of the measures individuals can take to reduce their transportation-related GHG emissions. Drivers will voluntarily reduce fuel use and GHG emissions from their activities when they have the information necessary to make wise decisions.

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

- Education on transportation choices and consequences: low-GHG-emitting vehicles, carpooling, use of alternative fuels, walking, biking, telecommuting, mass transit, safety issues, etc.
- Improved vehicle operation and maintenance: regular vehicle tune-ups, fuel-efficient tires, coolest temperature fueling, tire pressures, engine lubricants, slower acceleration, shifting at lower revolutions per minute, cruise control, turn-off vehicle when parked, elimination of "jack-rabbit" starts, etc.

The curriculum would be a requirement for all driver training programs and distributed through other possible venues as deemed appropriate by the agency that develops the program. This program should include questions pertinent to training included on the written/driving portion of private and commercial driver licensing tests. (Driver training programs in Utah and Arizona currently incorporate this type of curriculum in classroom settings.) In addition, programs that include this curriculum are to be mandated for both state and municipal fleet operators. All GHG-saving application methods included in the curriculum would be enforced at state and municipality fleet levels.

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

### Policy Design

#### Goals:

- Reduce transportation GHG emissions through education to promote intelligent transportation purchasing choices and vehicle operation.
- Begin the consumer information program in 2008, with program expansion as resources are made available.

#### Timing:

- By 2010, the state or appropriate agency would develop a marketing program for fuel-efficient replacement tires and energy-efficient driving practices and devices.
- By 2010, the state or appropriate agency would ensure that training be delivered for all state and municipal fleet operators.

- By 2010, private and commercial driver licensing tests would be modified to incorporate information about fuel-saving driving practices.

**Parties Involved:** Driver training programs; Department of Motor Vehicles (DMV); state, commercial, and municipal fleets.

**Other:** TBD – [as needed and approved by the TWG]

### **Implementation Mechanisms**

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

### **Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

### **Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

### **Barriers to Consensus**

TBD – [blank until final vote by the GCGW]

## TLU-10. New Vehicle Standards: Tailpipe GHG and Fuel Economy

### Policy Description

Arkansas could adopt new vehicle standards that would meet newly proposed federal and state GHG regulations.

To meet the new vehicle standards, the state could set up a “clean car incentive” system relating to new car/vehicle purchases. The state should provide incentives to encourage its citizens to purchase new vehicles that are more fuel efficient and produce lower GHG emissions. The efficiency goals should be determined by the federal standards for the fleet average fuel economy for cars and for LDTs (which should be treated separately so as not to jeopardize LDT owners). These incentives could include reduced registration fees, rebates, and/or tax credits to consumers purchasing new vehicles that are more fuel efficient than the average new car or light truck. The program would be self-financing. It would be paid for with disincentives to those who purchase new vehicles that are less fuel-efficient than the average new car or light truck, by charging a fee to those who purchase such vehicles.

It is not the intent of the state to charge fees to citizens who are netting less than a living wage or workers undergoing financial hardship. Living wage is defined as a wage that allows a family to meet its basic needs, and provides it with some ability to deal with emergencies, without resorting to welfare or other public assistance. Therefore, the incentives and disincentives should not apply to used vehicles that might be purchased by these citizens, who may only have the means to purchase older vehicles that may not fit the category of lower-GHG emitters or more energy-efficient vehicles.

### Policy Design

**Goals:** Increase the percentage of vehicles that have lower GHG emissions and are more energy efficient by 6% by 2015.

**Timing:** The total time for the impact of vehicle change was calculated for low-emission diesel vehicles at 5 years (until they are able to be produced and sold in the market at competitive prices), with the total impact time of 30 years until the new vehicle will have a significant impact on transportation sector GHG emissions (i.e., more than a third of vehicles in the fleet). For gasoline hybrids, it is assumed it will take 5 years for these vehicles to be produced and sold in the market at competitive prices, and 35 years until they will have a significant impact on transportation sector GHG emissions (i.e., more than a third of vehicles in the fleet). For the hydrogen fuel cell hybrid vehicle, it is assumed it can be produced and sold at competitive prices in 15 years, and that it will take 55 years for it to have a significant impact on transportation sector GHG emissions (i.e., more than a third of vehicles in the fleet).<sup>7</sup>

- By 2012, the state or appropriate agency will:

<sup>7</sup> J.B. Heywood, "Fueling Our Transportation Future," *Scientific American* September 2006;295(3):60–63. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/16925036>.

- Develop a program to help reduce GHG vehicle emissions by encouraging greater use of low-GHG-emission vehicles.
- Develop incentives and/or disincentives for purchasing new lower-GHG, more energy-efficient vehicles.
- By 2020, the:
  - Majority of vehicles on the road (greater than 50%) will produce less GHG emissions than the average for the U.S. fleet, and will be in compliance with federal and state GHG emission levels.
  - State or appropriate agency will establish legislation to set standards for new vehicles with mandatory manufacture labeling indicating the vehicle's GHG emission rate and fuel economy compared to the average fleet fuel economy for new vehicles.

**Parties Involved:** DMV, DOT, automobile companies, EPA, State Energy Office.

**Other:** TBD – [as needed and approved by the TWG]

### **Implementation Mechanisms**

TBD – [as approved by the TWG]

### **Related Policies/Programs in Place**

TBD – [as approved by the TWG]

### **Type(s) of GHG Reductions**

TBD – [as approved by the TWG]

### **Estimated GHG Reductions and Costs or Cost Savings**

TBD – [as approved by the TWG]

**Data Sources:** [TBD, as approved by the TWG]

**Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as approved by the TWG]

### **Key Uncertainties**

TBD – [as needed and approved by the TWG]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWG]

### **Feasibility Issues**

TBD – [as needed and approved by the TWG]

**Status of Group Approval**

Pending – [until GCGW moves to final agreement at meeting #7 or #8]

**Level of Group Support**

TBD – [blank until GCGW meeting #7 or #8]

**Barriers to Consensus**

TBD – [blank until final vote by the GCGW]