



Western Governors' Association

## **Transportation Fuels for the Future**

### ***Vehicle Fuel Efficiency***

**WGA Vehicle Fuel Efficiency Team**  
January 8, 2008  
Final Report

The following report is based on the contributions of the individuals and organizations listed below. The working group members were chosen for their breadth of knowledge and industry or policy experience. The group was assembled with the goal of having a wide scope of interests including industry, academia and environmental analysis. The group also worked towards consensus viewpoints on the critical issues impacting vehicle fuel and transportation system efficiencies. This consensus model helped to achieve a balanced perspective on the challenges and potential solutions to further commercial development of this alternative transportation fuel.

### **Working Group Members**

John Boesel, Chair, Weststart/Calstart  
Al Weverstad, General Motors  
David Greene, Oakridge National Labs  
Gerry Harrow, National Renewable Energy Laboratory  
Ken Kurani, UC/Davis  
Martha Roberts, Environmental Defense  
Peter Ward, California Energy Commission  
Tim O'Connor, Environmental Defense  
Tom Trueblood, International Truck and Engine Corp.

### **Staff Support**

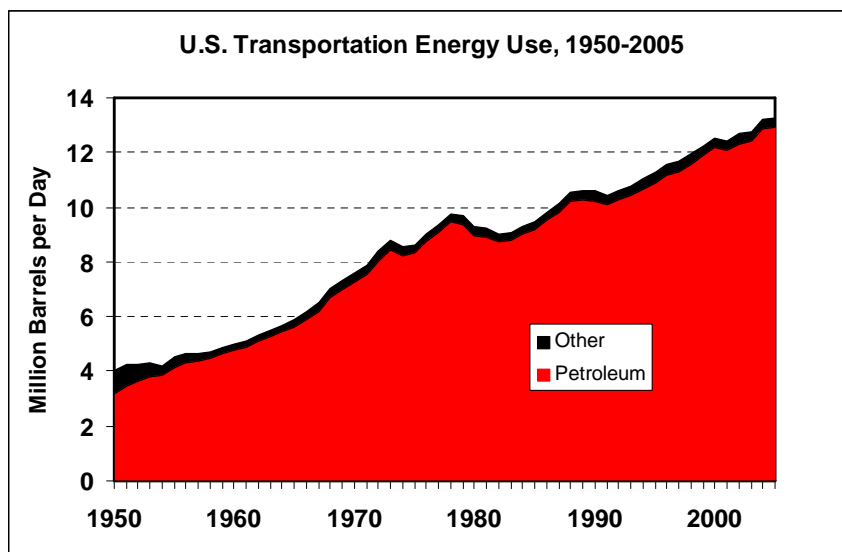
Gayle Gordon, Program Manager, Western Governors' Association  
Matt Futch, Western Governors' Association  
Will Singleton, Singleton Strategies

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## Introduction

The Western Governors are seeking suggestions for reducing fuel consumption to address the risks of energy security, to reduce the environmental impacts of fossil fuel use, and to support and expand local economies and the western region. The Fuel Efficiency Team of the Transportation Fuels for the Future Initiative explored ways that increasing fuel efficiency could contribute to these important goals. Improving energy efficiency is the cleanest and most secure way of supplying energy services. Fuel efficiency can be improved in many ways: through advanced vehicle technology, better driving behavior and maintenance, more intelligent traffic control, more efficient pricing of transportation services, better organization of the modal distribution of passengers and freight, and smarter development patterns that facilitate a wide range of transportation choices. The Fuel Efficiency Team considered a full range of options, with special attention to those areas in which the Western Governors might achieve the greatest benefits.



**Figure 1.** Transportation's Petroleum Dependence, 1950-2005.

Source: U.S. Dept. of Energy, Energy Information Administration, Annual Energy Review, table 2.1e.

Three decades after the oil crises of the 1970s, the U.S. transportation system remains all but totally dependent on petroleum (Figure 1). As a result of transportation's oil dependence and the peaking of U.S. crude oil production in 1970, our nation's net dependence on imported oil has reached 60% (USDOE/EIA, 2007a, table 1.7). Despite higher oil prices, major technological advances in oil exploration and development, and important new oil discoveries, U.S. petroleum production has never since exceeded its 1970 peak output level (Figure 2). The International Energy Agency (IEA, 2006) and Exxon Mobil Corporation (Tillerson, 2004) predict a plateau, rather than a peak, in global oil supply from non-OPEC producers beginning in 2010. Given the rapid growth in demand by developing economies such as China and India, either OPEC's market share and market power will expand rapidly or a growing gap between conventional oil supply and petroleum product demands will have to be filled by other energy sources (Greene,

Hopson and Li, 2004). It is not at all likely that OPEC will expand its production to fill the gap between future demand and conventional oil supply simply because OPEC producers will receive more revenue if they do not expand production than if they do (USDOE/EIA, 2005, tables 17-20). If demand growth is to be accommodated without further oil price increases, other sources of liquid fuels must be developed. Today, the world is consuming petroleum resources at an astonishing rate. The National Petroleum Council estimates that over the next 25 years, world economies will consume 1.1 trillion barrels of oil, more than has been consumed from the dawn of civilization until today. There is an urgent need to develop sustainable energy sources for global transportation, and while energy efficiency alone is not the answer, it has a crucial role to play in buying time for innovation and facilitating the transition to sustainable energy.

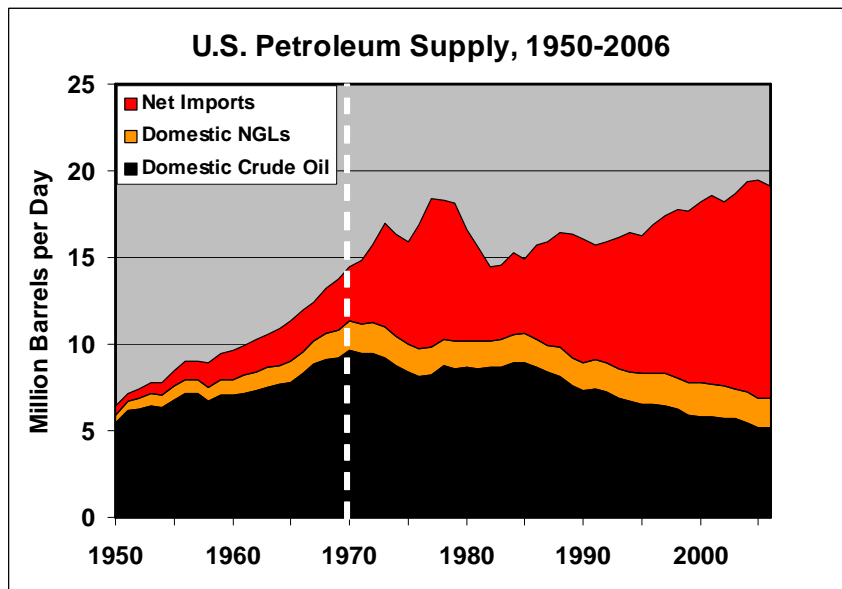


Figure 2. Peaking of U.S. Petroleum Production and Oil Import Dependence, 1950-2006. Source: U.S. Dept. of Energy, Energy Information Administration, Annual Energy Review, table 5.1.

The policies in place today will not solve the problems of oil dependence and climate change. The Energy Information Administration projects that under current policies, U.S. oil import dependence will remain in the vicinity of 60% through 2030 (USDOE/EIA, 2007b, table 11). Biofuels production is expected to increase, under current policies, from 0.27 million barrels per day (mmbd) in 2005 to almost 1 mmbd in 2030. By 2030, liquid fuels produced domestically from coal are expected to contribute less than 0.5 mmbd to a total national consumption of 27 mmbd. Under current policies, our nation's oil security problem will persist for at least another 25 years.

The U.S. transportation system is a major source of greenhouse gases, especially carbon dioxide (CO<sub>2</sub>). While electricity generation remains the largest source of CO<sub>2</sub> emissions in the U.S. economy, among energy end-use sectors, transportation has become the single greatest source (Figure 4). The U.S. transportation system alone adds more climate-

changing CO<sub>2</sub> to the atmosphere each year than any other nation's entire economy, with the exception of China. Fossil fuel replacements for conventional petroleum, such as oil sands, shale oil, and coal-to-liquids, will produce much greater well-to-tank emissions of greenhouse gases than conventional petroleum, unless the carbon produced in upstream processes is captured and stored. A "path of least resistance" transition to unconventional fossil sources of conventional transportation fuels would increase total fuel cycle CO<sub>2</sub> emissions by 20% to 100%.

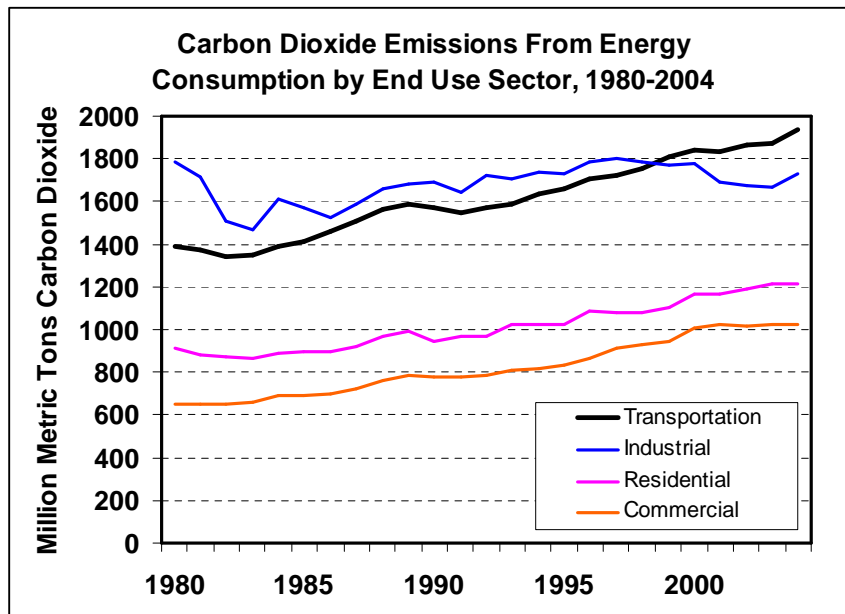


Figure 4. Carbon Dioxide Emissions from Energy Consumption by End Use Sector  
Source: U.S. Dept. of Energy, Energy Information Administration, *Annual Energy Review*, table 12.2.

Improving energy efficiency works. Past improvements in energy efficiency have significantly reduced transportation's petroleum use and carbon emissions over what they would otherwise have been. Light-duty vehicle fuel economy improvements following the first oil price shock in 1973-74 decoupled fuel use and vehicle travel for more than 15 years (Figure 3). As a result, cars and light trucks are now using about 70 billion gallons (4.5 mmbd) less fuel per year than they would have had their fuel economy remained constant at the 1975 level. From 1975 to 1985 manufacturers made dramatic gains in passenger car and light truck fuel economy. Sales weighted average passenger car mpg increased from 15.8 in 1975 to 27.0; light truck fuel economy was raised from 13.7 to 20.6 mpg. In model year 2006, the average passenger car rated 28.8 mpg on the EPA's tests and light trucks achieved 21.5 mpg. Despite these improvements, greater demand for light trucks cause the combined average fuel economy of light duty vehicles to decrease slightly, from 25.0 in 1985 to 24.6 in 2006.

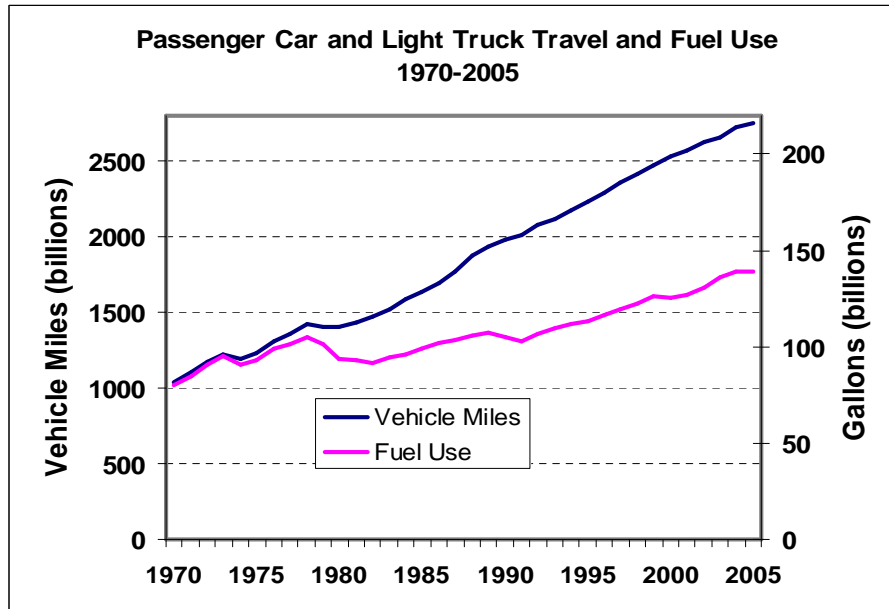


Figure 3. Decoupling of Passenger Car and Light Truck Travel and Fuel Use, 1970-2005  
Source: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, table VM-1.

Other transport modes have achieved even greater energy efficiency gains. Energy use per airline passenger mile today is less than one-third of what it was in 1970, and it now takes less than half as much energy to move a ton of freight by rail as it did in 1970 (Davis and Diegel, 2007, tables 2.14 and 2.16). Other modes have achieved more modest reductions. Heavy truck energy use per ton-mile, for example, has declined by less than 20% over the same period.

Energy efficiency is the cornerstone of an effective energy policy but it is not a panacea for our energy challenges. Alternative and sustainable sources of energy must also be developed. But increasing energy efficiency is an essential component of a comprehensive strategy for delaying and diminishing the consequences of oil peaking, reducing our nation's dependence on petroleum, and mitigating transportation's greenhouse gas emissions. Efficiency improvements can be made across the transportation sector, from vehicles, to operations to infrastructure and land use. At every stage, Western Governors can play an important and constructive role.

## Tank to Wheel Efficiency

Increasing the fuel efficiency of private and public fleets is a key opportunity to reduce fuel usage and harmful emissions. A number of existing and emerging technologies and strategies are available to increase vehicle fuel efficiency. The governors can use their leadership position to create incentives and model opportunities for increased fuel efficiency.

Potential policies and programs include tax incentives for efficient vehicles, mandating improvements in state vehicle fleets, and a wide variety of education programs, among many others. By demonstrating high level leadership on fuel efficiency, the governors can raise awareness and public support for fuel efficiency, creating a message that citizens can support their state and protect their environment by purchasing fuel efficient vehicles and using their existing vehicles in efficient manners.

**Recommendation:** The Western Governor's should consider adopting a stated goal for their respective state of reducing demand for on road gasoline and diesel to 15 percent below 2003 levels by 2020. The California Air Resources Board and the California Energy Commission established a statewide goal for the state's petroleum consumption to be 15 percent less in 2020 compared to 2003 levels. In order to ensure that the reduction in petroleum usage leads to commensurate environmental benefits, the state should also annually monitor greenhouse gas emissions from transportation sources with the goal of reducing greenhouse gas emissions by 10 percent below current levels.

### **Incentives for private and public fleets**

**Recommendation:** The governors should support the use of tax incentive programs for fuel efficient vehicles by lobbying for their expansion at the federal level and creating and expanding state level incentive programs. The governors should identify specific funding sources for incentive programs to ensure continuing, substantial financial support.

Offering rebates for highly fuel efficient vehicles is already a common strategy to create incentives for the purchase of efficient vehicles. The governors can support incentives for fuel efficient private vehicles by lobbying for continued federal tax credits, or creating or expanding state level tax credit programs. Many of these programs focus incentives on hybrid electric vehicles or alternative fuel vehicles. For example, some analysts attribute the strong sales of the Toyota Prius to the substantial tax credits available for buyers of hybrid vehicles. Incentive programs can lead to increased production levels and therefore decreased production costs for fledgling technologies; however, the primary focus of incentive programs should remain on increasing fuel efficiency, not picking technologies. The governors should concentrate rebate programs on highly fuel-efficient vehicles, regardless of the technology used to reach the increased fuel economy.

A key foundation of a successful incentive program is consumer outreach and education. The governors should ensure that there is a sufficient consumer awareness of the tax credit program so that the program influences consumer behavior. Information on the size and availability of the credit should be included on car sales stickers or the states should perform other outreach and education efforts to consumers and car dealers. If consumers are not aware of incentives for higher efficiency vehicles, they may purchase the car of their choice with any regard for the resulting tax credit. If the rebate program does not influence consumer behavior, the policy will expend public funds without any measurable gain or impact.



**The United States incentive program for fuel efficient vehicles**

The Energy Policy Act of 2005 includes a tax credit for hybrid vehicles of \$250-\$3,400, depending on the fuel efficiency and weight of the vehicle. Eligibility for the complete tax credit is open only to the first 60,000 hybrid vehicles sold from each manufacturer. While the tax credits are available through the end of 2010, many manufacturers have already reached or will soon reach their maximum. Toyota, for example, is capped out and anecdotal evidence suggests that sale volumes of their hybrid vehicles are softening with the advent of reduced tax rebates incentives. The governors can use their influence to expand this program at the federal level, or can implement programs at the state level that make up for gaps in federal incentives or supplement existing rebates.

For more information on federal incentive programs, see:

<http://www.aceee.org/transportation/hybtaxcred.htm> and  
[http://www.eere.energy.gov/afdc/progs/view\\_ind\\_fed.cgi/afdc/348/0](http://www.eere.energy.gov/afdc/progs/view_ind_fed.cgi/afdc/348/0)

For more information on Colorado's aggressive state level incentive program, visit:

[http://www.eere.energy.gov/afdc/progs/view\\_ind.cgi?afdc/5246/0](http://www.eere.energy.gov/afdc/progs/view_ind.cgi?afdc/5246/0)

Identifying and creating specific funding sources to pay for rebate programs can give the governors greater funding to support larger rebate programs. The governors can use funding from a variety of transportation related sources to fund rebate programs. Some opportunities include:

- Vehicle registration fees
- Road tolls
- Public goods charge on petroleum derived fuels

**Mandating a fuel efficient state fleet**

**Recommendation:** The governors should enroll their state vehicle fleets in efficiency initiatives, such as the 'Green Fleets' program, that measure fuel use/greenhouse gas emissions, set reduction targets, and implement a variety of fuel use reduction strategies to meet these goals. The governors should actively recruit private sector partners to participate in their initiative.

Individual states have large fleets of passenger cars and light and heavy duty trucks. The Western Governors can use their state fleet to model strategies to increase fuel efficiency and to demonstrate the potential savings and other benefits that can stem from adopting fuel-efficient policies.

One existing, tested fuel or greenhouse gas reduction opportunity that the governors can take advantage of is joining the Green Fleets initiative. The Green Fleets program measures the baseline fuel use or GHG emissions of enrolled fleets, sets goals for fuel use or GHG emission reduction, and then offers support to locally led programs and policies implemented in order to reach Green Fleets goals. The basic premise is that "what gets measured gets managed."

The objective of Green Fleets programs is to encourage fuel/GHG emission reductions through any effective means, rather than implementing top down directives on specific actions or strategies to reduce emissions. The program is outcome oriented and technology neutral. State fleet managers are given requirements for fuel use/GHG emission reduction and allowed to implement a wide variety of strategies to reach

#### **Denver's Green Fleets Program**

In 1993, the City and County of Denver adopted a model Green Fleets program for its fleet of over 3,500 vehicles. The program mandated that city fleet fuel expenditures decrease by an average of 1% per year, carbon dioxide emissions decline by an average of 1.5% per year, and other requirements for vehicle bid specifications, reductions in miles traveled by fleet vehicles, and reductions in fleet size. In 1999, Green Fleets Committee decisions:

- offset the City's fleet growth by ten vehicles and downsized thirteen others.
- saved the City \$40,000 in annual operation and maintenance costs.
- saved the City up to \$100,000 in annual capital costs by not purchasing some of the vehicles requested.
- prevented the emission of ten to fifteen tons of CO<sub>2</sub>.

For more information, see the website: <http://www.greenfleets.org/Denver.html>

program goals. Because local users are allowed the freedom to design their own strategy to reach program goals, reductions are reached at a low cost and appropriate to local conditions.

The list below gives an idea of some of the programs that can be used to achieve fuel use/emission reduction goals:

- Mandating state fleet procurement guidelines that have a heavy emphasis on fuel efficient vehicles
- Mandating state fleet purchasing of fuel efficient (low rolling resistance) replacement tires
- Optimizing vehicle maintenance schedules for fuel efficiency
- Instituting employee training on non-aggressive, fuel efficient driving strategies
- Implementing supportive telecommuting policies
- Paying for employee public transit passes

Governors can multiply the success of state fleet participation in a Green Fleets program by actively recruiting partners from other states, the federal government, and private

fleets. Recruiting additional partners can increase the visibility of the state fleet initiative and create additional opportunities to share information and lessons learned.

### Education and research on fuel efficiency

**Recommendation:** The governors should promote fuel efficiency by repeatedly emphasizing themes and messages of fuel efficiency and by setting a positive example with their own choices and the state fleet.

The governors can play an active and personal role in promoting fuel economy by making fuel efficient choices and using fuel efficient messages, thereby linking fuel efficiency with positive attributes. Most individuals do not base their decisions on fuel efficiency and vehicle miles traveled on the dollars and cents of fuel cost savings alone. People take many actions to identify with a specific group of people and use stories to signal their membership in that group (Kurani, Turrentine, and Heffner 2006). The governor can play a critical role in defining and telling stories that identify fuel economy and petroleum use reduction with desirable group memberships.

Through speeches, policy initiatives, personal actions, and state fleet actions, the governor can help define and model the actions a citizen of their state can take. Each and every time a state acts to promote fuel economy, i.e., any time any other recommendation in this document is implemented, the governors can use these opportunities to craft and tell stories about how and why high fuel economy is important to being a “good” westerner or state citizen. These messages can emphasize that a citizen of the state is one who cares about the state's natural resources including air and water quality, wants the state to be a leader in the nation, and takes pride in how the state's citizens and government are good stewards. If the governor, and consequently the other government leaders, business leaders, and the press, define how a citizen is concerned about improved fuel economy and reducing miles traveled, peer models and pressure starts driving people towards the desired actions.

#### Sample message points on fuel efficiency

1. We live in a great State
2. As citizens we want to keep it that way and make it better for our children
3. The state has taken a leadership role in the nation
4. As a state and as national leaders, we will be taking action to...
  - Reduce fuel/ petroleum use by (state goal)
  - Reduce Greenhouse Gas emissions and improve air quality (state goal)
  - Decrease congestion (state goal)
  - If appropriate to the state... Support our farm community
5. By... (outline state level actions, examples may include fleet purchasing mandates, fuel reduction targets, funding for biofuels infrastructure, tax/ HOV/ parking incentives for fuel efficient vehicles)
6. Call on every citizen to take action to...
  - Purchase vehicles with higher fuel economy, maintain vehicles, reduce vehicle

Of the many reasons suggested to explain why consumers may not purchase high fuel efficiency vehicles is that consumers fail to internalize the future value of increased fuel efficiency, leading to a “market failure.” Remedies to such failures are usually described in terms of “getting the prices right” and improving consumer information about the value of future fuel savings. While such policies are important because they increase the attractiveness of fuel efficient vehicles, relying on these strategies alone assumes that individuals are utility-maximizing decision makers who rely entirely on economic considerations when purchasing vehicles.

However, higher automotive fuel efficiency is also an important social symbol and joining a community of people who care about fuel efficiency is an important incentive for buying fuel efficient vehicles, as demonstrated by recent work at the Institute of Transportation Studies at the University of California, Davis (Kurani, Turrentine, and Heffner 2006; Turrentine and Kurani, 2007; Heffner, Kurani, and Turrentine, 2007). Consequently, the prices of gasoline and fuel economy improvements are only part of the value of fuel efficiency for consumers. The governors can use their visibility to broadcast support for fuel efficiency and further develop the social incentives for buying fuel efficient vehicles. Kurani, Turrentine, and Heffner (2006) provide a useful description of the governor's role:

“The rising and volatile price of gasoline is not just an economic issue, but a social one as well, that is, people are talking about it. Gasoline prices, petroleum geopolitics, and automotive technologies like hybrid electric drivetrains are in the news most days, books about oil politics are on bestseller lists, and editorials regularly focus on petroleum and gasoline supplies and prices. As this conversation continues, the type of automobile each person drives increasingly will come to symbolize a position on such issues.... Early HEV buyers didn't buy just lower private fuel cost when they bought their cars. They bought, instead, a piece of a much broader future, including a less-consumptive lifestyle, smart consumer choices, clean air, lower oil consumption, and less terrorism.

A complementary strategy would be for leaders to tell better stories. In the U.S., federal energy and climate change policies are currently conflicted, at best. Leaders at intermediate levels of governance, such as mayors and governors, are beginning to tell civic narratives linking their choices to swap full-size SUVs for HEVs to civic and fiscal responsibility, reduced resource consumption, and lower GHG emissions. Telling such stories can be vital to initiating and sustaining a national conversation, a new discourse about energy, energy efficiency, carbon-free energy, global warming, future transportation, and the possibilities for positive societal changes.”

**Recommendation:** Governors should direct state research funds towards efficiency programs and lobby for increased federal support for efficiency research.

Further research and development is critical to improve fuel efficiency technologies and to identify policy strategies that support the widespread deployment of fuel-efficient practices. The governors have the ability both to lobby the federal government for increased research funding, press federal agencies to direct more research funding towards efficiency research, and to distribute a greater portion of state funds towards efficiency research. For example, states can direct resources from Petroleum Violation Escrow Funds and from State Energy Program Funds towards efficiency programs.

#### **Fuel Efficiency Research Directions**

Some of the fuel efficiency research programs that the governors could support include research into:

- Technologies that optimize fuel efficiency. Such research should include efforts to increase vehicle efficiency with alternative fuels, as well as gasoline.
- What types of maintenance practices most benefit fuel efficiency.
- Whether on-board instrumentation (eg. dashboard real-time fuel efficiency values) positively influence driver behavior.
- Evaluating fleet efficiency programs. For example, projects that study, evaluate, and document the experiences of private and public fleets that implement a 'Green Fleets' program.
- Identifying planning practices for transportation and development that lead to reduced vehicle miles traveled.
- Identifying strategies and messages that increase the appeal and attractiveness of fuel efficiency and fuel efficient cars.

**Recommendation:** Governors should create educational and labeling programs that help consumers make more informed choices related to fuel efficiency.

A wide variety of informational and educational tools have been developed to promote clean and efficient vehicles—energy and fuel economy labeling, web-based tools to facilitate individualized comparisons of vehicles, and comprehensive evaluations of all light-duty vehicles environmental performance. Examples of each include the Monroney sticker required to be posted on new cars which includes (among other information) the federal EPA fuel economy estimates for that vehicle, the federal Department of Energy's [www.fueleconomy.gov](http://www.fueleconomy.gov) website, and the American Council for an Energy Efficient Economy's (ACEEE) annual Green Car Guide [www.greenercars.com](http://www.greenercars.com). Education will be an appropriate tool to promote vehicle fuel efficiency when individual self-interest is strong and consistent with societal goals, but the target group or individual is uninformed or misinformed.

**The Department of Energy's Clean Cities Program**

An overall strategic framework for the deployment of educational tools can help support a coherent fuel efficiency message. The Department of Energy's Clean Cities program is one example of a social marketing campaign that governors could support or emulate. While Clean Cities has focused primarily on alternative fuels and electric drive vehicles, it provides a framework for participation and cooperation between businesses, civic organizations, and multiple levels of government. Western governors could support the development of:

- a new "Clean Cities-type" program focused on transportation fuel economy, or
- a new emphasis within the existing Clean Cities program on transportation fuel economy.

For more information, go to: <http://www.eere.energy.gov/cleancities/>

The governors can implement a wide variety of educational programs that support increased vehicle fuel efficiency. Some potential programs or policies include:

- Require tire labels that describe the relative fuel efficiency of different replacement tires (see box below).
- Require labels for used vehicles that describe the vehicle's fuel efficiency. The fuel efficiency of older vehicles typically decreases only incrementally over time; therefore, including the fuel efficiency rating from when the vehicle was new will still give an accurate picture of its current fuel efficiency.
- Promote vehicle maintenance programs; educate, encourage, and enable drivers to maintain vehicles, including engines, transmissions, tires, air conditioning, etc. Well-maintained vehicles can have substantially higher fuel efficiency versus poorly maintained counterparts.
- Encourage better driver behavior by integrating fuel efficiency concepts into driver training programs and questions on license exams. Drivers can significantly increase vehicle fuel efficiency by reducing aggressive driving and excessive acceleration, maintaining properly inflated tires, and reducing speeding.
- Enforce speed limits.
- Organize events with automotive manufacturers as well as local and regional businesses, governments, and civic organizations to promote good driver behavior, good vehicle maintenance practices, higher fuel economy, and setting and achieving fuel use reduction goals.

**California's Replacement Tire Labeling Law (2003)**

California's AB 844 aims to increase education and awareness of the fuel efficiency implications of different types of replacement tires. The law requires that California develop a rating and labeling program that informs the consumer of the relative fuel efficiency of different replacement tires. In addition, the law requires that all tires sold after July 1, 2008 be at least as fuel efficient, on average, as the original equipment on new passenger cars and light-duty trucks.

See the law's full text at: [info.sen.ca.gov/pub/03-04/bill/asm/ab\\_0801-0850/ab\\_844\\_bill\\_20031—1\\_chaptered.pdf](http://info.sen.ca.gov/pub/03-04/bill/asm/ab_0801-0850/ab_844_bill_20031—1_chaptered.pdf)

**Recommendation:** Reduce idling by passenger and light duty vehicles.

Consumers and fleets have become accustomed to idling vehicles for a number of reasons, but most drivers don't seem to make the connection between idle time, increased emissions and wasted fuel. The governors can take the following actions to support reduced passenger and light duty vehicle idling:

- Educate drivers on the impacts of idling and on alternatives to idling in driver's education programs and drivers license questions.
- Encourage your local schools to enforce a no-idle zone for school buses and personal vehicles.
- Encourage the purchase of hybrid electric vehicles, which limit idling at traffic stops.
- Create incentives or tax rebate programs for the purchase and installation of idle reduction technologies designed for light and medium duty vehicles, including coolant heaters, air heaters, and energy recovery systems.
- Enact and enforce anti-idling statutes

### Heavy-duty vehicles

**Recommendation:** State government should collaborate with the U.S. Environmental Protection Agency's "SmartWay" fleet program.

The U.S. Environmental Protection Agency's SmartWay Transport Partnership is a voluntary partnership between various freight industry sectors and EPA that establishes incentives for fuel efficiency improvements and greenhouse gas emissions reductions. By 2012, this initiative aims to reduce between 33 - 66 million metric tons of carbon dioxide (CO<sub>2</sub>) emissions and up to 200,000 tons of nitrogen oxide (NO<sub>x</sub>) emissions per year. At the same time, the initiative will result in fuel savings of up to 150 million barrels of oil annually.

Similar to the Green Fleets initiative, the Smart Way Partnership is focused on outcomes and technology neutral. Partners commit to measure and improve the efficiency of their freight operations, using EPA-developed tools that quantify the benefits of a number of fuel-saving strategies. Working with states, banks, and other organizations, the program provides financing to help partners purchase devices that save fuel and reduce emissions, from low rolling resistance tires to more aerodynamic cab designs or trucks with hybrid engines. The partnership is also developing a nationwide network of idle-reduction options along major transportation corridors - truck stops, travel centers, distribution hubs, rail switch yards, borders, ports, and even along the side of the road—in order to eliminate unnecessary truck and rail idling.

State governments could further the work of the Smart Way program in several ways:

- Enrolling state fleets in the program;

- Working with EPA to locate or provide financing for purchases of fuel-saving devices for any Smart Way enrolled fleet; and
- Participating in the development of reduced-idling transportation corridors.

**Recommendation:** State governments should provide incentives for purchase of medium- and heavy-duty hybrid vehicles in order to stimulate the introduction of these vehicles into the market.

The search for greater fuel efficiency for medium- and heavy-duty vehicles (both trucks and buses) is currently leading all vehicle manufacturers to develop diesel-electric (and in some cases, diesel-hydraulic) hybrid products for various applications. Applications with considerable stop-and-start operation, such as transit and school buses, beverage trucks, and pickup and delivery vehicles, are especially well suited to hybridization because hybrid vehicles typically store energy during deceleration and use it during acceleration. Currently available models include medium-duty pickup and delivery vehicles, school buses, transit buses, utility service trucks, and step vans.

**A Model Incentive Policy: The New York State Program**

Using federal Congestion Mitigation Air Quality (CMAQ) funds, New York State created a “gold standard” program to reduce emissions of criteria pollutants such as NO<sub>x</sub>, PM, CO, Ozone, SO<sub>2</sub> and lead. This program allows private-sector and non-profit fleets operating within New York City to apply for up to 80% of the incremental cost for new or converted natural gas, electric, dual-fuel (80% CNG), or hybrid electric vehicles. The program specifies that only medium and heavy-duty trucks are eligible to apply and the trucks must be purchased after the application deadline in order to qualify. Funds are awarded on a competitive basis to fleets that:

- Achieve the greatest emissions reduction per program dollar
- Reduce the greatest amount of petroleum fuel
- Leverage private and public cost-sharing for infrastructure development and vehicle acquisition
- Implement cleaner vehicles throughout the fleet, vs. a one-time program
- Offer unique and innovative partnerships and approaches to meeting priorities.

For more information, see contact Patrick Bolton at [ppb@nyserda.org](mailto:ppb@nyserda.org) or visit [www.nyserda.org/programs/transportation/afv/NYCPrivateFleet.asp](http://www.nyserda.org/programs/transportation/afv/NYCPrivateFleet.asp).

However, at the current limited production volumes of these vehicles, hybrid medium- and heavy-duty vehicles typically carry a price premium of 50% to 100% over the cost of an equivalent non-hybrid vehicle in many if not most cases. This is largely due to extremely low initial sales volumes and low production scale. Vehicle manufacturers fully expect that increasing sales volumes will lower the cost of production, thus narrowing the price differential. But the high initial price differential is a barrier to increasing sales volumes since the increased purchase price of the hybrid technology cannot be recovered by the customer over the anticipated period of time the vehicle will be used. State governments can help solve this “chicken and egg” problem by providing incentives for purchase of such vehicles until sales volumes increase to the point where the cost differential is sufficiently reduced to enable recovery of this cost over the



vehicle's expected operational lifetime. Such incentives could be in the form of grants or, in the case of non-governmental fleets, sales or income tax credits.

**Recommendation:** The governors should support state-level programs to reduce truck idling. Policy options include enacting and enforcing anti-idling statutes, providing funding assistance for truck stop electrification along major transportation corridors and ensuring that state weight limits on trucks allow for the increased weight of onboard anti-idling devices.

According to a 2006 report by Argonne National Laboratory, it was estimated that the over 13 million light and medium duty trucks used over 600 million gallons per year of fuel (gasoline and diesel) for idling. Elimination of unnecessary idling is another way of improving vehicle fuel efficiency.

Unless another source of power is provided, heavy-duty long-distance line-haul trucks must idle their engines during driver rest periods in order to operate heating or air conditioning systems as well as appliances and entertainment systems. Similarly, school buses may need to be idled to maintain comfortable interior temperatures while waiting for passengers. In most other situations, however, idling is not necessary and simply wastes fuel and increases engine wear. Unfortunately, poorly trained or inexperienced drivers often unnecessarily idle their vehicles in the belief that diesel engines are difficult to restart once they have been shut off. While this may have been true in some cases with older diesel engines, today's modern diesel engines can be easily restarted in all but the most extreme temperatures.

State governments could help eliminate unnecessary idling in three ways:

- a. Enactment of state-level statutory restrictions on idling. Over 20 states and several local jurisdictions have enacted such statutes.
- b. Improved enforcement of anti-idling statutes. Where such statutes already exist, lack of enforcement is sometimes a problem.
- c. Sponsoring driver-education programs for commercial vehicle fleets to combat the myth, widespread among poorly trained drivers, that diesel engines must never be turned off.

Where idling of medium- and heavy-duty vehicles is necessary, state governments can further the reduction or elimination of idling at truck stops by providing funding for the installation of "shore power" systems that provide electricity to parked trucks. At many truck stops, drivers will keep their engines running in order to maintain comfortable cab temperatures while resting. Truck stop electrification programs can allow truckers to run heating and air conditioning systems without needing to use their engine. Because such systems can require a significant investment by truck stop operators, state governments can facilitate the use of these systems by providing grants or loans for the installation of such systems.

Finally, the states can facilitate the installation of anti-idling devices, such as auxiliary power units, by ensuring that state weight limits on trucks allow for the increased weight

of onboard anti-idling devices. The federal Energy Policy Act of 2005 provided an increase in up to 400 pounds per vehicle in federal vehicle weight limits to accommodate and encourage the installation of onboard anti-idling devices. However, some states have failed to enact similar amendments to their own vehicle weight limits. Where this is the case, states can take positive action to encourage the use of these devices by amending their weight limits.

### Other Policy Options for Improving Tank to Wheel Efficiency

The working group discussed a number of policy opportunities to address vehicle fuel efficiency on a broad national scale. The group agreed that the Western Governors' Association should support a national cap and trade carbon dioxide program that included emissions from transportation. There was broad interest in and support for all the below policy options, but the group was unable to reach a consensus position on feebates and raising CAFE standards.

#### a) Feebates

Feebates create a market based incentive for private car buyers to purchase more fuel efficient vehicles. A feebate system provides a rebate or levies a fee on new vehicle purchases based on the vehicle's fuel efficiency. Buyers of new cars, whose fuel efficiency exceeds a certain standard, or 'pivot point,' receive rebates that reduce the sticker price, while the converse is true for buyers of new cars with lower fuel efficiency. Properly designed feebate systems should be revenue neutral, with income from levies on low fuel efficiency vehicles going to support rebates and the program's administration.

Feebates can either cover the vehicle fleet as a whole or can be 'attribute based.' Attribute based systems separate vehicles into different categories based on their interior volume or footprint. Because attribute based systems encourage car buyers to purchase the most fuel-efficient vehicle within the vehicle class of their choice, an attribute-based feebate system does not distort consumer choice. In addition, attribute based systems should allow automakers with strengths in different vehicle classes to compete within their class, rather than favoring automakers that primarily build and sell vehicles in smaller and more fuel efficient classes.

**Recommendation:** The group was unable to reach consensus on whether individual Western States should adopt individual feebate programs. However, if such a policy were to be adopted, extra benefits would be achieved if it were done so on a national or even all Western regional basis to prevent gaming of the system by consumers.

#### **Sources of additional information on feebates:**

Maryland feebate law: <http://government.westlaw.com/mdcode>

Washington, DC feebate law: see pg. 10-16,

<http://www.dccouncil.washington.dc.us/images/00001/20041217093718.pdf>

Canadian feebate law: see the 2007 Canadian budget, pg 66-70,

<http://www.budget.gc.ca/2007/pdf/bp2007e.pdf>

b) Raising and / reforming CAFÉ standards

The single most significant policy tool to encourage vehicle efficiency in the United States is one controlled by Congress. During the first ten years of its existence, the Corporate Average Fuel Economy (CAFE) standards have successfully increased average fuel economy over much of the U.S. private fleet. For the past 20 years, however, the fuel economy performance of the passenger car market has stagnated, resulting in a larger dependence on oil, an increased trade deficit, and heightened levels of greenhouse gas emissions.

In the early years of the program, the CAFE standards were gradually increased, and affected the sales-weighted average fuel economy, expressed in miles per gallon, of a manufacturer's fleet of passenger cars or light trucks weighing 8,500 pounds or less.

Currently, modifications of the CAFE standard are being discussed in Congress. Such changes could allow for implementation of national vehicle standards based on the various attributes of vehicles within the fleet such as vehicle size or class. Further, efficiency standards may be structured around providing incentives to automakers for manufacturing cars that meet performance criteria. Whatever these modifications entail however, all parties agree that changes to the standard should result in building upon and increasing the efficiency mandates currently in place. The technology exists to substantially improve fuel efficiency of the U.S. fleet. In addition, although some may view proposed changes to CAFE as an effective solution to promoting long-term fuel economy increases, other may see CAFE changes as a near term measure best used in concert with other long-term solutions. Proponents of this second approach are likely to view CAFE as one tool for increasing fuel economy and are likely to support other programs aimed at the same end result.

**Recommendation:** The Governors should encourage federal action to strengthen and improve federal fuel economy standards.

c) Nationwide cap and trade carbon program that includes transportation

A variety of emissions trading or cap and trade programs are currently being considered to address greenhouse gas emissions throughout the U.S. economy. Europe has already instituted the Emissions Trading Scheme (ETS) to coordinate economy-wide efforts to reduce greenhouse gas emissions and meet Kyoto Protocol requirements, California is currently building a policy to meet its statewide greenhouse gas policy, and a variety of cap and trade programs are already in place in the U.S. to address sulfur dioxide, nitrogen oxides and mercury pollution.

A cap and trade program that includes emissions from transportation sources could limit carbon dioxide emissions nationwide and incentivize emissions reductions from the automotive sector. By including transportation emissions with other industry sectors, this policy could distribute greenhouse gas emission reductions across all sectors of the economy and ensure that each sector shares responsibility for emission reduction efforts.

#### **Cap and Trade Programs**

In a cap and trade plan, a government agency sets a limit on carbon dioxide emissions, and then allocates allowances to companies or other groups that emit carbon. The amount of allowances is equal to the capped level of emissions, limiting carbon emissions to that level. Permit holders are allowed to trade their allowances, so that companies who reduce their carbon emissions below their number of permits can sell their allowances, and vice versa. In this manner, companies that can reduce their emissions cheaply can trade credits to those who cannot, leading to emissions reductions at the lowest possible cost to society. In California, research and policy recommendations have been developed to support the implementation of Assembly Bill 32, California's Global Warming Solutions Act. The Market Advisory Committee, a team of experts on climate policy, recently published a policy recommendation document outlining their support for a statewide cap and trade program. This document can be accessed at:

[http://www.climatechange.ca.gov/documents/2007-06-29\\_MAC\\_FINAL\\_REPORT.PDF](http://www.climatechange.ca.gov/documents/2007-06-29_MAC_FINAL_REPORT.PDF)

**Recommendation:** The Western Governors Association should support a national cap and trade carbon dioxide policy that includes emissions from transportation. A nationwide cap and trade program would have the largest impact and achieve the greatest efficiency gains; however, in the absence of federal action, the Western Governors should support state and regional level cap and trade programs that address emissions from transportation sources.

#### **Cross cutting issues: system and vehicle efficiency**

**Recommendation:** The governors should study and support innovative insurance policies like pay at the pump or pay as you drive insurance.

Vehicle insurance is regulated at the state level, and therefore represents a key opportunity for the governors to incentivize reduced fuel use. One policy that creates incentives for both more fuel-efficient vehicles and reduced vehicle miles traveled is pay at the pump insurance. With pay at the pump insurance, a minimum level of insurance policy is purchased at the fuel pump along with existing state taxes, and then is repaid back to state insurance issuers in proportion to their existing market share.<sup>1</sup>

Current auto insurance policies cost the same regardless of vehicle miles driven. While drivers are mandated to maintain a minimum level of insurance, some do not purchase

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<sup>1</sup> Insurance issuers can sell additional, higher levels of insurance to consumers independent of the program, through whichever strategy or policy they choose.

any insurance in order to save money and in hopes that they will not be caught. With our current insurance system, people who drive very little but maintain their insurance subsidize those who drive more or do not have insurance. With pay at the pump insurance, all drivers are guaranteed to hold a minimum level of insurance, and tying the cost of insurance to the level of gas consumption creates an incentive for reducing vehicle miles traveled and increasing fuel efficiency.

Pay at the pump insurance policies have been strongly supported by low-income groups. The most recent research into driving patterns found that low-income populations drove significantly fewer miles than higher income groups (EIA 1993). Surveys of support for pay at the pump insurance show that low income drivers—particularly those who do not have insurance—are strongly in favor of pay at the pump insurance, and that low-income advocacy groups strongly support such insurance policies (Khazzoom 2000).

Another opportunity to use insurance policy to incentivize reduced gas consumption is by implementing pay as you drive insurance, where drivers pay insurance rates relative to the total miles driven on an annual or monthly basis. With this system, drivers maintain an onboard record of miles traveled and insurance rates are levied proportional to the miles traveled. While this policy does not create an incentive for higher fuel economy and does not address the problem of uninsured drivers, it does create a substantial incentive for reducing vehicle miles traveled.

## Systems Efficiency

### Introduction

Energy security policies associated with fuel efficiency must target multiple issues of fuel use: fuel carbon, vehicle efficiency, and overall fuel demand. Without creating a crosscutting system of measures aimed at all three, improvements in one area can be eroded with losses in another. This section discussed policies that reduce overall fuel demand through improvements in the transportation system as a whole. Due to the unique nature of individual transportation systems and development patterns, these policies are most effective on the local and statewide scale, though regional and national approaches may be appropriate.

The measures explored in this section are characterized as systems efficiency measures because they seek to promote the use of fuel in the transportation system in the most efficient manner. The fuel efficiency team therefore recommends the Western Governor's Association require state and local transportation and planning agencies study and implement each of the measures discussed. While this list of policies is not exhaustive, the ability of state and local governments to implement such measures may be diminished within policies outside the scope of this list.

### Improving vehicle movement and traffic flow

Reducing the traffic on the road will reduce the amount of time that people need to drive to get from one place to another. Also, reducing traffic will reduce idling. It should also be noted however that improved traffic flow will open up the road for more cars and may lead more people driving. Therefore, the measures suggested to improve vehicle movement should be accompanied by measures to prevent traffic increases and land use impacts.

## **1. Short-term study and implementation recommendations**

### **a. Toll road, toll booth and toll collection planning**

Improved planning and location of toll collection stations can reduce congestion, speed traffic flow, and reduce time spent idling. Since toll booths cause drivers to slow down to pay the toll, decreasing the number of booths or improving their can improve traffic flow by minimizing impediments. Strategies involved to improve toll collection include collecting tolls at fewer locations, collecting tolls at on and off ramps rather than on main roadways, and collecting tolls based on distance and time of day.

Increasing the availability and use of automated toll collection will result in more drivers passing through toll collection areas at higher speeds. Since more cars can proceed through a toll collection point in a given period of time, less congestion will result in the area around the toll station. Policies to incentivize drivers to acquire automated toll payment devices as well as policies developed to standardize toll payment devices across tolling systems will therefore increase the overall number of cars that can proceed through toll centers and will improve traffic flow. Such policies involve increasing the points of purchase and ease of access of toll payment devices, making toll payment devices useful for alternative purposes (e.g. parking at airports), and improving marketing.<sup>2</sup>

## **2. Medium-term study and implementation recommendations**

### **a. Cordon road pricing<sup>3</sup> and congestion pricing<sup>4</sup>**

Under a cordon pricing (or road pricing) system, motorists pay directly for driving in a particular cordoned area (or on a particular roadway), with tolls collected at control points in booths or from electronic collection devices. This type of transportation control has been used in Singapore since 1975, and more recently in other cities like Oslo, Stockholm, Rome and London. Coupled with the collection of revenue, these programs typically involve increased spending on public transportation infrastructure both within the cordoned area as well as on routes into the cordoned area. Studies of the success of

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<sup>2</sup> FasTrak Strategic Plan, May 2006 [http://www.mtc.ca.gov/services/fastrak/FasTrakStrategicPlan-Final\\_Draft.doc](http://www.mtc.ca.gov/services/fastrak/FasTrakStrategicPlan-Final_Draft.doc)

<sup>3</sup> Win-Win Emission Reduction Strategies, Todd Litman, Victoria Transport Policy Institute, 27 April, 2007

<sup>4</sup> Traffic Congestion, Congestion Pricing, and the Price of Using California's Freeways, Bradley Flamm and Gregory Rosston, Stanford Institute for Economic Policy Research (2005) - [http://siepr.stanford.edu/Papers/briefs/policybrief\\_apr05.pdf](http://siepr.stanford.edu/Papers/briefs/policybrief_apr05.pdf)

these programs indicate that increased ridership of public transportation and increased walking and biking have resulted, thus leading to overall transportation system efficiency improvement.<sup>5</sup>

Congestion pricing is similar to road pricing in that it involves payment of money to drive on a particular road or road lane. However, congestion pricing is different than fixed road pricing because it involves fluctuating toll payments based on the time of day (with the highest price occurring during peak traffic periods). Congestion pricing may occur in one of a few different configurations. In southern California, some roadways use congestion pricing to allow single occupancy drivers to pay money to access to special high occupancy vehicle (HOV) lanes for driving, with fluctuating prices based on the time of day. Also in southern California, some other roadways use congestion pricing to change toll prices for all vehicles passing through toll booths depending on the time of day. Such price fluctuation systems are aimed at encouraging drivers to avoid making unnecessary trips during these times and to change their commute habits.

### **3. Long-term study and implementation recommendations**

#### **a. Freight management (put in mode shifting)**

Freight Transport Management involves strategies to increase the efficiency of freight and commercial transport. These strategies involve “mode shifting” (changing distribution practices to involve more resource efficient modes like rail and marine), changing freight movement times to periods of decreased traffic congestion (night-time shipping), and better location of industrial locations to improve distribution efficiency. Policies aimed at improving freight management will tend to improve traffic flow for both passenger vehicles and heavy-duty trucks on roadways and may cause improvements in freight movement delivery times.<sup>6</sup>

### **Reducing Vehicle Miles Traveled**

Inducing people to decrease their Vehicle Miles Traveled (VMT) will cause fuel use reductions and will lead to overall use of more efficient methods of transportation. Such demand reduction can be achieved with the implementation of policies that create incentives to avoid driving, carpool, use public transit, or otherwise reduce VMTs.

### **1. Short-term study and implementation recommendations**

#### **a. Parking cash-out programs<sup>7</sup>**

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<sup>5</sup> Transport’s Role in Sustaining the UK’s Productivity and Competitiveness - The Case For Action: Sir Rod Eddington's advice to Government, December 2006, United Kingdom Department for Transport <http://www.dft.gov.uk/162259/187604/206711/executivesummary>

<sup>6</sup> Win-Win Emission Reduction Strategies, Todd Litman, Victoria Transport Policy Institute, 27 April, 2007. <http://www.vtpi.org/wwclimate.pdf>

<sup>7</sup> <http://www.bwc.gov/pdf/parkingcash.pdf>

Under parking cash out programs, employers give employees a choice to keep a parking space at work, or to accept a cash payment and give up the parking space. These programs are seen as one of the most effective means to encourage employees not to drive alone to work, and can be implemented by state law (e.g. California's Parking Cash-Out Law)<sup>8</sup> or through incentive based programs such as the Best Workplaces for Commuters program sponsored by US EPA and US DOT. Although any employer who pays for parking can implement parking cash out, these programs work best for employers who lease, rather than own, parking.

b. Parking pricing<sup>9</sup>

Parking pricing means that motorists pay directly for using parking facilities. This is facilitated by using better pricing methods that accommodate various payment options and only charge motorists for the amount of time they are parked. Programs that force motorists to internalize parking fees induce the assessment of whether driving to and from their place of destination is worth the added expense of parking.

c. Promoting telecommuting<sup>10</sup>

Telecommuting policies at places of business that allow employees to work from satellite locations reduce overall VMT and fuel use because employees do not have to expend fuel to get to and from the workplace on the days they telecommute. Studies at companies such as British Telecom and AT & T have found that employee productivity and retention may be improved due to the offering of telecommuting to employees.

## **2. Medium-term study and implementation recommendations**

a. Pay-as-you-drive pricing<sup>11</sup>

Pay-As-You-Drive (PAYD) pricing (also called Distance-Based and Mileage-Based pricing) is a system that connects vehicle insurance, registration, taxes or leasing fees to the annual mileage driven. The more a car is driven, the more the owner pays, and vice versa. Such a system creates an incentive to drive less because people pay for added insurance costs and vehicle fees with each extra mile. Although PAYD pricing requires odometer audits at regular intervals. However, once an audit system is established, other pricing systems based on mileage become possible. Currently, states such as California, Texas, Washington, Minnesota and Oregon have all incurred some action within their borders toward starting PAYD pricing ranging from legislative mandate to court orders.

b. Mass Transit and ridesharing improvements

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<sup>8</sup> <http://www.arb.ca.gov/planning/tsaq/cashout/cashout.htm>

<sup>9</sup> Parking Pricing, TDM Encyclopedia, Victoria Transport Policy Institute, <http://www.vtpi.org/tdm/tdm26.htm>

<sup>10</sup> The Telework Coalition: <http://www.telcoa.org/>

<sup>11</sup> <http://www.environmentaldefense.org/article.cfm?ContentID=2205>



Policies to improve mass transit and encourage people to use multiple passenger transportation systems decrease overall fuel use by improving alternatives to driving. Such policies include increased overall spending and eliminating state constitutional restrictions that bar or limit use of highway user fees and gas taxes to pay for transit and other transportation modes. Examples of improvements in mass transit systems include decreasing headways between buses and trains (the time between each bus or train) and adding more routes to make taking mass transit easier and more appealing. Further examples include improving transit vehicle comfort, lowering and making fares more convenient, improving user information, improving transit marketing programs, planning transit around development, improving transit security, and providing special services such as commuter express buses and special event shuttles all tend to increase ridership improve overall use.

One working example of transit improvement are Bus Rapid Transit (BRT) programs that use buses that provide high capacity and high-speed rail-like service through the design of special vehicles and infrastructure.<sup>12</sup> Such a program was implemented Honolulu, HI, and lead to the steady growth of rider-ship from 100,000 riders in 1999 to 630,000 riders in 2005.

Examples of improvements in ridesharing include increasing high occupancy vehicle (HOV) traffic assistance and sponsoring HOV programs. Such programs increase the appeal of carpooling, thus reducing the overall number of cars on the road.

#### c. Car share programs<sup>13</sup>

Car sharing refers to automobile rental services intended to substitute for private vehicle ownership. While it is similar to car rental, people can use the car sharing vehicle for as little as a half-hour and the cars are located in the communities rather than at a central car rental location.

Car sharing began in Switzerland in the 1980's and has expanded throughout Europe and in North American cities such as Seattle, Chicago, Portland, Long Beach, Los Angeles, Denver, San Diego, San Francisco, Toronto, Boston, New York, and Washington, DC. In these cities, for-profit or non-profit organizations maintain the car sharing fleet and reservation website. Payment is based on per hour and per mile fees.

Because car sharing has low fixed costs and high variable costs that are based on miles driven, it encourages users to minimize their driving and use alternatives when possible. Further, car sharing can induce people to not own a vehicle, thus decreasing the number of overall vehicles on the road, leading to increased system efficiency.

#### d. Walking and cycling improvements

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<sup>12</sup> <http://www.calstart.org/programs/brt/new/index.php>

<sup>13</sup> Win-Win Emission Reduction Strategies, Todd Litman, Victoria Transport Policy Institute, 27 April, 2007. <http://www.vtpi.org/wwclimate.pdf>

Increasing the potential for citizens to walk and cycle requires improved and increased facilities (sidewalks, crosswalks, paths and bicycle parking), traffic calming, shortcuts, street scaping, encouragement programs, and more mixed land use (so more activities are within walking distance). Policies aimed at improving walking and cycling induce people to assess whether they can get to their destination without driving and thus decreases the overall number of cars on the road.

One general method to improve in this area involves the adoption of complete streets policies sponsored by the National Complete Streets Coalition.<sup>14</sup>

One specific method to improve cycling is to build or improve bicycle stations at major transit stops. Providing bike lockers, bike racks, and guarded bicycle parking at transit stops can free up car parking spaces for those who can't bike or who live too far to bike to transit, while offering a low cost healthy way for those 1/2 mile to 2 miles from the transit station or stop get to and from transit. An example of this approach first occurred in 1996 when the City of Long Beach implemented the nation's first attended bicycle parking facility, or "Bikestation." These facilities have since opened in the communities of Palo Alto and Berkeley and are under development in San Francisco, Denver, Seattle, Santa Barbara, Los Angeles and Pittsburgh, Pennsylvania and provide a range of clean transportation options--including secure, bicycle parking, bicycle repairs and accessory sales, changing and restrooms, and bicycle rentals.<sup>15</sup>

e. Individualized Transportation Marketing<sup>16</sup>

Implementation of soft policies to improve people's perceptions and awareness of infrastructure and services available to them are proven methods to increase utilization of mass transit systems. Such programs target individual's households and educate them about the vehicle trips they make and how those can be decreased by the use of alternate methods of transportation. Examples of successful programs are taking place in Europe and Australia as well as in Portland, Oregon<sup>17</sup>

f. Green Mortgage programs<sup>18</sup>

Location Efficient Mortgages (or Green Mortgages) provide discounted mortgages to people who buy homes in compact, energy efficient, mixed-use communities serviced by public transportation. Lenders recognize that living in these types of communities reduces the homebuyer's need to drive, thereby lessening the homebuyer's transportation and energy costs. Green mortgage programs must be integrated into a comprehensive location efficiency strategy for new and existing housing in order to achieve effective

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<sup>14</sup> Complete the Streets: <http://www.completestreets.org/>

<sup>15</sup> [www.bikestation.org](http://www.bikestation.org)

<sup>16</sup> FTA Individualized Marketing Campaign Demonstration, [http://www.fta.dot.gov/assistance/technology/research\\_4505.html](http://www.fta.dot.gov/assistance/technology/research_4505.html)

<sup>17</sup> [http://www.oregon.gov/ODOT/PT/PROGRAMS/TRANS\\_OPTIONS/TRAVEL\\_SMART/TravelSmartMar07Rpt.pdf](http://www.oregon.gov/ODOT/PT/PROGRAMS/TRANS_OPTIONS/TRAVEL_SMART/TravelSmartMar07Rpt.pdf)

<sup>18</sup> Land Use, Transit & Travel Demand Management, (Dierkers et al. 2007) [http://www.ccap.org/images/guidebook/CCAP\\_Transportation\\_Guidebook\\_Part1.pdf](http://www.ccap.org/images/guidebook/CCAP_Transportation_Guidebook_Part1.pdf)

emissions reductions. Further, if green mortgages are used to incentivize infill/brownfield or transit friendly housing developments, air quality co-benefits improvements can be substantial by reducing overall vehicle use.

### **3. Long-term study and implementation recommendations**

#### **a. Smart growth planning - Re-development within City Centers**

Most metro regions contain ample redevelopment opportunities, which may include old industrial sites (brownfields), empty shopping malls (greyfields), and vacant lots. Such properties tend to have existing infrastructure (roads, water, sewer and other utilities), are large enough to accommodate entire new neighborhoods with a mix of homes, shops, offices, civic buildings and parks, linked together by a grid of streets and sidewalks. Developing these areas reduces the pressure for development outside of established communities with pre-existing infrastructure.

Policies to facilitate the restoration of older buildings, abandoned properties, vacant buildings, tax delinquent homes, empty historic buildings, or other potentially useful properties are all examples of smart growth methods and can lead to increased investment in city centers and infill. Further examples aimed at smart growth re-development include the reform of state and city tax foreclosure laws and initiation of improved inventory and tracking systems to more quickly identify negligent owners of abandoned properties and transfer them to new investors.

#### **b. Smart growth planning - Encourage Accessory Apartments Near Jobs and Transit**

Many people end up living far from work because they cannot find affordable housing closer by, and in many cases, affordable housing is not present because local zoning codes impede homeowners from developing invisible infill affordable housing – accessory apartments. One policy to change this is requiring transportation plans to consider how affordable accessory housing units in areas near transit and job centers, more opportunities for live-work space, and more transit oriented development could cut traffic and to identify barriers to these forms of market-based community development. Also, reforming zoning codes that make it difficult, costly, and time-consuming to create accessory apartments in neighborhoods near transit and job centers and provide technical assistance to homeowners interested in creating such units in these areas can be useful steps forward.

#### **c. Smart Growth Planning - Creating and nurturing thriving, mixed-use centers of activity outside of city centers**

Policies to create and support smart growth strategies in housing developments outside of city centers minimize the increased use of vehicles associated with urban sprawl. One such policy is to promote transit-oriented development (TOD): creating mixed-income housing, shops and offices around train stations and bus stops. Another important

strategy involves rezoning to permit multifamily housing in and around the jobs-rich “edge cities”. This can make it possible for more people to live near work while also introducing the residents needed to support neighborhood retail.

#### d. Improving the Livability of City Centers

In addition to specific legal and regulatory reform, aiming policies at making city centers safe and attractive and allowing for more walking and safe bicycling also work to promote growth in city center.<sup>19</sup> One example of this is the city of Chicago, which earned the 2006 City Livability Award from the US Conference of Mayors.<sup>20</sup>

#### e. Requiring use of up to date transportation demand models

Transportation demand modeling (TDM) has been used for many years to predict effects of new development on roadway congestion and mass transit ridership. However, predictive models in use today by many metropolitan planning organizations are out of date and do not use location efficiency and transit access variables developed over the last decade. Such variables take into account the effect that increasing density within pre-established cities has on the use of existing public infrastructure and vehicle trip reductions. Therefore, many planners may be failing to accurately account for the benefits of urban infill and smart growth; and may be discounting development strategies with recognized benefits and VMT reduction potential.

Potential improvements in transportation demand models range from quick fixes that involve simple computer program modifications to complete modeling overhauls. One example approach for mandating such overhauls can be seen in California’s AB 1020 (2006).<sup>21</sup>

#### f. Using Public Money Efficiently

The use of government dollars to improve transportation system efficiency is important to avoid negative impacts altogether and to get the largest benefit for money spent. Two methods to achieve this end goal are 1) tying environmental performance criteria to new funding expenditures and 2) requiring the use of a mix of policy options to achieve the desired end result.

Injecting transportation system efficiency and environmental performance criteria into public funding distribution can lead to development projects that are efficient at the outset. For example, implementing policies that require state agencies to choose competitive bid projects based on best environmental performance criteria will lead to project bids that have thoughtful transportation and smart-growth planning embedded

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<sup>19</sup> See FN 4

<sup>20</sup> [http://www.usmayors.org/74thAnnualMeeting/citylivability\\_060306.pdf](http://www.usmayors.org/74thAnnualMeeting/citylivability_060306.pdf)

<sup>21</sup> [http://info.sen.ca.gov/pub/05-06/bill/asm/ab\\_1001-1050/ab\\_1020\\_bill\\_20060828\\_enrolled.pdf](http://info.sen.ca.gov/pub/05-06/bill/asm/ab_1001-1050/ab_1020_bill_20060828_enrolled.pdf)

within. Such a debate is ongoing in California over the recent passage on a 19.9 billion dollar transportation bond ballot measure 1B.<sup>22</sup>

Comparing and selecting transportation system efficiency options with the highest rate of return supports the economy while protecting the environment and promoting an inclusive society. Since efficiency improvement options include a wide range of alternatives (e.g. encouraging changes in behaviors, making better use of existing assets, investing in capacity increases, creating new fixed infrastructure), it is important to identify the mix that best meets policy goals. In many cases, smaller projects offer the highest returns since they can be targeted at specific bottlenecks on the transport system at relatively low cost.<sup>23</sup>

### **Focus on Cutting Carbon during Transportation related decision-making**

When state and local governments are faced with making transportation related decisions over areas they unambiguously control, focusing on cutting carbon will lead to overall fuel use reductions and efficiency improvements. One way to achieve this is to institute both fiscal and planning reforms so current policies are "carbon sensitive."

Instituting "carbon sensitive" policy reform has already begun occurring at the local level. Such reforms include the creation of reporting and evaluation requirements that lay out the climate impact of decisions. One such program was created in King County, Washington in 2006 by executive order.<sup>24</sup> Stronger reforms in the future may include a requirement to select the least-GHG-emitting alternative.

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<sup>22</sup> [http://www.sen.ca.gov/ftp/SEN/COMMITTEE/STANDING/TRANSPORTATION/\\_home/3-6-07Background.doc](http://www.sen.ca.gov/ftp/SEN/COMMITTEE/STANDING/TRANSPORTATION/_home/3-6-07Background.doc)

<sup>23</sup> See FN 4

<sup>24</sup> <http://www.kingcounty.gov/exec/globalwarming/execorders.aspx#transit>

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