

Background Paper Strategies To Reduce Greenhouse Gas In Florida

Background

This paper provides background information for the upcoming workshops on Transportation System Strategies to Reduce Greenhouse Gases (GHG) in Florida that Support Healthy Communities. Three workshops are planned (May 28th in Tallahassee, June 16th in Orlando and June 17th, Ft. Lauderdale).

These workshops bring transportation, planning and health officials together to identify and develop practices supporting transportation and environmental actions to lower greenhouse gas emissions. Anticipated benefits include identifying and fostering transportation and land use policy and projects that working together will reduce greenhouse gases and provide clear public health and environmental benefits. This workshop will emphasize transportation mobility options, efficiencies in the management of the transportation network and, through better coordination and planning foster more compact and multimodal development patterns.

Underway in Florida and around the world is the beginning of a generational effort to address climate change by stalling, and eventually reducing, emissions of greenhouse gases. A vital part of this effort will be for each state, regional entity and community to incorporate energy reduction and environmental sustainability principles into transportation and land use design policy and practice.

Accumulating evidence worldwide has documented how human related actions are affecting the earth's climate –potential impacts include increases in air and water temperatures, increases in more intense and heavy rainfall and rising sea levels. Currently, the U.S. is the world's largest energy consumer and largest greenhouse gas (“GHG”) emitter. According to the Environmental Protection Agency and the U.S. Department of Energy, approximately 30 percent of the United State's greenhouse gas emissions are produced by mobile sources. Private vehicles are the largest contributors to household “carbon foot prints”—accounting for 55 percent of carbon emissions from U.S. households—while 85 percent of transportation sector emissions are related to the transportation systems. Americans travel an overall average of about 15 billion miles a day, mostly by car and truck with single user. North America, with only five percent of the world's population, is responsible for one-quarter of the 85 million barrels of petroleum consumed worldwide every day.

Reducing greenhouse gas emissions from the transportation sector involves three primary actions – improving the fuel efficiency of vehicles, reducing the carbon content of fuel and reducing the growth in travel. This workshop will focus on strategies to reduce the growth in travel by changing travel behavior, reducing growth in vehicle miles traveled, and improving the efficiency of the transportation network. Part of these efforts include changes in land use patterns that can reduce the growth of vehicle miles traveled by enabling individuals to make fewer trips, make shorter trips, or use alternative transportation modes.

The importance of these overall efforts has been recently highlighted by U.S. Department of Housing and Urban Development (HUD) Secretary Shaun Donovan's and U.S. Department of Transportation (DOT) Secretary Ray LaHood's announcement of a new partnership to help American families gain better access to affordable housing, more transportation options, and lower transportation costs.

They noted that the average working American family spends nearly 60 percent of its budget on housing and transportation costs, making these two areas the largest expenses for American families. Both Donovan and LaHood want to seek ways to cut these costs by focusing their efforts on creating affordable, sustainable communities. These new efforts are particularly important to Florida families that have generally have land use patterns and transportation networks that are respectively sprawling and automobile dependent.

I.) In Florida, the transportation sector accounts for almost 40 percent of all greenhouse gas emissions that contribute to climate change. Changing land use patterns and encouraging more “sustainable” land use and regional visions that support land use outcomes that reduce the growth of vehicle miles traveled such as urban infill and redevelopment and transit oriented development is an important strategy. Economics, existing government policies and a lack of alternative modes in travel supported by sprawling development patterns have fostered unsustainable growth by focusing investment on new road construction and widening roads at the fringes of our developed communities, and calculating investment needs and pay-in on personal vehicle travel in cars at the expense of alternative transportation modes and development design. The end result has been that most people have few choices but to drive—and often to drive long, roundabout distances — to complete the daily mix of places where they work, shop, and conduct and carry-on other activities. As long as energy was cheap, and development and consumer loans easy to get, the arguments against sprawling development were largely academic. The economics of cheap energy and cheap property at the developing community fringe, more often than not, trumped efforts to invest in compact or urban infill development. Singular transportation investment over several decades at federal, state, regional and local levels directed at almost exclusively at arterial road extensions and widening provided the necessary governmental subsidy to landowners and developers to sprawl outwardly - following the money.

This is highlighted by following the money or capital investments trails in Florida that include presumptive funding directives favoring highway development and maintenance over other modes of transportation or community development patterns that reduce the road size and need for extensions. There are many factors contributing to Florida's situation. Important to these is that significant changes that have occurred in the U.S. as well as Florida over the last 50 years:

Growing Travel Demand & Population

- ▶ Between 1950 and 2007, the U.S. population has doubled from 150 million to 300 million. Florida's population grew at least five times during that same period from 2.8 million in 1950 to approximately 18.5 million in 2008. Florida's population is now 6 percent of the national total.
 - ▶ Between 2000 and 2007, Florida's population grew at an average of 2.3 percent per year. From April 1, 2006 to April 1, 2007, Florida added 907 persons per day.
 - ▶ The nation's GDP has grown from \$345 billion to \$13 trillion. Florida 2007 portion of GDP out of the 50 states is about 5.3% or \$734,519,000.
 - ▶ Since 1970, imports to the U.S. have tripled and exports have doubled.
- ### **Florida Travel Behavior and Travel Levels**
- ▶ The use of highways has become the primary mode of choice for most Americans. The 2001 National Household Survey (the last survey completed by U.S. Department of Transportation) found that 87 percent of daily trips involved the use of personal vehicles.
 - ▶ According to the Federal Highway Administration ("FHWA"), VMT has grown three times faster than the U.S. population, and almost twice as fast as vehicle registrations.
 - ▶ In 2007 there were more than 2.99 trillion vehicles miles traveled, nearly 5 times the level experienced in 1955.

Transportation System

System Performance

- ▶ From 2000 to 2007 VMT increased by 18.1% while lane miles increased by 5.3%.
- ▶ Growth in person-hours of delay continues to outpace growth in VMT, population and lane miles.
- ▶ Florida's roads are more heavily traveled than those of other states.

Transportation Impacts

- ▶ Land use, economic development, and mitigation patterns of the last fifty years have spread homes, businesses, and the surface transportation network farther from dense city centers where public transit infrastructure had largely been built.
- ### **Expenditures and Costs**
- ▶ The funding necessary to maintain what we have built and then to cover what we need to handle anticipate growth is falling short. An estimated shortfall of \$58 billion in funding over the next 25 years, Florida's transportation system must maintain and grow where necessary an estimated 122,000 centerline miles of public roads, 127 public aviation facilities, 2,800 miles of rail and 14 deepwater seaports. Florida needs \$200 billion over the next 20 years for infrastructure needs... "see findings: bridges, highways, transit and ports" attributed to 2008 Report Card on the state's infrastructure needs for the Florida Section of the American Society of Civil Engineers.

II.) Approaching the Reduction of Greenhouse Gases

Though no one approach encapsulates the full breadth of the objectives of energy reduction and environmental sustainability, various strategies are being employed to meet emerging energy and environmental goals, such as:

- ▶ Employing practices in design and capital construction, such as using sustainable building materials, recycled materials, and solar and other renewable energy sources to make facilities as “green” as possible.
- ▶ Employing practices in operations and maintenance such as: increasing fuel efficiency and reducing emissions, creating and using energy-efficient lighting.
- ▶ Employing community-based strategies to encourage land use and transit-oriented development designed to increase public transit ridership, walking, and bicycling.
- ▶ Employing transportation network efficiencies practices in the design and operation of existing and newly developed network components.

Big on the list of possibilities are land use and transportation choices that each can be combined to reduce the carbon footprint and have beneficial impacts on energy supply and our living environments. In addition to creating a sprawling transportation system that contributes high volumes of greenhouse gases to the atmosphere, the developed system has been noted for how it contributes to fragmenting communities and landscapes, isolates segments of the population that are not able to drive and encourages individuals to minimize body movement (walking, biking) which contribute to a variety of health issues. Broad issues of community and transportation system design that need attention relative to efforts to reduce greenhouse gases are:

- Individual well-being and health benefits that can be gained by supporting more compact community designs where walkable and multimodal transportation approaches can compete well against personal automobile usage. Public health entities and organizations regularly present research and information that diabetes, heart and arterial health as well as mental health can each benefit by improvements to community design that encourage more walking and less automobile usage.
- Encouraging better local transit options to serve working citizens, our large retiree population and tourist. This includes the expanded use of integrated buses and light rail systems that link directly and efficiently to other intra or inter state and international transportation linkage nodes.
- Identifying federal and state disincentives for compact-transportation integrative urban designs and pursue policy and/or funding changes that may redress these problems.
- Emphasizing fiscal and environmental conservatism, where only the most necessary and strategic new highways segments will be considered for funding after demonstrating that strong growth management controls have been set in place, wildlife connectivity and surface and groundwater hydrology issues have been addressed; and, real transportation alternatives to automobile dependency have are programmed and funded. This requires the fostering and encouraging of state level governance and leadership (needs federal coordination too).

- Reducing travel times, idling time and “in traffic” time for motorist. In general, emissions tend to increase as average vehicle speed decreases.
- Reduce the vehicle miles travelled per auto.

In recent years, however, there has been a significant decline in the performance of the national and Florida transportation systems, with many aspects of the transportation network operating at or near capacity and little monies available to address the problems. The Texas Transportation Institute’s 2007 Urban Mobility Report found that in 2005, 4.2 billion hours of travel delay resulted in 2.9 billion gallons of additional fuel used per year. This wasted fuel and time translated into a total congestion cost of \$78.2 billion in 2005--\$5.1 billion higher than a year earlier—and that in 2005, drivers in 28 metropolitan areas experienced 40 or more hours of delay per year.

In comparison, according to a recent study, if Americans used public transit at the same rate as Europeans – for roughly 10 percent of their daily travel needs – the United States could reduce its dependence on imported oil by more than 40 percent, nearly equal to all of the crude oil that we import from Saudi Arabia each year. A February 2008 report by ICF International found that a person, who switches a 20-mile round trip commute alone by car to existing public transportation, can reduce his or her annual carbon dioxide emissions by 4,800 pounds per year, equal to a 10 percent reduction in all GHG produced by a typical two-adult, two-car household.

Recently, several groups, including the American Association of State Highway and Transportation Officials (AASHTO) has called for the annual growth in VMT to be cut by one-half to lower emissions and address air quality concerns. "In its July 2007 publication, *A New Vision for the 21st Century*, AASHTO noted that 'global climate change has become a political, environmental, and economic fact of life.' That report identified bold but achievable goals for reducing greenhouse gas emissions from road transportation:

- Support the President's goal to reduce oil consumption 20 percent in 10 years. Double the fuel efficiency of passenger cars and light trucks;
- Double transit ridership by 2030, and significantly expand the market share of passengers and freight moved by rail;
- Reduce the growth in vehicle miles traveled (VMT)—from 3 trillion in 2006 to 5 trillion, rather than the projected 7 trillion, by 2055.
- Increase the percentage of those who car pool, walk, bike, or work at home.

In addition to reducing the growth in vehicle miles traveled, AASHTO recommends technological innovation in vehicles and fuels (hybrids, biofuels, and hydrogen fuel cell vehicles), operational strategies (congestion relief and driver behavior) and policy toolbox (research and development funding, vehicle emission standards, low carbon fuel standards, road pricing and vehicle miles traveled tax, cap and trade program/carbon tax, consumer incentives and education campaigns

According to the American Public Transportation Association, over 10 billion passengers used public transportation in 2007, the highest level in 50 years, while 2008 figures were on track to again break that record. In Florida though, the existence of transportation modal options is so under-developed, that there are often no viable transportation options available to a person other than driving.

Slowing growth in vehicle miles traveled and improving the transportation system efficiency will require improved travel choices (walking, biking, transit and ride-sharing), smart growth planning land use development patterns, complementary demand management policies (pricing, parking, telework) and more efficient freight movement (rail).

Smart growth refers to an integrated approach to development encompassing land use, transportation and building design and location. There is mounting evidence that smart growth development patterns can increase travel and housing choices, reduce vehicle miles traveled and greenhouse gas emissions and foster infrastructure cost savings. Efficient land use patterns that increase travel choices are a critical complement to improved vehicles and fuels (Source: Center for Clean Air Policy: Transportation and Climate Change). Program

III. A Roadmap to Policy Reforms – Can Florida Get from Here to There?

The Environmental Law Institute suggests a new policy framework for a sustainable future that responds to climate change and increases in greenhouse gas emissions. In their new book entitled *Agenda for a Sustainable America*, the authors call for policy reforms at all levels of government that shift emphasis away from new and expanded roads and toward transportation investments that revitalize existing communities, encourage compact development patterns, and reduce the miles we drive.

Recommendations include:

- ***Fix It First.*** A “fix it first” approach would increase the efficiency and safety of our transportation infrastructure and would reduce land consumption and other adverse impacts of new road projects. Many existing facilities are in poor or only fair condition, and many bridges are deficient.
- ***Provide and Promote Transportation Choices.*** These should include freight rail, light rail, high-speed rail, buses, rapid transit, bicycling, and walking. In addition, improvements in connectivity within, and between, these various modes of transportation need to be given higher priorities. Presently little choice is available in Florida, and by default most everyone has to drive by auto to get anywhere.
- ***Link Transportation and Land Use, and Promote Smarter Growth.*** Low-density sprawl typically makes driving the only realistic transportation option. Land development policies should be aimed at promoting “traditional” development patterns that place people closer to jobs, shopping, and other activities. Linking transportation and land use and promoting smarter growth can occur by re-evaluation of existing communities to enhance street networks to provide more route choices and interconnections, which can reduce driving and

congestion. Within older or new developed areas opportunities to develop and better integrate alternate transportation modes such as trolleys and urban light rails should be sought and acted upon. Planning and constructing such options and integrated transportation networks in Florida communities will help drive land use density and intensity decisions. Availability and proximity to such alternatives helps to drive up the density and mix of land uses to levels that eventually produce necessary revenues.

- ***Reduce Subsidies That Mask the Cost of Driving.*** Current government spending policies provide billions in direct and indirect subsidies that mask the true costs of driving. Identifying and reducing these subsidies and more accurate pricing would reduce driving and boost demand for more efficient, cleaner vehicles and modes of transportation. In development planning, one example is parking requirements that rely on peak parking needs - and thus use significant and costly lands. Such requirements lower the possible density and intensity of possible land uses - this is a subsidy carried by private developers and businesses that is unnecessary and promotes wasteful use of urban space. Another subsidy is use of tax revenues to constantly finance the extension or widening of roads in support development beyond existing community growth bounds or to allow existing components of the State's SIS to be used as local roads without recouping the financial cost to the State of the eventual need to expand or relocate the congested components.
- ***Promote Cleaner, More Efficient Vehicles.*** The average fuel economy of motor vehicles in the U.S. was higher 20 years ago than it is today. Higher efficiency standards and development of alternative fuels and vehicles could greatly decrease oil use and tailpipe emissions. A start to this can be that all government owned fleets lead the way in efficiency and use of alternate fuels.

IV.) Key Transportation System Opportunities

Florida communities and agencies have new opportunities to reduce greenhouse gas emissions from transportation sources. Three principal means to reduce greenhouse gas emissions involve:

- **Fuel Efficiency/Economy Focused** - Improving the fuel efficiency can follow several differing approaches. One approach is more industry and federal or state government driven, wherein vehicles produced are required to meet minimum efficiency standards such as 20, 30 or 40+ miles per gallon of fuel burned. Another fuel efficiency improvement approach is to work within a transportation network to reduce congestion and delay (improved travel flow and signal timing, less idling, electronic and open tolling, rapid incident response and information).
- **Carbon Content/Fuels Focused** - Reducing the carbon content of fuel to reduce greenhouse gases may occur by substituting existing gasoline and diesel fuels with lower GHG emissions fuels or arrangements. For example, using

replacement fuels such as hydrogen, alcohol, compressed gas; or using electric/gas hybrids to reduce the volume of GHG produced by vehicles is a viable approach.

- **Vehicle Travel Focused** - Reducing the growth in travel by reducing the number of trips or by making trips more efficient (employer based strategies such as carpooling, vanpooling and telecommuting, funding alternative modes - transit/passenger rail and bicycle and pedestrian improvements, congestion and pricing strategies, expansion of rail for freight, sustainable development patterns and road network efficiencies).

<u>Vehicle Travel Focused</u>	<u>Fuel Economy Focused</u>	<u>Carbon Content/Fuels Focused</u>
<p>Travel Pricing</p> <ul style="list-style-type: none"> ▶ Road pricing ▶ VMT/Mobility fees ▶ Fuel pricing <p>Provisions for Alternative Modes</p> <ul style="list-style-type: none"> ▶ Transit investment ▶ Bicycle support strategies ▶ HOV lanes ▶ Park-and-ride facilities <p>Parking Management</p> <ul style="list-style-type: none"> ▶ Parking pricing ▶ Mandatory parking cash-out ▶ Parking supply limits <p>Land Use Planning</p> <ul style="list-style-type: none"> ▶ Increasing density, mix of uses, and transit oriented development ▶ Pedestrian environment improvements <p>Other-reduction Measures:</p> <ul style="list-style-type: none"> ▶ Telecommuting ▶ Compressed work weeks ▶ Restrictions on vehicle use 	<p>Improving Traffic Operations</p> <ul style="list-style-type: none"> ▶ Traffic flow improvements ▶ Speed limits ▶ Driver education <p>Vehicle Technology Improvements</p> <ul style="list-style-type: none"> ▶ Mandates on new vehicle fuel economy (CAFÉ) ▶ Research and development on fuel economy <p>Changing Vehicle Purchase/Retirement Decisions:</p> <ul style="list-style-type: none"> ▶ Disseminate fuel economy information ▶ Vehicle efficiency tax or feebates ▶ Emissions-based vehicle registration fees ▶ Vehicle retirement & buyback programs. 	<ul style="list-style-type: none"> ▶ Alternative fuel vehicle (AFV) mandates ▶ Research and development on fuel and AFVs ▶ Carbon taxes or differential taxes for fuels <p>Notes:</p> <p>*Fuel pricing may reduce VMT and improve vehicle fuel economy. It is discussed once in order to reduce travel repetition. All strategies that reduce travel may also improve fuel economy as a secondary effect (by reducing traffic congestion).</p> <p>*Vehicle technology improvement efforts Have involved study of alternative fuel vehicles in addition to improvements to conventional gasoline vehicles.</p>

From: Chapter 5 of Transportation and Global Climate Change: a Review and Analysis of the Literature – Federal Highway Administration <http://www.fhwa.dot.gov/environment/lit.htm>

This paper focuses on the following strategies to reduce the growth in VMT and strategies to reduce transportation network inefficiencies (i.e., reducing vehicles miles

traveled, improving transportation network efficiencies, and develop employer based and optional worker production strategies).

1. Reducing Vehicle Miles Traveled

Florida communities and agencies can decrease greenhouse gas emissions through reducing vehicle miles travelled by the millions of individual automobiles. The Florida Action plan has estimates of reduced emissions if goals are met. This, in its most basic form, is designing and building communities to make each of our multiple daily automobile or transit trips shorter. Reducing vehicle miles traveled can involve actions like:

- Changing land use patterns and improving community transportation network integrative design and improving transportation system management.
- Ramping-up transit/passenger rail options while seriously reducing subsidies to large highway expansion projects and redirecting these funds to transit and/or compact integrated transportation alternatives.;
- Coordinate transit planning and development to better link transit options that essentially serve the same larger communities, urban areas or corridors across jurisdictions.
- Identify and protect accessible nodes of commerce and work relative to the housing and social function areas (schools, day care, and hospitals) and plan for dependable and regular transit linkage.
- Identify and address parking need changes that may include daytime car parking for transit stop areas – Many people that live in the suburbs, might be willing to drive a short way to a transit connection point, park their car and take transit to work or school.
- Use land use strategies and design options to reduce vehicle miles travelled - shorter driving distances between where we live, work and play- by supporting community designs with a mix of land uses either blended together, or placed within very short distance of each other, and well linked by multiple accessible transportation options.
- Increasing funding of transit and bicycle/pedestrian improvements to help shift trips off roadways.

2. Increasing Transportation Network Efficiencies

Florida communities and agencies can decrease greenhouse gas emissions through improved road network efficiencies that reduce net overall vehicle miles traveled. This involves Transportation System Management (TSM) which is the pairing transportation infrastructure demand with transportation infrastructure supply to reduced vehicle delay. Reduce vehicle delay can be achieved by optimizing the transportation network flows for overall fuel use efficiencies by actions such as:

- managing speed limits;
- managing acceleration and deceleration paths;
- improving traffic signalization and timing;
- providing adequate and properly sized and spaced turn lanes and turnarounds;
- using traffic flow enhancers such as roundabouts:

- more rapid response to crashes and other incidents so roads can be cleared quickly;
- manage construction work zones so fewer vehicles wait in traffic around construction sites; and,
- electronic toll collection and open road tolling to reduce vehicle delay.

3. Develop Optional Worker Production Strategies

Florida communities and agencies can decrease greenhouse gas emissions by examining and adopting, where practical, employer based optional worker production opportunities. Many of these options involve decision by companies and agencies to work with their employees to reduce daily commutes, commuting times and work related driving. These actions and programs often involve:

- Carpooling, vanpooling and other employer based strategies such as commuter assistance programs to reduce vehicle trips;
- Telecommuting (often allowing some opportunity to work from home);
- Online conferencing;
- Web Camera linkages to other district of company offices; and,
- Work Hours Adjustments such as:
 - Off the peak hour scheduling for working; and,
 - 4 Day work weeks or compressed work weeks.

Summary

By reducing VMT, improving road network efficiencies and adopting optional or flexible worker production options Florida's communities and transportation agencies can have direct impact to provide greater travel choices while substantially reducing pollution, helping to address global warming, eliminating our oil dependence, strengthening our economy, and fostering healthier communities. States and communities that venture first to address these transportation problems of climate change will likely be the beneficiaries of commerce and business development. A world hungry for solution will be seeking communities that solve these problems.

VMT REDUCTION FOCUSED	ROAD NETWORK EFFICIENCIES AND FUEL ECONOMY FOCUSED	DEVELOPING OPTIONAL WORKER PRODUCTION OPPORTUNITIES
<p>Provisions for Alternative Modes</p> <ul style="list-style-type: none"> ▶ Transit investment (buses & commuter stop enhancements, light “trolley” rail and commuter rail infrastructure deployment) ▶ Bicycle support strategies (Linked and separate paths and transit linkages) ▶ Transit-linked Park-and-Ride facilities. ▶ HOV lanes <p>Parking Management</p> <ul style="list-style-type: none"> ▶ Parking pricing ▶ Mandatory parking cash-out ▶ Parking supply limits ▶ Subsidized urban parking garages/towers <p>Land Use Planning</p> <ul style="list-style-type: none"> ▶ Increasing density, mix of uses, and transit-oriented development ▶ Pedestrian environment improvements ▶ Restrictions on vehicle use <p>Travel Pricing</p> <ul style="list-style-type: none"> ▶ Road pricing ▶ Mobility/ VMT fees ▶ Fuel pricing 	<p>Improving Transportation System Management (TSM) & Traffic Operations</p> <ul style="list-style-type: none"> ▶ Pairing transportation demand with transportation supply to help transportation networks effectively and efficiently serve demand by reduced vehicle delay ▶ Increase the reliability of the transportation network ▶ Reduce idling and other transportation actions that result in increased GHG emissions <p>Initiating traffic flow improvements such as:</p> <ul style="list-style-type: none"> ▶ coordinated signalization; ▶ Speed limit adjustments; ▶ Managing acceleration and deceleration paths; ▶ Managing Traffic signalization and timing; ▶ Providing adequate and properly sized and spaced turn lanes and turn arounds; and, ▶ Using traffic flow enhancers such as roundabouts. 	<p>Company/Agency Home-based</p> <ul style="list-style-type: none"> ▶ Telecommuting ▶ Online conferencing ▶ Web Camera linkages, etc <p>Work Hours Adjustments</p> <ul style="list-style-type: none"> ▶ Off the peak hour scheduling for working ▶ 4 Day work weeks or Compressed work weeks

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In addition, there are several "Smart Growth" related websites, which may offer additional guidance, including:

1. **[Smart Growth America](http://www.smartgrowthamerica.org/)** - <http://www.smartgrowthamerica.org/>
2. **[Smart Growth Online](http://www.smartgrowth.org/Default.asp?res=1280)** - <http://www.smartgrowth.org/Default.asp?res=1280>
3. **[Smart Growth/U.S. Environmental Protection Agency](http://www.epa.gov/dced/)** - <http://www.epa.gov/dced/>

