

## **DOT Climate Change Policies and VMT Reduction: Synthesis**

prepared for

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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

### **Request for Synthesis:**

Katy Taylor, Director, Public Transportation Division, WSDOT, and Anne Criss, Program Lead, Climate Change Team, WSDOT, requested information on state-DOT policies, targets, and measures for climate change, specifically those involving VMT reduction.

### **Background:**

A search of state DOT and agency Web sites has revealed three state DOTs, Connecticut, Maine, and Massachusetts, actively pursuing a set of climate change initiatives. Many states, often their agencies for environment or energy, are in the process of developing or implementing climate action plans, which may recommend policies for DOTs. Several DOTs publicize programs that lead to emissions reduction, such as transit or multimodal programs, although these programs are not obviously guided by an overarching climate-change policy. Legislation to reduce emissions is on the increase, as well as land-use planning strategies to promote transportation efficiency.

### **Databases Searched:**

- Transport, available through WSDOT Library
- TRIS Online
- Research in Progress
- Google
- Wisconsin DOT Transportation Synthesis Reports

### **Synthesis Summary:**

Categories of publications and resources are as follows:

- State Policies
- National Resources
- WSDOT Research on Climate Change
- Literature Search on VMT Reduction and Greenhouse Gas
- Literature Search on Road Pricing

## **STATE POLICIES:**

### **California:**

#### **Climate Action Program: Moving Forward**

The Climate Action Program at the California Department of Transportation (Department) is an interdisciplinary effort intended to promote and facilitate greenhouse gas (GHG) emission reduction measures and greening within the Department. The overall objective is to encourage innovative ways to balance progressive program delivery and responsible environmental stewardship in a way that: 1) transportation strategies, plans, and projects as a whole contribute to the State's GHG emission reduction targets, and 2) proper guidelines, procedures, and a quantifiable set of reporting protocols are in place to monitor GHG footprints and provide feedback for program development and implementation. The Climate Action Program serves as a resource for technical assistance, training, information exchange, and partnership-building opportunities.

<http://www.dot.ca.gov/climateaction.htm>

#### **Climate Change Draft Scoping Plan: a Framework for Change (June 2008 Discussion Draft Pursuant to AB 32, the California Global Warming Solutions Act of 2006)**

California Air Resources Board

*Excerpt (p. 7 of PDF):* ARB must develop a Scoping Plan to lower the state's greenhouse gas emissions to meet the 2020 limit. This Draft Scoping Plan, developed by ARB with input from the Climate Action Team, proposes a comprehensive set of actions designed to reduce overall carbon emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, and enhance public health while creating new jobs and enhancing the growth in California's economy. ARB will revise this Draft Plan based on continuing analysis and public input, and will take the Proposed Scoping Plan, which will be released in early October, to the Board for consideration at its meeting in November, 2008. The measures in the Scoping Plan adopted by the Board will be developed over the next three years and be in place by 2012.

Primary recommended emissions-reduction measures, including several related to transportation, begin on page 29 of the PDF. Secondary measures for the transportation sector begin on page 53 of the PDF. Forthcoming appendices will detail and add measures.

<http://www.arb.ca.gov/cc/scopingplan/document/draftscopingplan.pdf>

#### **Assessment of Local Models and Tools for Analyzing Smart-Growth Strategies, Final Report**

DKS Associates, et al, July 2007, California Department of Transportation

Provides case studies of travel models for six California studies (p. 101 of PDF).

[http://www.dot.ca.gov/newtech/researchreports/reports/2007/local\\_models\\_tools.pdf](http://www.dot.ca.gov/newtech/researchreports/reports/2007/local_models_tools.pdf)

#### **California Transit-Oriented Development (TOD) Database, Caltrans**

Caltrans provides travel outcome data for each of its TODs, comparing station area vehicles per household and auto mileage per household with that of the surrounding area. The supporting methodology can be found at <http://www.sierraclub.org/sprawl/transportation/holtzclaw-awma.pdf>.

The Mountain View station travel outcomes are provided for example:

<http://transitorienteddevelopment.dot.ca.gov/station/stateViewStationOutcomes.jsp?stationId=1>.

## **Connecticut:**

### **Connecticut Climate Change Action Plan 2005, Transportation and Land Use Sector**

This chapter of the Climate Change Action Plan lists three DOT-related recommended actions:

- RA5, Public Education Initiative on Transportation: Raise the awareness of low GHG emitting vehicles (p. 19 of PDF),
- RA7, **Transit, Smart Growth, and VMT Reduction Package**: Implement a package of transit improvements and land-use policies and incentives to achieve a 3 percent reduction in VMT below the 2020 baseline (p. 23 of PDF), and
- RA8, Multistate Intermodal Freight Initiative (p. 31 of PDF).

[http://ctclimatechange.com/documents/TransportationSector\\_CCCAP\\_2005.pdf](http://ctclimatechange.com/documents/TransportationSector_CCCAP_2005.pdf)

For progress on the above initiatives, including a detailed description of **VMT reduction measures**, see pages 4 and 6 of the following PDF:

<http://ctclimatechange.com/documents/RAupdatetransportationNov07.pdf>.

### **Public Act 08-98, Section 5, Item 2, 2008**

The Department of Transportation shall, within available appropriations, continue to investigate the potential for improvements to the state's transportation system that will reduce greenhouse gas emissions and coordinate with the northeastern states on regional strategies to incorporate greenhouse gas emission reductions into regional transportation planning, including, but not limited to, high speed rail, light-rail passenger service and freight rail service within the northeast region.

<http://www.cga.ct.gov/2008/ACT/PA/2008PA-00098-R00HB-05600-PA.htm>

### **2005 Connecticut Climate Change Action Plan**

This is the main Web page of the Action Plan with links to report sections and related materials. DOT-related policies are described in the "Executive Summary" and the "Transportation and Land Use" section summarized below.

<http://ctclimatechange.com/StateActionPlan.html>

## **Florida:**

### **House Bill 7135, 2008**

The bill calls for MPOs to minimize greenhouse gas emissions in accord with state transportation plans (p. 71-73 of PDF).

<http://www.flsenate.gov/data/session/2008/House/bills/billtext/pdf/h713503er.pdf>

## **Maine:**

### **Second Biennial Report on Progress toward Greenhouse Gas Reduction Goals**

Maine Department of Environmental Quality, January 2008

*Page 10 of PDF:* LD 1180, "An Act to Promote Transportation Planning, Increase Efficiency and Reduce Sprawl," (enacted as P.L. 2007, ch. 208) will assist in the implementation of Option 17, "**Lowering the Growth of VMT.**" It establishes a program within the Department of Transportation, funded on a pilot project basis, to provide technical assistance and incentive grants to municipalities to prevent new development along state highways.

*Page 12 of PDF:* Workgroup on Option 17, "**Lowering the Growth of Vehicle Miles Travelled.**" Composed of some members of the original Transportation Working Group, plus new members, this group is staffed by DEP, Maine Department of Transportation, and the Maine State Planning Office. It has agreed to focus on ways to promote healthy transit-oriented development in some of Maine's key geographical transportation corridors, and is working with the Center for Clean Air

Policy, supported by foundation grants, to gather and analyze Maine-specific data in order to assure that any recommendations will meet the desired level of GHG reductions. In 2007, DOT secured funding for a research project, "Transportation Impacts of Transit-Oriented Development in Maine" that will produce additional policy recommendations to move this option forward.

[http://www.maine.gov/dep/air/greenhouse/Report%20to%20NRC%201-18-08\\_FINAL.pdf](http://www.maine.gov/dep/air/greenhouse/Report%20to%20NRC%201-18-08_FINAL.pdf)

**Public Law 2007, Chapter 208, An Act to Promote Transportation Planning, Increase Efficiency and Reduce Sprawl**

<http://www.mainelegislature.org/legis/bills/chapters/PUBLIC208.asp>

**Maine Climate Action Plan 2004, Volume 1**

Department of Environmental Protection, December 2004

GHG mitigation option 17, "**Slowing VMT Growth**," is presented on page 67 of the PDF.

<http://www.maine.gov/dep/air/greenhouse/MaineClimateActionPlan2004Volume%201.pdf>

**Massachusetts:**

**The Green Communities Act, Senate Bill 2768, 2008**

The act calls for state transportation agencies to make alternative fuels available on the Massachusetts Turnpike and to advance hybrid and alternative-fuel vehicles (p. 89 of PDF).

<http://www.mass.gov/legis/bills/senate/185/st02pdf/st02768.pdf>

**Massachusetts Climate Protection Plan 2004**

Office for Commonwealth Development

The following climate change mitigation actions for the Executive Office of Transportation are detailed beginning on page 36:

- Favor Transit-Oriented Development around MBTA Stations,
- Include Energy Use and GHG Emissions Data as Criteria in Transportation Decisions,
- Maintain and Update Public Transit Services,
- Increase Parking at Train Stations to Encourage Use of Public Transit,
- Improve the Efficiency of Transit Vehicle Movement,
- Develop New Bicycle and Pedestrian Policies, Programs, and Facilities,
- Expand Programs to Promote Efficient Travel,
- Seek Opportunities to Reduce Emissions at Logan Airport,
- Improve Aircraft Movement Efficiency,
- Evaluate the Benefits of Expanded Rail and Water Opportunities,
- Promote the Use of Cleaner Vehicles and Fuels in Our Public Transit Fleets,
- Clean Up the Existing Transit Fleet with Less Polluting Fuels,
- Continue to Promote the Use of Clean Diesel Equipment on State-Funded Construction Projects,
- Eliminate Unnecessary Idling of Buses, and
- Use Cleaner Train Engine Technology to Reduce Diesel Soot.

[http://masstech.org/renewableenergy/public\\_policy/DG/resources/2004\\_MA\\_Climate\\_Protection\\_Plan.pdf](http://masstech.org/renewableenergy/public_policy/DG/resources/2004_MA_Climate_Protection_Plan.pdf)

## **Minnesota:**

### **Transportation and Land Use Technical Work Group: Draft Priority Policy Options for Analysis**

Minnesota Climate Change Advisory Group, January 2008

This report describes several climate change policies for the transportation sector. Most call for DOT involvement and some are VMT reduction measures. All options are summarized on page 1. According to a policy briefing

(<http://www.dot.state.mn.us/traffic/data/mtdmcc/CLIMATE%20CHANGE%20ENERGY%20POLICY.ppt>) the measures most related to the DOT are:

- 2, Expand Transit, Bicycle, and Pedestrian Infrastructure (p. 15 of PDF),
- 4, Infrastructure Management (p. 27 of PDF),
- 5, Climate-Friendly Transportation Pricing (p. 30 of PDF),
- 7, “Fix-it-First” Transportation Investment Policy and Practice (p. 36 of PDF),
- 11, Heavy-Duty Idle Reduction (p. 42 of PDF),
- 13, Reduce Maximum Speed Limits (p. 52 of PDF), and
- 14, Freight Mode Shifts: Intermodal and Rail (p. 56 of PDF).

<http://www.mnclimatechange.us/ewebeditpro/items/O3F14766.pdf>

Minnesota Climate Change Advisory Group: Home

<http://www.mnclimatechange.us/index.cfm>

## **New Jersey:**

### **New Jersey FIT: Future In Transportation**

Welcome to the future of transportation in New Jersey. The NJFIT initiative represents a change in direction for the New Jersey Department of Transportation. With NJFIT, we are integrating road building and community building. We are forming partnerships to coordinate development and redevelopment in our towns and cities with transportation needs and investments.

This web site presents case studies of current initiatives, and the goals, toolbox, and partnership opportunities of NJFIT.

<http://www.state.nj.us/transportation/works/njfit/>

## **New York:**

### **New York State: A Leader in Alternative Fueled Vehicles**

New York Office of General Services, January 2008

This is a bulletin on the state’s alternative fueled vehicles program. An item under “Developing the State’s Alternative Fuel Infrastructure” notes, “The Thruway Authority is planning a project to install E-85 [85 percent ethanol, 15 percent gasoline] pumps at Thruway Travel Plazas” (p. 2).

<http://www.ogs.state.ny.us/supportservices/vehicles/cleanfuel/epactInfrastructureUpdate.pdf>

## **Oregon:**

### **Efforts on Climate Change: Fact Sheet—March 2008**

Oregon Department of Transportation

The Oregon Department of Transportation recognizes that the transportation sector in Oregon generates significant greenhouse gases. In fact, transportation sources are responsible for over a third of emissions in the state—roughly the same share as the electric power sector. The department understands that in order to meet the greenhouse gas reduction goals laid out by

Governor Kulongoski and the legislature, the state will need to make major changes in the transportation sector.

<http://www.oregon.gov/ODOT/SUS/docs/EffortsOnClimateChange2008.pdf>

## **Pennsylvania:**

### **Rail Freight Funding Programs**

#### Rail Freight Assistance Program

The Rail Freight Assistance Program (RFAP) provides financial assistance for investment in rail freight infrastructure. The intent of the Program is to (1) preserve essential rail freight service where economically feasible, and (2) preserve or stimulate economic development through the generation of new or expanded rail freight service.

<http://www.dot.state.pa.us/Internet/Bureaus/pdBRF.nsf/infoGrantProgram?OpenForm>

## **South Carolina:**

### **Reducing Emissions thru Congestion Mitigation, SCDOT**

#### Bicycles, Pedestrians Accommodations and Intermodal Planning

SCDOT was the first DOT in the southeast to adopt a policy affirming that bicycle and pedestrian accommodations be a routine part of planning, design, construction and operating activities and be included in the everyday operations of our transportation system. Highways are being viewed as more than simply a place for cars and trucks, they are also facilities that will allow for alternative modes of transportation and easier commutes. A prime example of this is the bicycle/pedestrian lane on the new Cooper River Bridge. This lane is separated from traffic and is used by hundreds of people each day.

SCDOT is also identifying and protecting abandoned rail corridors across the state to promote the future use of passenger rail and shared bicycle and pedestrian paths. These modes of transportation have the potential of reducing carbon emissions -promoting good health for the citizens of our state, as well as reducing the green house effect on our environment.

To further reduce emissions, SCDOT has encouraged Mass Transit providers to install bike racks on buses. This increases mobility for customers and encourages the use of alternative transportation. The Central Midlands Regional Transit Authority (CMRTA) has installed bike racks on all of the CMRTA busses and providers throughout the state are beginning to follow their lead. Bike racks have also been installed at the SCDOT Headquarters building in Columbia, encouraging visitors and employees to use two-wheeled transportation- an environmentally friendly form of transportation.

Intermodal connectivity is another tool we use to enhance transportation, giving travelers more options and improved convenience. SCDOT is developing a 20-year Intermodal Plan that will improve connectivity between highways, airports, bus terminals, seaports, rail, public transit, bicycle and pedestrian facilities. By working together with our partners in each of these areas, the state will benefit by having a well thought-out transportation system.

Twenty to twenty-five percent (20-25%) of morning rush hour traffic is attributed to adults driving their children to school. (*U.S. Department of Transportation, National Highway Traffic Safety Administration, "Safe Routes to Schools," DOT HS 809-497: Sept. 2002, 73.*) The South Carolina [Safe Routes to School Program](#) provides guidance and funding to make walking and cycling more appealing transportation alternatives for students in kindergarten through eighth grades. By enabling and encouraging children to walk and bicycle to school, we reduce traffic congestion and improve air quality. The Safe Routes to School Program also explores reducing the number of children that must be bused within a reasonable walking distance, encourages carpooling, and proposes no idling policies in school pick-up lines.

<http://www.scdot.org/environmentalstewardship/bikes.shtml>

## SMARTRIDE

SCDOT partners with DHEC, and the SC Energy Office to help improve air quality and reduce imports of foreign oil by using the SmartRide commuter service. Currently, SmartRide offers two bus routes that provide service between Camden and downtown Columbia, and between Newberry and downtown Columbia. The SC Department of Transportation offered free fares on the SmartRide commuter service between July 1 and September 30, 2007 on days DHEC forecasted Ground-Level Ozone Action Days. SmartRide has proven to be popular with many people who live in outlying areas and commute to downtown Columbia on a daily basis.

<http://www.scdot.org/environmentalstewardship/smartride.shtml>

## Traffic Signal Coordination

Several tools used in the reduction of congestion and improving traffic flow are computer generated traffic signal coordination and improved intersection design standards. These efforts reduce stop-and-go traffic and vehicle idle times, saving fuel and shortening commuting times.

SCDOT Traffic Engineers monitor traffic signal systems to ensure optimum performance. Properly managed traffic signal systems can improve highway capacity up to 20%\*. (\*footnote: based on national studies and can deliver up to a 40:1 benefit to cost ratio) In the past year, our Traffic Engineers have retimed 23 signal systems. There are currently 208 signal systems in South Carolina. Several large "retiming" projects managed by SCDOT are currently in progress in Columbia, Rock Hill, Spartanburg and Charleston- major urban areas. There are currently plans to retime 20 signal systems in Richland, Lexington, Florence, Bluffton and the Myrtle Beach area. New signal systems are also planned in Georgetown and Spartanburg County in the near future.

<http://www.scdot.org/environmentalstewardship/trafficsignals.shtml>

## Tennessee:

### **TDOT Biofuel Program**

#### TDOT Plays Key Role in Governor's Alternative Fuel Initiative

Tennessee Governor Phil Bredesen is dedicated to the protection of our natural resources, our environment, our economy and the health of Tennessee's citizens. That commitment includes a focus on promoting the efficient use of natural resources, including renewable alternative fuels, such as biodiesel and ethanol ("biofuels"), made from agricultural products.

<http://www.tdot.state.tn.us/biofuel/default.htm>

## Virginia:

### **Senate Bill 233, 2008**

Revises code regarding the Statewide Transportation Plan such that the plan will include quantifiable measures and achievable goals relating to greenhouse gas emissions.

<http://leg1.state.va.us/cgi-bin/legp524.exe?081+ful+SB233E>

### **Transportation and Land Use**

The planning and construction of new highways and transportation improvements affects existing land uses and plans for future development. Types and pattern of development influence and impact travel patterns and demand for transportation facilities.

In Virginia, land use is the prerogative of local governments, while transportation planning and funding decisions are generally made at the state level.

Improving the coordination between transportation and land-use planning is essential for ensuring mobility throughout the commonwealth.

The Virginia Department of Transportation (VDOT) is working with various stakeholders to develop regulations to improve the coordination between transportation and land-use planning in Virginia.

Through these regulations and requirements, VDOT strives to provide a balanced and efficient transportation system for citizens of the commonwealth.

<http://www.virginiadot.org/projects/landuse.asp>

### **NATIONAL RESOURCES:**

#### **Pew Center on Global Climate Change: U.S. States and Regions**

States and regions across the country are adopting climate policies, including the development of regional greenhouse gas reduction markets, the creation of state and local climate action and adaptation plans, and increasing renewable energy generation.

Read More . . .

<http://www.pewclimate.org/states-regions>

#### **Center for Clean Air Policy Transportation Emissions Guidebook**

This interactive website provides an index to two categories of mitigation policies: (1) land use, transit, and travel demand management, and (2) vehicle technology and fuels. The site provides briefs for each policy, which include an overview, emissions-reduction potential, implementation strategies, case studies, and links to resources. There is also an emissions-reduction calculator and a policy comparison matrix.

[http://www.ccap.org/safe/guidebook/guide\\_complete.html](http://www.ccap.org/safe/guidebook/guide_complete.html)

#### **Updated List of Select State Global Warming Policies and 2008 Bills**

National Caucus of Environmental Legislators, February 2008

[http://www.ncel.net/newsmanager/news\\_article.cgi?news\\_id=184](http://www.ncel.net/newsmanager/news_article.cgi?news_id=184)

#### **Primer on Transportation and Climate Change**

AASHTO, May 2008

This report identifies and summarizes five national data sources from the FHWA, EPA, and DOE that underlie most of the independent research on transportation-related GHG emissions (excerpts, p. 23):

- *FHWA, Highway Statistics*: The report includes detailed break-downs of VMT as well as total fuel consumption, but does not include data on GHG emissions.
- *FHWA, Conditions and Performance Report*: Important information in this report includes vehicle miles of travel (VMT) growth rates from 1984 through 2004, as well as projected VMT growth trends through 2024. Notably, the FHWA forecast of VMT growth is somewhat higher than the forecast in DOE's *Annual Energy Outlook*.
- *U.S. DOE, Annual Energy Outlook*: The report provides a 25-year forecast of various measures of energy usage for all sectors of the economy. The report includes forecasts for VMT, fuel economy (miles per gallon), and energy usage (measured in BTUs), all of which are broken down by vehicle type. The report also provides CO<sub>2</sub> emissions for the transportation sector as a whole.
- *U.S. EPA, Inventory of Greenhouse Gas Emissions and Sinks*: The report includes historical data, not future projections. It includes data on VMT, fuel economy, and GHG emissions for various classifications of transportation vehicles. It also includes historical data on trends in use of ethanol and other biofuels.
- *U.S. DOE, Transportation and Energy Data Book*: [This report] is a compendium of primarily historical data regarding energy usage, transportation vehicle characteristics (e.g., fuel economy), alternative fuel usage, GHG emissions, economic conditions, and

other factors. It includes some projections of future fuel usage, but does not include projections specifically for VMT growth or GHG emissions.

Additional sources can be found in the Reference Materials section (p. 49). Noted resources include TRB's Appendix B to Special Report 290 (2008), which provides an in-depth review and explanation of the transportation sector's contribution to GHG emissions and a discussion of potential strategies for reducing those emissions, and USDOT's online list of publications, <http://climate.dot.gov/publications/index.html>.

Available from the WSDOT Research Library and at <http://downloads.transportation.org/ClimateChange.pdf>

### **Securing a Clean Energy Future—Greener Fuels, Greener Vehicles: a State Resource Guide**

National Governors Association, February 2008

*Excerpt from Page 24:*

Overcoming Barriers: State Examples: Governors across the country are applying one or more types of policy tools to build sustainable alternative fuel sources, infrastructure, and advanced vehicle markets. Some of these state policy actions are described below.

<http://www.nga.org/Files/pdf/0802GREENERFUELS.PDF>

### **Backgrounder: State and Regional Greenhouse Gas Initiatives (Energy Sector)**

National Governors Association, October 2006

Summary of regional GHG initiative programs.

<http://www.nga.org/Files/pdf/0610GREENHOUSE.PDF>

### **Transportation and Global Warming: Defining the Connection and the Solution**

CTC & Associates LLC and WisDOT Research & Library Unit, July 2007

This transportation synthesis report provides background on transportation's contribution to global warming and a state-by-state list of DOT and local government initiatives. Research articles on CO<sub>2</sub> emission reduction strategies are cited or included for the following subjects:

- reducing GHG emissions through land-use development (The Kyoto Protocol and Sustainable Cities: Potential Use of Clean-Development Mechanism in Structuring Cities for Carbon-Efficient Transportation, *Transportation Research Record No. 1983*, 2006);
- using byproducts such as fly and bottom ash for embankment construction (p. 15 of the pdf);
- developing policies to target behavioral differences of diesel and hybrid car buyers (p. 35 of the pdf);
- implementing an emission permit trading program (p. 50 of the pdf); and
- measuring emissions reductions of roundabouts (p. 66 of the pdf).

<http://www.dot.wisconsin.gov/library/research/docs/tsrs/tsrglobalwarming.pdf>

### **Transit-Oriented Development: Developing a Strategy to Measure Success**

John Renne and Jan Wells, February 2005, *NCHRP Research Results Digest 294*

*From Summary:* This digest offers a strategy to systematically evaluate the potential success of transit-oriented development. The digest identifies and evaluates various indicators of the impacts of transit-oriented development, provides the results of a survey of transit-oriented development indicators, and identifies ten indicators that can be used to systematically monitor and measure impacts.

[http://trb.org/publications/nchrp/nchrp\\_rrd\\_294.pdf](http://trb.org/publications/nchrp/nchrp_rrd_294.pdf)

## **WSDOT RESEARCH ON CLIMATE CHANGE:**

### **Transportation-Efficient Land Use Mapping (TELUMI): Phase 3 of Integrating Land Use and Transportation Investment Decision-Making**

Anne Vernez Moudon, UW, June 2005, Publication No. WA-RD 620.1

The objective of this project was to devise a conceptually simple tool that operationalized the complex relationship between land use and travel behavior. The TELUMI is a set of maps that depicts how the region's urban form affects overall transportation system efficiency.

<http://www.wsdot.wa.gov/Research/Reports/600/620.1.htm>

### **Options for Making Concurrency More Multimodal**

Mark Hallenbeck, Dan Carlson, Keith Ganey, Anne Vernez Moudon, Luc de Montigny, and Ruth Steiner, December 2006

This study's purpose, by legislative intent, is to examine and propose multimodal improvements to concurrency. These include both alternative ways to measure the availability and effectiveness of multimodal transportation systems, and ways to use those measurements to implement more effective multimodal transportation systems that support the intent of the Growth Management Act.

<http://depts.washington.edu/trac/bulkdisk/pdf/ConcurrencyOptions.pdf>

### **Travel Behavior, Emissions and Land Use Correlation Analysis in the Central Puget Sound**

Lawrence Frank and Company, Inc., Mark Bradley, Keith Lawton Associates, July 2005, Publication No. WA-RD 625.1

A growing body of research documents that land use relates with travel mode choice, distances and time spent traveling, and household level vehicle emissions. However, to date little work has been done at a sufficiently disaggregate scale to gain an understanding of how local governments should alter their land use policies and plans to reduce vehicle use and encourage transit and non-motorized forms of travel. This study of the four county Central Puget Sound region links parcel level land use data with travel data collected from the Puget Sound Household Travel Survey (PSHTS).

The primary aim of the study is to describe how measures of land use mix, density, and street connectivity where people live and work influences their trip making patterns including trip chaining and mode choice for home based work trips, home based non-work trips, and mid day trips from work. Land use measures are developed within one kilometer of the household and employment trip ends in the survey. Tour based models are developed to estimate the relative utility of travel across available modes when controlling for level of service, regional accessibility to employment, and sociodemographic factors.

A secondary aim of the project is to estimate the linkages between land use and household generation of Oxides of Nitrogen and Volatile Organic Compounds that are precursors to the formation of harmful ozone.

<http://www.wsdot.wa.gov/Research/Reports/600/625.1.htm>

### **Travel Indicators and Trends in Washington State**

Anne Vernez Moudon, Gwen Rousseau, and D.W. Sohn, April 2005, Publication No. WA-RD 615.1

This review of travel indicators in Washington State aims to understand similarities and differences between the state and the nation and to detect changes or special conditions that need to be considered in the future. The work is intended to support general transportation policies and future state-level transportation plans.

None of the travel indicators reviewed strongly suggests that travel conditions in the state stand out in the national context. Two factors are prime in their association with travel demand:

household income and development density. Stagnant income explains why the demand for car travel has slowed over the recent past, yet future demand for car travel may increase if the economy improves. On the other hand, demand could remain stable if development density continues to increase.

Residential and population densities are positively associated with demand for modes other than single-occupancy vehicle (SOV) travel. Living in more compact residential areas and in alternative housing types, and renting versus owning a home, also relate to lower demand for SOV travel.

Even at the aggregate level of national data, the Puget Sound region's transportation context differs from that of rural or other urbanized regions in the state. State policies need to recognize at least three different markets for transportation, which are found in rural, small town, and metropolitan areas.

Overall, Washington State needs to stay tuned to national projections about the likely impacts on travel demand and transportation of general economic trends, the slow down in household formation, growth in car ownership among new immigrants, an aging population with changing driving patterns, and population growth in densely populated areas --where transportation systems investments and land-use policies can affect future travel behavior.

<http://www.wsdot.wa.gov/Research/Reports/600/615.2.htm>

**An Analysis of Relationships Between Urban Form (Density, Mix, and Jobs: Housing Balance) and Travel Behavior (Mode Choice, Trip Generation, Trip Length, and Travel Time)**

Lawrence Frank, July 1994, Publication No. WA-RD 351.2

This project is part of a research agenda to discover ways to plan and implement urban forms that reduce dependence on the single occupancy vehicle (SOV). The purpose of this project was to empirically test the relationship between land use density, mix, jobs-housing balance, and travel behavior at the census tract level for two trip purposes: work and shopping. This project provides input into policies at the national, state, and local level targeted at the reduction of SOV travel and for urban form policies.

<http://www.wsdot.wa.gov/Research/Reports/300/351.2.htm>

**Relationships Between Land Use and Travel Behavior in the Puget Sound Region**

Lawrence Frank and Gary Pivo, September 1994, Publication No. WA-RD 351.1

<http://www.wsdot.wa.gov/Research/Reports/300/351.1.htm>

**LITERATURE SEARCH ON VMT REDUCTION AND GREENHOUSE GAS:**

**Modeling Land Use, Bus Ridership, and Air Quality: Case Study of North River Industrial Corridor in Chicago**

Jie Lin and Santosh Mishra, 2006, Conference Title: Transportation Research Board 85th Annual Meeting, Washington, Held: 20060122-20060126

*Abstract:* Public transportation is a means to reduce vehicle miles of travel and vehicle emissions from automobile travel. This paper presents a demonstrative study of predicting potential automobile VMT and emissions reductions due to transit service improvement by using a simple GIS-aid computer tool. The prediction procedure involves a bus ridership model that incorporates transit policy and land use indicators, prediction of transit demand of new or modified existing service by applying the ridership model in GIS spatial analysis, and finally estimation of VMT and emissions reductions. We applied this approach to a proposed new Chicago Transit Authority (CTA) bus service in the North River Industrial Corridor in City of Chicago. Bus ridership was found to be strongly correlated with bus service measures such as bus headways, run miles and service frequency; residential and commercial land area and value within a quarter mile buffer zone of a bus route, and other competing transit services available in the same area. We further

demonstrated that the ridership models combined with GIS tools and MOBILE6 models could be a useful screening tool for VMT and emissions reduction estimation for CMAQ type of projects. Model limitations are also discussed in the paper.

### **Heuristic policy analysis of regional land use, transit, and travel pricing scenarios using two urban models**

C.J. Rodier, R.A. Johnston, and J.E. Abraham, July 2002, *Transportation Research Part D* 7(4): 243-54, ISSN: 1361-9209

*Abstract:* To address some of the uncertainties inherent in large-scale models, two very different urban models, an advanced travel demand model and an integrated land use and transportation model, are applied to evaluate use, transit, and auto pricing policies in the Sacramento, CA (US), region. The empirical and modeling literature is reviewed to identify effective land use, transit, and pricing policies and optimal combinations of those policies and to provide a comparative context for the results of the simulation. The study illustrates several advantages of this approach for addressing uncertainty in large-scale models. First, as Alonso [Predicting the best with imperfect data, *AIP Journal* (1968)] asserts, the intersection of two uncertain models produces more robust results than one grand model. Second, the process of operationalizing policy sets exemplifies the theoretical and structural differences in the models. Third, a comparison of the results from multiple models illustrates the implications of the respective models' strengths and weaknesses and may provide some insights into heuristic policy strategies. Some of the key findings in this study are (1) land use and transit policies may reduce vehicle miles traveled (VMT) and emissions by about 5-7%, and the addition of modest auto pricing policies may increase the reduction by about 4-6% compared to a future Base Case scenario for a 20-year time horizon; (2) development taxes and land subsidy policies may not be sufficient to generate effective transit-oriented land uses without strict growth controls elsewhere in the region; and (3) parking pricing should not be imposed in areas served by light rail lines and in areas in which increased densities are promoted with land subsidy policies.

### **Index of Transportation Measurement Quantification Efforts: Methodology Matrix**

D.R. Luscher, D.A. Coleman, D.K. Popek, and F. Kamakate, September 1998, ARCADIS Geraghty & Miller, Inc., and Environmental Protection Agency—Regional and State Programs Division, Report No.'s SJ007262 and EPA420-98-018

*Abstract:* The purpose of this work assignment was to develop a comprehensive index of methodologies used in assessing transportation measures and other non-mandatory programs. Quantification refers to any effort to numerically evaluate transportation measures, or other related measures, in terms of developing air quality benefits, program costs, VMT reductions, trip reductions, and/or cost effectiveness. This extensive matrix was produced for planners and policy makers to use when they need to evaluate the travel and emissions impact of their own existing or planned transportation measures.

### **LITERATURE SEARCH ON ROAD PRICING:**

#### **Data Requirements to Support Road Pricing Analyses.**

Johanna Zmud, April 2006, Volpe National Transportation Systems Center and Department of Transportation—Office of the Secretary of Transportation, Conference Title: Expert Forum on Road Pricing and Travel Demand Modeling, Alexandria, Held: 20051114-20051115, Report No. DOT-OST/P-001-06

*Abstract:* This paper discusses data requirements to support pricing analyses. It focuses on road pricing analyses as they relate to infrastructure financing and congestion management. Infrastructure financing can be defined as either revenue generation via toll roads or capacity enhancement via more efficient use of existing roadway lanes. Congestion management under the rubric of travel demand management (TDM) may include strategies to reduce peak-period vehicle traffic or shift travel to alternative modes or times of the day. The paper has four parts. In the first part, an overview of road pricing is presented, along with associated background information including pricing history, its impetus, and pricing options. This information is followed

by areas of intersection between road pricing and travel demand modeling. Given the complexity of road pricing analyses, the paper then presents recommended data requirements at three levels: policy, strategic, and tactical. The paper concludes with ideas for future research, as well as recommended criteria for selecting data items.

### **Congestion and Traffic Management**

R.W. Poole, Jr., 2001, *Contributions in Economics and Economic History* (224): 59-77, ISSN: 0084-9235

*Abstract:* Transportation economists view urban traffic congestion as an imbalance of supply and demand, caused by the lack of market pricing of roadway use. Road pricing, in which higher prices are charged at peak times and lower prices are charged during off-peak hours could help alleviate this imbalance. There is strong political opposition to road pricing, but recent congestion pricing pilot programs suggest that technically and operationally successful forms of road pricing can be developed. The most successful programs thus far have high-occupancy/toll (HOT) lanes allowing vehicles not meeting the car-pooling requirement to purchase excess capacity in those lanes. The article suggests that a reform of highway finance is necessary to make road pricing feasible since the current financing and ownership of U.S. roadways is too convoluted. New technologies, such as electronic toll collection systems, vehicle-miles-traveled technologies, and a global positioning system-based virtual tolling system, could also help make road pricing a reality. This article suggests a new approach in which the road system becomes a public utility, run either as government utility or franchised to private firms on a long-term basis. The article concludes by suggesting the following policy changes: defederalize the highway system; convert high occupancy vehicle lanes to HOT lanes; use annual registration fees for local streets and roads; end "double taxation" of paying both tolls and fuel taxes; enact public-private partnership laws; and develop national standards for electronic tolling.

### **Where Are We Going? Transportation Demand Management in the Next Millennium**

P.L. Winters, 2000, Association for Commuter Transportation, Conference Title: ACT 2000 International Conference: Imagine the Possibilities, Orlando, Florida, Held: 20000917-20000920

*Abstract:* This paper will discuss how technology, policies, and procedures fit together to help alter travel behavior in our mobile society. Together these factors can influence travelers' choice of mode, departure time, route, or willingness to pay. These modified travel behaviors will help achieve goals such as reductions in traffic congestion and air pollution. Transportation demand management (TDM) is the all-inclusive term given to this variety of measures used to improve the efficiency of the existing transportation system. TDM products and services include encouragement to use alternatives to the single-occupant vehicle such as carpools, vanpools, transit, bikes, and walking. Alternative work-hour programs such as the compressed workweek, flextime, and telecommuting are also TDM strategies, as are parking management tactics such as preferential parking for carpools and parking pricing. The need to influence travel behavior becomes clearer as recent trends are examined. During the past several decades, commuting behavior could be described as more people in even more vehicles traveling to more places. Although the population increased nearly 22 percent from 1976 to 1996, licensed drivers increased 34 percent. The suburb-to-suburb commute became the dominant commuting pattern. Not only were there more drivers, there were 77 percent more vehicle miles of travel (VMT). Nevertheless, supply has increased at a much slower rate than demand. When adjusted for inflation, highway capital outlay in constant dollars increased by 56 percent from 1976 to 1996, but road mileage only increased 2 percent. In fact, highway expenditures by all units of government, with inflation removed, were about 56 percent of what they were for each vehicle mile of travel in 1976. The result of these growth and demographic trends is more traffic congestion. If present trends continue, increases in the total number of vehicles on the road and in the amount they are driven will continue to cause significant traffic delays and overwhelm the benefits gained from improved emissions controls on vehicles. Therefore, viable alternatives to single-occupant driving need to be available and used in order to ensure the healthy air quality

needed and to maintain the personal mobility we all depend on. As we look to the future, TDM professionals face the uncertainty with optimism and renewed vigor.

### **Proposal for a National Mileage Based Tax**

Adeel Z. Lari and Kenneth Buckeye, 1999, ITS America, Meeting (9th: Washington, D.C.), *New thinking in transportation: conference proceedings*, Publisher: Minnesota Dept. of Transportation—Office of Alternative Transportation Financing

*Abstract.* In Minnesota, as with virtually all other states, the motor fuel tax is the primary method for collecting road user charges. In addition, a significant portion of revenue is collected through motor vehicle registration fees which vary with the sale price and age of the vehicle. Although registration fees have grown in recent years, the rate of increase in motor-fuel consumption has fallen short of the increase in vehicle miles traveled due to increasingly efficient vehicles. This problem will likely be exacerbated in the future with demands for increased efficiency and as more vehicles are developed which use alternative sources of energy. One proposal to create a more optimal user fee system is a concept called the Mileage Based Tax (MBT). A primary motivation for a MBT is to close the widening gap between fuel consumption and vehicle miles of travel. Under such a concept revenue would increase in direct proportion to increased travel. The MBT, like other taxes, could be indexed to inflation thereby helping to assure that revenues keep pace with costs. Coupled with advanced electronics now becoming commonplace in motor vehicles the MBT may also be utilized to vary charges by type of vehicle, time of day, and route of travel. Primary challenges for the MBT concept are in the area of public acceptance and technical aspects of implementation.

### **Transportation Financing: Vehicle Miles Traveled (VMT) Assessment and Measurement: A Critical Review and Evaluation of Alternative Revenue Sources**

Reza Nevai, July 2007, California Department of Transportation, Source Notes: This document consists of two reports: 1) Transportation Pricing: Vehicle Miles Traveled (VMT) Assessment and Measurement: Executive Summary, and 2) Transportation Financing: Vehicle Miles Traveled (VMT) Assessment and Measurement: A Critical Review and Evaluation of Alternative Revenue Sources: White Paper

*Abstract.* This study provides a framework for the analysis and evaluation of transportation pricing, and in particular, vehicle miles traveled (VMT). It presents a critical analysis of transportation pricing issues and develops a realistic notion of market-based measures. The study evaluates transportation revenues and financing reform using different transportation sensitive criteria and strategic scenarios, along with the application of the VMT method. A framework is used to evaluate alternative revenue sources and provide an assessment in terms of adequacy and stability. Options are given that are available for reforming the existing financing system. Recommendations are presented underlining the packaging of potential new revenue sources and improvement measures.

### **Transportation Pricing Strategies for California: An Assessment of Congestion, Emissions, Energy, and Equity Impacts, Final Report**

E. Deakin, G. Harvey, R. Pozdena, and G. Yarema, November 1996, Deakin Harvey Skabardonis, Source Notes: This report was prepared for the California Air Resources Board (CARB) of the California Environmental Protection Agency and the Federal Highway Administration (FHWA); This report was funded and co-sponsored by FHWA, CARB, Caltrans, the Los Angeles County Metropolitan Transportation Authority, Southern California Association of Governments, and the San Diego Association of Governments; Contract/Grant No. 92-316 (CARB)

*Abstract.* This study investigated five categories of transportation pricing measures - congestion pricing, parking charges, fuel tax increases, vehicle miles traveled (VMT) fees, and emissions fees. Advanced travel demand models were used to analyze these measures for the Los Angeles, Bay Area, San Diego, and Sacramento metropolitan areas. The analyses indicate that transportation pricing measures could effectively relieve congestion, lower pollutant emissions,

reduce energy use, and raise revenues. For example, a combination of congestion pricing, employee parking charges, a 50 cent gas tax increase, and mileage and emissions fees would reduce VMT and trips by 5-7% and cut fuel use and emissions by 12-20%, varying by region. Because auto use and its impacts are quite inelastic to price, sizable increases in revenue can be obtained with relatively little effect on travel; conversely price increases must be large to obtain sizable reductions in travel and its externalities. Citizen reactions to prototype transportation pricing measures were explored in focus groups, and feedback from public officials and private organizations was obtained through meetings and interviews. First reactions were skeptical, but many were more favorably inclined after considering alternatives to pricing. Public acceptance would be increased by earmarking revenues for transportation improvements and providing independent oversight of revenue collection and expenditure. Federal and state laws govern and in some cases restrict the implementation of pricing strategies, and these and other institutional and administrative issues would have to be resolved before proceeding with specific measures.

### **Transport, Land-Use and the Environment, Chapter 10: Short-Term Impact Analysis of Pricing Strategies on VMT (Vehicle Miles Travelled) Reduction**

Y. Hayashi, J.R. Roy, T.J. Kim, and P. Hanley, 1996, *Transport, Land-Use and the Environment* 1996: 191-212, Report No. 0-7923-3728-X

*Abstract.* In order to comply with standards imposed by the US Environmental Protection Agency a number of strategies are being implemented across the United States. This paper assesses the impact of some of these transportation control measures, in particular pricing strategies, on the reduction of mobile sources of emissions and vehicle miles travelled. The case of Chicago is examined. Using data from the Chicago Area Transportation Study, a number of scenarios are tested which affect the cost of driving. These include various combinations of increases in fuel costs and parking charges. The most effective transportation control measures are identified.

### **Congestion Pricing and Motor Vehicle Emissions: An Initial Review**

R. Guensler and D. Sperling, 1994, *Transportation Research Board Special Report* (242): 356-379, ISSN: 0360-859X, Report No. 0309055059

*Abstract.* This paper examines the air quality impacts likely to result from congestion pricing. Key questions addressed are: What effect will congestion pricing have on trip making and VMT? How will traffic volumes change on priced and unpriced routes? How will the change in traffic volume affect the operating environment of vehicles (examined as a change in average vehicle speed under the current modeling regime) and the resulting emission rates per unit of vehicle activity? What changes in vehicle emissions are expected to result from overall changes in vehicle activity and emission rates? In this paper, the focus is on the effects of postulated changes in average vehicle operating speeds on emission rates. The existing emission modeling regime for average speed changes is examined, and a range of emission rate changes based on the projected changes in average vehicle operating speeds is provided. Using projected changes in average vehicle speeds provided by Harvey (in this volume, pp 89-114), percentage changes in emission rates associated with the implementation of four congestion pricing scenarios are examined.

### **Feasibility of Employee Trip Reduction as a Regional Transportation Control Measure**

M.R. Lupa, 1994, *Transportation Research Record* (1459): 46-52, Source Notes: This paper appears in *Transportation Research Record* No. 1459, Parking and Transportation Demand Management, ISSN: 0361-1981, Report No. 0309060664

*Abstract.* The passage of the Clean Air Act Amendments of 1990 resulted in the introduction of a number of transportation control measures (TCMs) that are designed to reduce the number of vehicle kilometers traveled in ozone nonattainment regions. Employee trip reduction (ETR) is one of those strategies. A policy analysis of ETR and a preliminary cost comparison of ETR among TCMs are presented. ETR is an evolving TCM and, as such, provides an arena for strategic planning using many tools, including direct political action, classical economics, technological implementation, pricing, and regional consensus building. Thus far ETR has not affected regional vehicle miles traveled, and yet it is premature to say that it has no effect on regional clean air

goals. ETR strategies cannot successfully be separated from related mode split component strategies such as transit expansion, transit user subsidy, and parking fees; this synergistic quality complicates freestanding analysis of ETR. Finally, the positive and negative results of ETR indicate that pricing of some sort is the most direct means of securing behavioral change.

### **An Assessment of Travel Pricing Strategies**

Regional Transportation Authority, September 1994

*Abstract.* A number of economists who have looked at our transportation problems have concluded that one of the key reasons we drive so much is because driving and the use of roads is underpriced. When prices are low, or the price is not perceived for what it is, i.e. the market signal is weak, then demand will not be tempered by market signals. There are a number of strategies by which market signals for travel demand can be strengthened. This report describes four major pricing strategies that recently have been discussed, analyzed and reviewed (and in a few cases implemented) by transportation planners, analysts and economists. The travel pricing strategies discussed in this report are: congestion pricing, parking pricing, fuel taxes and vehicle miles traveled/emission fees.

### **Urban Transportation: Reducing Vehicle Emissions with Transportation Control Measures**

General Accounting Office, August 1993, Source Notes: Report to Congressional Requesters, Report No. GAO/RCED-93-169

*Abstract.* In this report, the General Accounting Office (GAO) (1) reviews evidence on the effectiveness of transportation control measures (TCMs) in reducing pollution and (2) assesses the prospects for implementing TCMs in areas that have not attained federal air quality standards for ozone and carbon monoxide (CO). To meet these objectives, among other things, GAO conducted a nationwide survey of 119 metropolitan planning organizations (MPOs) in ozone and CO nonattainment areas. Briefly, GAO found the following: The traditional TCMs listed in the Clean Air Act Amendments of 1990 (CAAA) are projected to reduce regionwide hydrocarbon and CO emissions from 0 to 5% of total emissions. A strong consensus was found among transportation planners that TCMs are complementary programs that will supplement improvements in emissions technology, cleaner fuel, and vehicle inspection and maintenance programs. TCMs will play a growing role in transportation planning. The Intermodal Surface Transportation Efficiency Act (ISTEA) and CAAA contain funding and enforcement provisions that will encourage states to emphasize TCMs in the future. 56% of the surveyed MPOs stated that TCMs would receive strong emphasis in their transportation programs in the next 5 years (1993-98). Only 8% reported that TCMs had received strong emphasis in their programs during the last 5 years (1987-92). GAO found a strong consensus that market-based TCMs--financial disincentives that change travel behavior, such as gasoline taxes or emissions fees--may be more effective than traditional TCMs in reducing automobile use. Department of Transportation and Environmental Protection Agency officials are encouraging states to implement market-based TCMs. However, since these measures add to the cost of driving, they are economically and politically painful; 80% of the MPOs surveyed agreed that public resistance to these measures made their implementation highly unlikely. Localities that find market-based TCMs unfeasible may obtain maximum benefits from traditional TCMs through several approaches, including focusing on specific congested corridors and implementing TCMs that reduce the number of trips as well as the number of vehicle miles traveled.

### **Commuting, Congestion, and Pollution: The Employer-Paid Parking Connection**

D.C. Shoup and R.W. Willson, September 1992, Reason Foundation, Report No. Policy Insight No. 147

*Abstract.* Urban areas increasingly face problems associated with traffic congestion and vehicle air emissions. Employer-paid parking--a form of matching grant whereby an employer offers to pay the cost of parking if employees are willing to pay all other costs of driving to work--contributes to the tendency of employees to drive alone to work. In Los Angeles, the average employer-paid parking subsidy is equivalent to 11 cents per mile traveled to and from work. Thus,

imposing a congestion toll of 11 cents per vehicle mile traveled would raise the cost of driving to the Los Angeles CBD by only as much as employer-paid parking already lowers it. A survey of 5,060 commuters to downtown Los Angeles was used to estimate how employer-paid parking affects transportation system performance. The results show that employer-paid parking: increases the number of solo drivers by 44%; increases parking demand by 34%; increases automobile vehicle miles traveled to work by 33%; increases gasoline consumed for driving to work by 33%; increases the cost of automobile travel to work by 33%; and increases the total cost of parking at work and driving to work by 33%. Although employers spend an average of \$750 per employee per year for parking subsidies (\$563 in replaced employee spending, and \$187 in stimulated spending), the employees' own average spending for parking and driving declines by only \$183 per year. The net effect is that the employer must spend \$4.10 on parking subsidies for every \$1 the employee saves on the cost of parking and driving. This disproportion between the large amount employers pay and the small amount employees save is explained by employer-paid parking's strong stimulus to spending on both parking and driving: the stimulus to parking demand inflates what employers have to pay, and the stimulus to driving diminishes what the employees save. In offering to pay for their employees' parking at work, employers are responding to the Internal Revenue Code's so-called "special rule for parking", which defines employer-paid parking subsidies as a "working condition fringe" that is exempt from income taxation. Given the political difficulty of taxing employer-paid parking subsidies, an alternative policy would be to amend the special rule for parking in Paragraph (4) of Section 132(h) as follows: The term "working condition fringe" includes parking provided to an employee on or near the business premises of the employer if the employer offers the employee the option to receive in lieu of the parking, the fair market value of the parking subsidy, either as a taxable cash commute allowance or as a mass transit or ridesharing subsidy. Offering the cash option to employees who now receive employer-paid parking would reduce their solo driving share by an estimated 20%, and the number of vehicle miles traveled (VMT) per employee by 17%. This VMT reduction would reduce the total cost of automobile commuting to downtown Los Angeles by \$40 million per year, and would save 3.5 million gallons of gasoline per year.

### **Managing Transportation Demand: Markets Versus Mandates**

G. Giuliano and M. Wachs, September 1992, Reason Foundation, Report No. Policy Insight No. 148

*Abstract:* The increasing concern over congestion and air quality problems in Southern California, as well as recent federal legislation, has focused new attention on transportation demand management (TDM). The purpose of TDM is to reduce the demand for trips in order to cope with pollution problems and other difficulties associated with growth. There are two general approaches to TDM: a regulatory approach and a market-based approach. The regulatory approach, such as mandatory trip-reduction programs, involves requiring a class of individuals to achieve a specific performance target established by fiat, e.g. a particular average vehicle ridership. In contrast, a market-based policy creates incentives for socially desirable action but allows for discretionary market choices on the part of individuals. For example, the congestion pricing of expressways provides incentives for individuals to shift travel to non-peak times or to carpool, but it also allows individuals to pay premium fees if they so choose. This study compares the regulatory approach with the market-based approach, by focusing on a paradigm example of each. The South Coast Air Quality Management District's Regulation XV (a mandated employer-based trip-reduction program) is contrasted with the potential for congestion pricing on Southern California's freeways. The reduction in vehicle miles traveled (VMT) from congestion pricing is projected to be at least 12 times as great as that produced by Regulation XV. Even though regulatory techniques like Regulation XV are considered more politically acceptable, market-based strategies such as congestion pricing are more effective and more efficient, and should be considered the TDM policy tool of choice.