SP-9

Travel Demand Management

Goal

Reduce vehicle travel demand throughout the system.

Sustainability Linkage

Travel Demand Management (TDM) provides multiple sustainability benefits, including environmental (reduced energy consumption and related emissions), social (improved awareness of available travel choices), and economic (reduced costs of travel and congestion to economy).

TDM strategies aimed at maximizing traveler choices include education and outreach programs; incentivizing non-auto trips; ridesharing; parking, road, and vehicle pricing; pedestrian-friendly land use, and employer trip reduction programs (e.g., transit benefits, trip-end facilities, parking cash-out programs, teleworking, etc.). These measures are most effective in urban areas as this is where most congestion occurs and thus the benefits of reduced automobile travel may be most effectively realized.

Potential TBL Cost Savings*

$$ - Reduced congestion and parking demand can reduce the need for additional roadway capacity.

$$$ - Congestion reduction improves reliability, enhancing overall mobility.

$$ - Reduced greenhouse gas and principal pollutant emissions lessens environmental impact.

$$ - Traffic reductions and expanded transportation options can improve safety, health, and access.

*Order of magnitude dollar equivalent potential savings: $~1M, $$~10M, $$$~100M

Basis for Savings

Implementation of TDM strategies such as congestion pricing, policy changes, high-capacity rapid transit, parking management, transportation-efficient development, and others[1] can:

Reduce the need for billions of dollars in additional roadway capacity and associated maintenance, and maximize returns on existing infrastructure by implementing TDM measures that improve system-wide travel times, reliability, and access.[2]

Improve mobility and reliability by at least a few percent, reducing the hundreds of millions of dollars in costs related to person miles of travel and delay due to congested urban traffic for the public at large. Commuters and individuals who ride public transportation in urban areas can save almost $800 per month.[3]

Improve air quality by reducing emissions from single-occupancy vehicles (SOV) by several percent and preserve green space by reducing the amount of land needed for roads and parking facilities.[4]

Improve safety and access by at least a few percent reduces the tens of millions of dollars in costs associated with a lack of transportation options and the avoidable costs of traffic congestion, including crashes.[5]

Agency Experience

As a result of applying INVEST to Corridor Studies and the SR 520 Bridge Project in Washington State, the Washington State Department of Transportation (WSDOT) integrated TDM strategies into planning and programming that resulted in improved performance, measures, and guidelines.[6]

WSDOT reports significant successes with TDM throughout the years, including the removal of 28,000 vehicles from Washington roadways every weekday morning and an annual reduction of 62 million vehicle miles traveled (VMT) statewide. This reduction in VMT prevented 27,490 metric tons of greenhouse gases from being emitted and three million gallons of fuel from being consumed. Between 1990 and 2000 the City of Bellevue, WA, successfully reduced the SOV commute rate in downtown Bellevue by 30 percent by implementing TDM strategies.[7]

Figure 1: State Route 520 Bridge in Seattle, Washington (Source: Ramanathan)

Commuter Ridesharing

Ridesharing is a traditional TDM practice that strives to make long-term reductions in SOV trips in order to help meet air quality goals, increase system-wide efficiency, and improve travel time reliability. Other key benefits of ridesharing, carpooling, or vanpooling include user affordability, avoidance of costly car related expenses, time savings, reduced congestion, commuter tax benefits, and reduced greenhouse gas emissions and fuel consumption.[8]

A commuting cost calculator from the state of New Jersey estimates the following cost savings for carpools of various sizes:[9]

	Estimated Savings per Days of Carpool Use in a Week ($)				
Mode	1 Day	2 Days	3 Days	4 Days	5 Days
Carpool-2	6.11	12.22	18.33	24.44	30.55
Carpool-3	8.14	16.28	24.42	32.56	40.70
Carpool-4	9.16	18.32	27.48	36.64	45.80

Similarly the table below summarizes the CO_2 emissions from SOV commuting in the U.S. (lbs):[10]

Estimated CO_2 Emissions Savings per Typical SOV (lbs.)			
Daily	Weekly	Monthly	Yearly
23.3	116.5	456.6	5,587

In Los Angeles County, the ridesharing program reduced the cost per trip by $2.80 while the cost per person placed into a new ridesharing arrangement was $0.82 per day.[11]

Value/Congestion Pricing

Congestion pricing, a type of road pricing also known as value pricing, shifts travel time and reduces vehicle travel on a particular roadway depending on different factors such as congestion, location, and traffic volume levels.[12] The table below summarizes road pricing benefits on a rating scale from 3 (very beneficial) to -3 (very harmful). A score of 0 indicates no or mixed impacts.

Strategy[13]	Revenue Generation	Congestion Reduction	Pollution Reduction	Increased Safety
Road Toll (fixed rates)	3	2	1	1
Congestion Pricing (time-variable)	2	3	2	1
HOT Lanes	1	2	1	0
Cordon Fees	2	3	1	1
Distance-based Fees	3	2	2	2
Pay-As-You Drive Insurance	0	2	2	3
Road Space Rationing	0	3	1	1

Notes on Valuation

The range in the benefit-cost ratios and agency cost savings potential from TDM can be expected to vary across states due to:

- Highway congestion
- Availability of transit
- Willingness of employers to participate
- Degree of existing TDM system maturity

Individual Assessments

States are encouraged to review the FHWA Office of Operations publication titled *Integrating Demand Management into the Transportation Planning Process: A Desk Reference*[11] to assess the potential policy objectives as well as the scope of TDM in the planning process, and to consult the FHWA Invest Subject Matter Expert, egan.smith@dot.gov for additional working materials in assessing their own unique situations and/or if they have information that could assist others on this topic. States are also encouraged to review the FHWA Office of Operations *Operation Benefit/Cost Analysis Desk Reference*[14] and to consult with jim.hunt@dot.gov with questions relating to this material.

References

[1] Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). "Congestion & Transportation Demand Management" website. Accessed June 29, 2014, http://www.planning.dot.gov/focus_congestion.asp.

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[3] U.S. Census Bureau. "Table 1114. Passenger Transit Industry – Summary: 1990 to 2008". Accessed June 12, 2014, http://www.census.gov/compendia/statab/2011/tables/11s1115.pdf.

[4] SANDAG. 2012.

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[7] City of Bellevue. *Connect Bellevue: 2011-202 Transportation Demand Management Plan*. 2010. http://www.bellevuewa.gov/pdf/Transportation/draft_Citywide_Transportation_Demand_Management_Plan_.pdf.

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[10] RITA. 2010.

[11] FHWA. *Integrating Demand Management into the Transportation Planning Process: A Desk Reference*. By Gopalakrishna, Deepak, et al. 2012. Accessed July 1, 2014, http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf.

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[13] VTPI. *Road Pricing, Congestion Pricing, Value Pricing, Toll Roads and HOT Lanes*. 2010. Accessed July 3, 2014, http://www.apta.com/gap/advocacy/Documents/Victoria%20BC%20Mobility%20Management%20measurement.pdf.

[14] FHWA. Operation Benefit/Cost Analysis Desk Reference. By the Office of Operations. Accessed June 24, 2014, http://www.ops.fhwa.dot.gov/publications/fhwahop12028/index.htm#toc.