Why Manage Transportation Demand?

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TDM Encyclopedia

Victoria Transport Policy Institute

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Updated 26 July 2008

This chapter describes reasons to consider TDM solutions to transportation problems.

Introduction

Transportation Demand Management (TDM) (also known as *Mobility Management*) is a general term for various strategies that increase transportation system efficiency. TDM treats mobility as a means to an end, rather than an end in itself. It emphasizes the movement of people and goods, rather than motor vehicles, and so gives priority to more efficient modes (such as walking, cycling, ridesharing, public transit and telework), particularly under congested conditions. It prioritizes travel based on the value and costs of each trip, giving higher value trips and lower cost modes priority over lower value, higher cost travel, when doing so increases overall system efficiency.

TDM By Any Other Name Is Just As Sweet

Transportation Demand Management, or TDM, is a technical term used by planners, engineers and economists. It is not very suitable for use with the general public. After all, TDM sounds like *tedium*, something that is boring and unpleasant, not an image likely to gain supporters. Other terms can provide a more positive image.

Mobility Management is increasingly used by transportation planners, particularly in Europe.

Travel Options or *Travel Choices* refers to TDM strategies that involve improving alternative modes and rewarding people who reduce their vehicle use.

Innovative Transportation Management Solutions emphasizes that these strategies are new and rely primarily on managing existing transportation facilities, rather than building new capacity.

Least-Cost Planning and *Integrated Planning* refer to planning that gives demand management equal consideration with capacity expansion.

There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers. Some provide incentives to change trip scheduling, route, mode or destination. Others reduce the need for physical travel through more efficient land use, or transportation substitutes. Although most individual TDM strategies only affect a small portion of total travel, the cumulative impacts of a comprehensive TDM program can be significant.

Solving Transportation Problems

Transport problems and solutions can be viewed in two different ways. One is as *individual problems with technical solutions*: traffic and parking congestion require building more roads and parking facilities; crash risk requires roads and vehicles that offer greater crash protection; energy problems require alternative fuels and efficiency standards; mobility for non-drivers in automobile-oriented areas requires paratransit services. The motto is, "adjust roads and vehicles, not driver behavior."

But this approach has a fundamental flaw. Solutions to one problem often exacerbate other problems, particularly if they increase total vehicle travel. For example, over the long run, increasing roadway capacity tends to increase crashes, energy consumption and pollution, due to Induced Vehicle Travel; crash protection requires heavier vehicles that consume more energy; Fuel Efficiency Standards reduce the per-mile cost of driving, stimulating more traffic congestion and crashes; Paratransit vehicles add traffic congestion, crash risk and pollution. As a result, this approach cannot solve all problems because the more a solution achieves its objectives, the more it exacerbates other problems.

The other perspective is that most transportation problems share a common root: *market distortions that result in excessive automobile use*. From this perspective, solving transport problems requires planning reforms that increase transport options, and market reforms that give consumers suitable incentives to choose the best option for each individual trip. The motto is, "increase transportation system diversity and efficiency." Transportation Demand Management is the general term for this approach.

Although most individual TDM strategies only affect a small portion of total travel, and so their benefits appear modest with respect any particular problem, their impacts are cumulative and synergistic. When all benefits and costs are considered, TDM programs are often the most cost effective way to improve transportation.

Conventional evaluation practices tend to overestimate the overall benefits of technical solutions because they ignore indirect costs (such as the problems resulting from induced vehicle travel), and they tend to underestimate the full benefits of TDM strategies (such as helping to improve mobility for non-drivers, or support for strategic land use objectives). More comprehensive Evaluation and Planning practices are needed for TDM to receive the recognition and support that is justified.

Transportation Demand Management is increasingly used to address a variety of problems. Several trends are increasing the value of TDM, particularly as an alternative to expanding roads and parking facilities. During the Twentieth Century most countries developed extensive roadway networks. These systems are now mature, allowing motorists to drive to most destinations with relative convenience, safety and affordability, expect under urban-peak conditions. The major transportation problems facing most communities are traffic and parking congestion, inadequate mobility for non-divers, and various economic, social and environmental costs associated with high levels of automobile travel; all problems that can be addressed by TDM. The value of TDM is further enhanced by the following trends:

- *Rising facility costs.* The costs of expanding highways and parking facilities is increasing. In many cases it is more cost effective to manage demand than to continue expanding supply.

- *Increased urbanization.* In most developed countries the majority (typically 80-90%) of people and jobs are located in urban areas, where traffic and parking problems are significant and alternative modes are cost effective.

- *Demographics*. The population is aging in most developed countries, increasing the importance of providing quality travel options for non-drivers.

- *Energy Costs*. Vehicle fuel costs are projected to increase in the future due to depletion of oil supplies and environmental constraints.

- *Consumer preferences and market trends*. Many consumers want to live in more multi-modal communities where it is possible to walk and bicycle safely, use neighborhood services, and have access to quality public transportation.

- *Environmental concerns*. Concerns over air pollution, sprawl and other environmental impacts are motivating policy changes to encourage more efficient transportation.

When people think about transportation improvements they often envision new modes of travel: canals, steamships, railroads, automobiles and air travel. What comes next? Rockets? Lighter-than-air ships? Teleporters? Perhaps these may become more common in the future. But they will not necessarily solve existing transportation problems such as urban traffic congestion, parking costs or traffic crashes. The next major breakthrough to improve transport system quality may simply consist of management strategies that result in more efficient use of existing transport resources. When all impacts are considered, such strategies are often the best solution to transportation problems.

The Next Big Thing in Transportation – by Todd Litman
A few years ago I participated in a conference concerning the future of transportation, sponsored by the Idaho Department of Transportation. Conferences like this can be very useful by helping decision-makers think about long-term issues and develop strategic plans.

The main speaker was a "futurist," whose role was to identify broad social and economic trends that affect transportation. This makes sense, a futurist is, by definition, a professional concerned with long-term issues. But this futurist was primarily concerned with new consumer technologies, and his presentation consisted mainly of images copied from the Internet sites of various inventors and promoters showing flying cars, maglev trains, local helicopter services, and other large and fast vehicles (e.g., TurboHawk flying cars at www.turbohawk.com, and the High Speed Ground Transportation Association at www.hsgt.org), presented as the NEXT BIG THING in transportation, without critical analysis. This is the same vision presented by science fiction writers and artists since the beginning of the 20th century: transportation improvements consist of faster travel modes.

This vision is not necessarily wrong. The history of transportation consists, in part, of faster modes that expand human activities: steamships, railroads, bicycles, automobiles and air travel. Some faster modes are likely to become more common in the future. But it is important to consider the overall

value these modes can provide to society, and the problems they create: Can flying cars, maglev trains and local helicopter services really address the major transport problems facing communities? Can most individuals afford to uses them? What economic, social and environmental costs will they impose?

These high-speed modes can do little to address common transport problems such as road and parking congestion, crash risks to motorists and pedestrians on local streets, and inadequate travel options for non-drivers. It would be wasteful for a community to devote an excessive portion of its resources to these modes, when more fundamental transportation problems exist. Faster modes tend to increase space requirements, energy consumption, noise and air pollution, and crash risk compared with slower modes, imposing costs on non-users. When total costs and benefits are considered, many communities may prefer to forego these faster technologies or limit their use.

Perhaps the NEXT BIG THING in transportation is not a new mode or service, perhaps it is a new paradigm, that is, a new way of thinking about transportation problems and solutions. Perhaps it is an incremental approach that consists of management innovations that result in more efficient use of existing transportation systems.

This is not as radical as it may sound. Many important revolutions result from more effective use of existing technologies and resources, rather than a new technology. For example, no single technology has caused the tremendous growth in agricultural and industrial productivity during the last half-century, these “revolutions” result from the implementation of many incremental improvements, and many of the basic tools used in farms and factories have not changed at all during this time. Applying best management practices (what experts often call the “fundamentals”) is the key to improving overall system efficiency, competitiveness and service quality.

This means that the best solutions to transport problems may consist of management innovations that encourage efficiency and improve basic mobility services (walking and cycling conditions, road system management, public transit services, delivery services, etc.), rather than a new mode or breakthrough technology. Transportation Demand Management is the general term for strategies that achieve this. In other words, TDM can be the NEXT BIG THING in transportation.

Cost Effective Solution to Transportation Problems

When all impacts are considered, TDM is often the most cost effective solution to transportation problems (TDM Evaluation). TDM can provide multiple benefits, including reduced congestion, road and parking facility cost savings, crash cost savings, consumer cost savings, pollution reduction, and more efficient land use. Although not every TDM strategy supports every objective, most support several. A comprehensive TDM Program that includes a variety of complementary TDM strategies usually helps achieve most transportation improvement objectives.

Transportation Demand Management can provide significant savings to consumers and society by reducing and deferring roadway capacity expansion costs. It is often the Least Cost solution. Adding capacity to accommodate additional peak-period vehicle trips typically costs $5 to $20 per day just for road and parking facilities (Transportation Costs). In addition, consumers must spend thousands of

dollars annually on Vehicle Costs, and society bears external costs, including crash risk, pollution emissions and reduced mobility for non-drivers.

Since the majority of travel is by automobile in most communities (at least as transport is often Measured), you might assume that the best way to improve transport is to increase roadway capacity. But the existing roadway system provides a relatively high level of service, and there are diminishing marginal benefits from additional roadway investments. Motorists can travel to most destinations with reasonable speed, comfort and safety, except under urban-peak travel conditions. These are the conditions in which TDM tends to be effective, due to concentrated travel demand. The major transportation problems facing most communities (traffic and parking congestion, inadequate mobility for non-drivers, and external costs from traffic), are the types of problems that TDM can effectively address.

Individual TDM strategies tend to provide modest but multiple benefits, and so are not usually considered the best solution to any single objective. Conventional transportation evaluation practices that focus on individual problems tend to undervalue TDM solutions (Comprehensive Planning). They tend to favor technical solutions are effective at reducing one or two problems, although they often exacerbate others due to Rebound Effects. For example, adding capacity may reduce traffic congestion on a particular highway, but it can increase downstream traffic congestion, parking problems, crashes, environmental impacts, and urban sprawl. Conversely, fuel efficiency standards and alternative fuels that reduce vehicle operating costs encourage increased driving, which can increase traffic congestion, road and parking facility costs, crashes, sprawl and even some types of pollution. Table 1 illustrates how conventional solutions tend to support a particular objective but conflict with others, while TDM programs tend to support all objectives.

Table 1 **Impact Evaluation** (Evaluating TDM)

Objective	Widen Highways	Fuel Efficiency Standards	TDM Program
Congestion Reduction	+	-	+
Road & Parking Savings	-	-	+
Consumer Savings (vehicle costs)			+
Transport Choice			+
Road Safety	-	-	+
Environmental Protection	-	+	+
Efficient Land Use	-	-	+
Community Livability	-		+

+ = supports objective. - = contradicts objective.

Critics sometimes claim that TDM has been tried but failed. They make statements such as, “For more than a decade transportation planners have encouraged Americans (or Canadians, Southern Californians, Germans, etc.) to carpool (or ride transit, bicycle, walk, telecommute, give up their cars, etc.) but automobile traffic continues to grow.” Such statements misrepresent the issue.

The truth is that most TDM programs are cost effective overall but too modest in scale to significantly impact overall travel patterns. Many communities implement individual TDM strategies that are worthwhile investments (Success Stories), but virtually no community has implemented the full range of TDM strategies that are technically feasible and economically justified. Comprehensive TDM programs that include a variety of individual strategies can make a major contribution to solving regional or national transportation problems. The question is not, "Can TDM solve transportation problems," but "How much will we allow TDM to solve transportation problems." TDM is limited by its institutional and political acceptance, not by its technical feasibility or cost effectiveness.

Flexibility

TDM can provide flexible solutions. TDM greatly expands the range of solutions that can be considered for addressing transportation problems, and allows solutions to be tailored to a particular situation. It can often be implemented quickly, and target a particular location, time period or user group. For example, TDM can reduce congestion problems during Special Events, road construction or emergencies. It may allow new development in areas where road and parking capacity is constrained, it can help protection particularly sensitive environments, and it can provide access to groups with special mobility needs.

Consumer Benefits

TDM can directly benefit consumers. Most strategies use positive incentives, as illustrated in Table 2. They give consumers more travel options or opportunities to save money. Motorists that continue driving are no worse off, and those who reduce their driving must be better off or they would not change their travel habits.

Table 2 **Direct Consumer Impacts**

Positive Incentives	Mixed	Negative Incentives
Alternative Work Schedules	Access Management	Fuel Tax Increases
Bike/Transit Integration	Carfree Planning	Parking Pricing
Carsharing	Comprehensive Market Reforms	Road Pricing
Commuter Financial Incentives	HOV Preference	Vehicle Use Restrictions
Guaranteed Ride Home	Parking Management	
Improved Security	Smart Growth	
Location Efficient Mortgages	Street Reclaiming	
New Urbanism	Traffic Calming	
Park & Ride		
Pay-As-You-Drive Insurance		
Pedestrian and Cycling Improvements		
Ridesharing		
School Trip Management		
Shuttle Services		
TDM Marketing		
Telework		
Transit Improvements		

Transit Oriented Development		

Most TDM strategies use positive incentives: they improve transportation options or provide new rewards for reduced driving. Motorists who continue their current travel patterns are no worse off, and those who reduce their mileage must be directly better off or they will not change their travel patterns. These are in addition to indirect benefits to motorists, such as reduced traffic congestion, facility costs and pollution emissions, and benefits to non-motorists from reduced crash risk.

Positive incentives by themselves tend to modest travel impacts, and so are most cost effective when implemented with other strategies, such as road and parking charges. Price increases are often criticized as unfair and harmful to consumers (Criticisms of TDM). However, consumers already bear the costs of roads and parking indirectly, through taxes, as a substitute for other employee benefits, and as higher costs for consumer goods. Automobile user charges therefore represent direct rather than indirect payment for these facilities, not necessarily a new consumer cost (Evaluating Pricing).

Some people are skeptical that TDM strategies are feasible, because they require consumers to change their travel habits and support policy changes such as pricing reforms. Although such changes may be difficult to implement, there are examples of successes, including recycling, smoking reductions and seat belt use. In each case, a combination of public education, policy changes and support services have had a dramatic impact on behavior patterns, indicating that consumers can support such changes both politically and individually.

Equity

TDM can help achieve equity objectives (Evaluating TDM Equity). For example, TDM strategies can:

- Increase horizontal equity (fairness) by creating more neutral planning and investment practices.
- Increase horizontal equity by making transportation prices more accurately reflect costs.
- Benefit lower-income people by providing direct financial savings and improving affordable transport choices.
- Benefit transportation disadvantaged people by improving transport choices and reducing the automobile external costs they must bear (such as road and parking subsidies, and uncompensated crash risk and pollution costs).
- Improve basic access by increasing transport choices and giving priority to higher value trips.

Not all TDM strategies provide all of these equity benefits, but many do, and a comprehensive TDM program that includes a suitable combination of strategies will usually help achieve most equity objectives. Table 3 lists TDM strategies that help achieve specific TDM objectives.

Table 3 TDM Strategies That Help Achieve Equity Objectives

Treats Everybody Equally	User-Pays	Benefits Lower Income	Benefits Transport Disadvantaged	Basic Mobility and Access
Institutional Reforms	Comprehensive Market Reforms	Alternative Work Schedules	Bike/Transit Integration	Access Management
Least Cost Planning	Distance-Based Fees	Carsharing	Carfree Planning	Bike/Transit Integration
Location Efficient Mortgages	Fuel Tax Increases	Commuter Financial Incentives	Commuter Financial Incentives	Freight Transport Management
Parking Management	Parking Management	Guaranteed Ride Home	Comprehensive Market Reforms	Guaranteed Ride Home
	Pay-As-You-Drive Insurance	HOV Priority	Guaranteed Ride Home	HOV Preference
	Parking Pricing	Improved Security	HOV Preference	Improved Security
	Road Pricing	Location Efficient Mortgages	Parking Management	Parking Management
	Smart Growth	New Urbanism	Improved Security	Pedestrian and Cycling Improvements
		Pay-As-You-Drive Insurance	Location Efficient Development	Ridesharing
		Park & Ride	New Urbanism	School Trip Management
		Parking Management	Pedestrian and Cycling Improvements	Shuttle Services
		Pedestrian and Cycling Improvements	Ridesharing	Smart Growth
		Ridesharing	School Trip Management	Telework
		School Trip Management	Shuttle Services	Transit Improvements
		Shuttle Services	Smart Growth	Traffic Calming
		Smart Growth	Street Reclaiming	Universal Design
		TDM Marketing	Taxi Service Improvements	Vehicle Use Restrictions
		Telework	TDM Marketing	
		Transit Improvements	Telework	

		Transit Oriented Development	Tourist Transport Management Transit Improvements Traffic Calming Transit Oriented Development Universal Design Vehicle Use Restrictions	

This table lists TDM strategies that help achieve various equity objectives.

Although some TDM programs require subsidies, these can only be considered unfair if they are greater than subsidies for comparable automobile travel. Expenditures on alternative modes may simply represent an alternative way for non-drivers to receive their share of transportation resources. Even if subsidies are greater than that for automobile travel per passenger-mile, non-drivers only travel about a third as much as distance as motorists each year, and so per capita annual subsidies tend to be smaller. Total annual per capita transportation external costs and subsidies tend to be much greater for motorists than for transit riders (Social Benefits of Public Transit).

Automobile-oriented strategies to achieve transportation equity objectives often create new problems. Since annual vehicle travel tends to increase significantly with income, higher income people tend to receive the greatest per capita transportation subsidies. For example, free parking and low road users charges, which are often justified on the grounds that they make driving more affordable for lower-income motorists, but they result in cross-subsidies from low-income households that do not own an automobile to high-income households that drive more than average. It would be fairer to charge users the full costs of their road and parking costs and provide a targeted subsidy to lower-income households. TDM strategies can result in better Transportation Choices to people who are transportation disadvantaged, and a fairer distribution of public resources.

The equity benefits of TDM can be particularly large for comprehensive TDM programs that reduce market distortions, increase transportation choices, and create more balanced transportation and land use systems. This can provide significant financial savings that particularly benefit lower-income households and people who are transportation disadvantaged (McCann, 2000). Many TDM strategies help achieve equity objectives in addition to economic and social objectives (Win-Win Transportation Solutions). Implementing such “no regrets” solutions helps achieve more Sustainable Transportation.

Economic Benefits

An efficient market must follow specific rules, including consumer choice, competition, cost-based

pricing and economic neutrality (Market Principles). Transportation markets often violate these principles in ways that increase encourage excessive automobile use, as summarized in the table below.

Table 4 **Market Principles – Implications for TDM** (Market Principles)

Market Requirements	Current Transport Markets	Implications for TDM
Choice. Consumers need viable transportation and location choices, and information about those choices.	Consumers often have few viable alternatives to owning and driving an automobile, and living in automobile-dependent communities.	Many TDM strategies improve consumer choice.
Competition. Producers must face competition to encourage innovation and efficient pricing.	Most roads and public transit services are provided as public monopolies. There is often little competition or incentive for innovation.	Some TDM strategies directly encourage competition and innovation, while others encourage it indirectly by increasing demand for alternative modes.
Cost-based pricing. Prices should reflect costs as much as possible, unless a subsidy is specifically justified.	Transportation in general, and driving in particular, is significantly underpriced. Many costs are either fixed or external.	Many TDM strategies result in more efficient transportation and land use pricing.
Economic neutrality. Public policies (laws, taxes, subsidies, and investment policies) should apply equally to comparable goods and users.	Tax policies, regulations and planning practices tend to favor automobile traffic over demand management alternatives.	Many TDM strategies help correct existing biases in transportation planning and investment practices.
Land Use. Land use policies should not favor automobile oriented development.	Zoning laws, development practices and utility pricing tend to encourage lower-density, automobile-dependent land use patterns.	Some TDM strategies correct existing land use planning biases. TDM tends to encourage more efficient land use by discouraging automobile dependency.

Current transportation systems often violate market principles. Many TDM strategies help correct these distortions, resulting in increased efficiency and equity.

These inefficiencies are cumulative, so analysis of just one impact underestimates the total harm that results from price distortions, and the potential benefits from market reforms. For example, underpriced parking not only encourages inefficient use of parking facilities, it also exacerbates traffic congestion, roadway costs, crashes and pollution. Similarly, underpricing road use increases not only congestion and roadway costs, but also parking costs, traffic accidents and pollution. Over the long run underpriced driving creates less accessible land use patterns and reduces travel choices.

To the degree that transportation and land use markets are distorted as described in Table 4, a portion of automobile travel is economically inefficient. Although consumers may perceive direct benefits from driving, at the margin these benefits are more than offset by additional costs borne elsewhere in the economy. An efficient market allows consumers to choose the optimal level of vehicle use. In a less distorted market, consumers would drive less, and be better off overall as a result.

Transportation Demand Management helps correct current transportation and land use market distortions by increasing consumer choice, encouraging competition, making prices more accurately reflect costs, and creating more neutral planning and tax policies. In this way, TDM can support economic

development by increasing productivity, reducing external costs and shifting consumer expenditures toward goods that provide greater employment and business activity (TDM and Economic Development).

Many current public policies developed with little consideration of their long-term impacts on travel behavior or land use patterns. For example, minimum parking requirements in zoning codes were created by transportation professionals and implemented by local governments to make driving convenient and avoid spillover problems, but with little consideration of their tendency to increase per capita automobile ownership and use, or result in more dispersed land use over the long run. Many other public policy decisions have similar "leveraging" effects on transport and development patterns. TDM applies this in positive ways, allowing public policy decisions to more effectively support long-term transportation and land use objectives.

Sustainable Transportation

Transportation Demand Management can help create a more sustainable transportation (Sustainable Transportation and TDM). TDM reflects sustainability principles of integration and resource efficiency. TDM supports specific sustainability objectives, including resource conservation, equity, environmental protection, efficient land use, and public involvement. Sustainable transportation tends to rely on TDM as a primary solution to transportation problems.

A Stitch In Time…

TDM is a preventive solution to transport problems. In general, preventing problems is more cost effective than treating problems after they occur. Good preventive management avoids damages, stress and productivity losses that result from inefficient systems and unexpected failures. This applies to virtually any system:

- *Human body* - health maintenance activities tend to be more cost effective than treating medical problems, and avoid the disabilities, pain and complications of illness.
- *Buildings and factories* - monitoring electrical and plumbing systems and replacing damaged parts is cheaper, safer and easier than dealing with emergency failures.
- *Vehicles* - replacing tires before they are worn through is cheaper and safer than dealing with unexpected blowouts.
- *Transportation networks* - mobility management can reduce congestion or air pollution before they become major problems, and provides options for dealing with unexpected change and unusual demands.

However, preventive solutions tend to be undervalued, because beneficiaries are seldom aware of the harms they avoid. For example, a family physician who urges you to lose weight, exercise and stop smoking is considered an annoyance, but a surgeon who performs a successful heart transplant after you get heart disease is considered a hero. Similarly, fire prevention (safety education programs, zoning requirements for smoke alarms and sprinklers, appliance design standards) may seem mundane and tedious, but firefighters who rescue people from burning buildings are heroes.

Similarly, a mobility management program that reduces traffic congestion and crashes may receive little appreciation. Beneficiaries never experience the problems that are avoided, but they experience the annoyance of new regulations and pricing requirements. The benefits may be quite real, but only evident through statistical analysis. For example, there may be little excitement about a new mobility management program that results in roadway Level-of-Service C (modest congestion) rather than E or F (extreme congestion), since congestion still exists, although this represents a significant reduction in traffic delay. Similarly, few people are likely to be very excited hearing that a new management program reduced their chance of dying in a car crash from 0.000000008 to 0.000000006 per passenger-mile, although this represents a 25% reduction in risk.

Wit and Humor

Early one morning an inebriated man goes ice fishing. He finds a spot on the ice that he thinks looks good, and starts to drill a hole with his auger. Suddenly, a loud booming voice from above says, "THERE ARE NO FISH DOWN THERE!"

So he stops drilling, looks around, but there is nobody in sight. He moves to another spot, and starts to drill again. The same voice booms, "THERE ARE NO FISH THERE!"

So he moves a little further and is about to drill again, but the voice calls out one more time, "THERE ARE NO FISH THERE EITHER!"

The drunk looks around again and says, "Who are you anyways? God?"
"NO, I'M THE RINK MANAGER!"

Conclusions

Transportation Demand Management offers many potential benefits. In fact, many transport problems are virtually unsolvable without some TDM. Conventional solutions, such as increasing roadway capacity or improving vehicle design, often reduce one problem but exacerbate others, particularly if they increase total vehicle travel. When all costs and benefits are considered, an integrated TDM program that includes an appropriate set of complementary strategies is often the most cost effective way to improve transportation.

Automobiles are wonderful servants but terrible masters. It is important to avoid letting motor vehicles damage our communities or burden our lives by limiting the solutions we consider to transportation problems or overlooking their full impacts.

Many transportation professionals are skeptical that TDM can be effective because it requires consumers to change their travel behavior. They argue that Americans (or Canadians, British, French, etc.) have a love affair with their cars, and so will not voluntarily reduce their driving. As a result, they favor technological solutions (e.g., wider roads, increased parking capacity, vehicle design improvements) over TDM strategies. However, these arguments are often wrong. Given suitable options and incentives, people are often willing to change their consumption patterns. Traffic safety programs, smoking

reduction and consumer recycling are all examples of successful programs that require individuals to change their behavior in order to achieve public safety, health and environmental objectives. In these, and other cases, technical solutions alone (more crashworthy vehicles, less harmful cigarettes, larger garbage pits) are less effective, less cost effective, and tend to create additional problems (Gladwell, 2001).

As an example, during the last few three decades, rates of cigarette smoking have declined from over half to less than a quarter of North American adults. This resulted, in part, from public policies that made smoking less convenient, particularly prohibitions on smoking in workplaces and other enclosed public spaces. When these policies were first proposed opponents argued that they violated smokers' rights. Since more than half of the patrons and employees smoked at many worksites, it would be fairer to require non-smokers to leave a building for fresh air than to require smokers to leave when they smoke. But, as smoke-free workplace policies were implemented, many people took the opportunity to reduce or stop smoking. In other words, policies that *accommodate* workplace smoking actually forced some people to smoke more than they wanted. The natural rate of smoking in a neutral environment, reflecting true consumer preference, is half what occurs when people are surrounded by cigarette smoke.

Although about half the population consisted of smokers, half of these were actually reluctant smokers who preferred to be non-smokers, but could not quit without support, including restrictions on workplace smoking. Allowing smoking in public buildings really only benefited about a quarter of the population, the hard-core smokers, but made three-quarters of the population directly worse off, including people who never smoked and those who voluntarily give up when given support. In addition, reduced smoking provides broad social benefits by reducing smoke-related illnesses, disabilities and deaths.

Similarly, although many people rely on automobile travel, this reflects, in part, public policies that encourage driving beyond what would occur in a more neutral transport system. Current transport planning and investment practices designed simply to accommodate automobile travel result in transportation and land use patterns that favor automobile travel and reduce travel options. Just as workplace smoking made it difficult for many people to successfully give up smoking, policies to accommodate automobile travel tend to create barriers to alternative modes. Wide roads with heavy traffic, and abundant parking around buildings create barriers to walking, and disperse destinations so they are difficult to serve efficiently with public transit.

At the margin (i.e., relative to current travel patterns), many consumers would prefer to drive somewhat less than they do now, and use alternatives more. Even people who enjoy driving are sometimes willing to use alternatives, particularly if there is a comfortable, convenient, affordable alternative to driving on congested roadways. TDM does not require that motorists completely give up their cars; rather, it requires modest changes under certain conditions, often resulting from positive incentives which rewards people who change modes, while those who drive are no worse off.

Roadway investments have declining marginal benefits. Although roadway transportation is important for personal accessibility and community development, once a basic roadway system exists in a region,

there are modest benefits from increasing capacity, and substantial costs if roadway projects lead to Automobile Dependent transportation and land use patterns. Put another way, under many circumstances, there are more benefits from increasing transportation system efficiency and Diversity than from increasing roadway system capacity.

Motorists can travel to most destinations with reasonable convenience, economy and safety, and quickly *except under urban-peak conditions*. The major transport problems in most communities are traffic congestion, facility costs, traffic impacts on community livability, and limited mobility for people who are transportation disadvantaged - all problems TDM can help address.

Related Chapters

For more discussion of TDM benefits see TDM Planning, Evaluating TDM, Measuring Transportation, Comprehensive Transportation Planning, Evaluating Pricing Strategies, Evaluating Transportation Choice and Win-Win Transportation Solutions.

References And Resources For More Information

Katie **Alvord** (2000), *Divorce Your Car; Ending The Love Affair With The Automobile*, New Society Publishing (www.newsociety.com).

American Planning Association (www.planning.org) has extensive resources for community and transportation planning.

Association for Commuter Transportation (www.actweb.org) is a non-profit organization supporting TDM Programs.

Sally **Cairns**, et al (2004), *Smarter Choices - Changing the Way We Travel*, UK Department for Transport (www.dft.gov.uk); at www.dft.gov.uk/stellent/groups/dft_susttravel/documents/divisionhomepage/031340.hcsp. This comprehensive study provides detailed evaluation of the potential travel impacts and costs of various mobility management strategies. Includes numerous case studies.

Center for Transportation Excellence (www.cfte.org) provide research materials, strategies and other resources for evaluating public transportation benefits.

Commuter Choice Program (www.epa.gov/oms/traq) provides information, materials and incentives for developing employee commute trip reduction programs.

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Information and Publicity Helping the Objective of Reducing Motorized Mobility (INPHORMM) (www.wmin.ac.uk/Env/UDP/phorm/inphormm.htm) is an organization that supports TDM marketing efforts.

International Council for Local Environmental Initiatives (www.iclei.org) provides tools to help communities become healthier and more environmentally responsible.

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This Encyclopedia is produced by the Victoria Transport Policy Institute to help improve understanding of Transportation Demand Management. It is an ongoing project. Please send us your comments and suggestions for improvement.

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Victoria Transport Policy Institute

www.vtpi.org info@vtpi.org

1250 Rudlin Street, Victoria, BC, V8V 3R7, CANADA

Phone & Fax 250-360-1560

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