

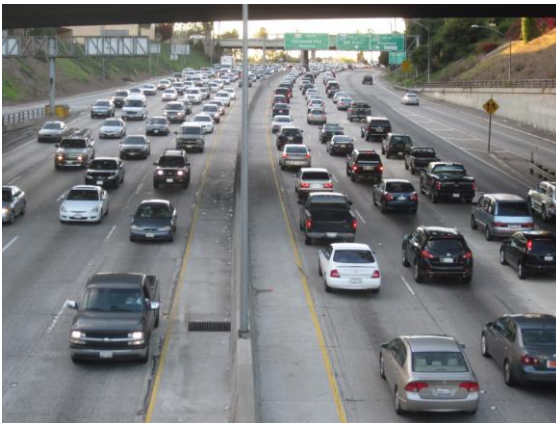
## Are Vehicle Travel Reduction Targets Justified?

*Evaluating Mobility Management Policy Objectives Such As Targets To Reduce VMT And Increase Use Of Alternative Modes*

29 August 2013

Todd Litman

*Victoria Transport Policy Institute*



*Automobile dependency and sprawl force people to drive more than is economically efficient. VMT reduction targets provide a framework for policy and planning reforms that help create more accessible, multi-modal communities where less driving is needed to meet people's needs.*

### Abstract

This report investigates whether transportation policies should include targets to reduce vehicle travel and encourage use of alternative modes, called *mobility management objectives*. Such objectives may be justified on several grounds: they help solve various problems and provide various benefits; they help insure that individual short-term planning decisions support strategic goals; and they help prepare for future travel demands. Many mobility management strategies are market and planning reforms that increase transport system efficiency and equity. Mobility management criticism tends to reflect an older, automobile-oriented planning paradigm that considers a limited range of objectives, impacts and options. More comprehensive analysis tends to favor mobility management. Appropriate mobility management can reduce vehicle travel in ways that minimize costs and maximize benefits to consumers and society.

This report expands on the article  
Todd Litman (2013), "Comprehensive Evaluation Of Energy Conservation And Emission  
Reduction Policies," *Transportation Research A*, Vol. 47, January, pp. 153-166

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## Introduction

Should transportation policies include targets to reduce *vehicle miles of travel* (VMT) and increase use of alternative modes (walking, cycling, public transit, etc.)? For example, the proposed *Federal Surface Transportation Policy and Planning Act of 2009* includes goals to “reduce national per capita motor vehicle miles traveled on an annual basis” and “increase the total usage of public transportation, intercity passenger rail services, and non-motorized transportation on an annual basis” (Commerce Committee 2009).

Proposals include targets to reduce per capita vehicle travel 16%; triple walking, biking, and public transit use; and increase rail and intermodal freight mode share 20% (Holt, et al. 2009). California law requires regional governments to develop *smart growth* policies that reduce VMT (CPDR 2008). Washington State has a target to reduce per capita VMT 25% below 1990 levels by 2035 (Winkelman, Bishins and Kooshian 2009). TransForm (2009b) has established a trip generation reduction certification program that communities can use to reduce VMT from new developments.

Critics argue that such targets are misguided. Highway advocacy groups (HUA 2009), activist organizations (Poole 2009a; O’Toole 2009; Cox 2009), and some transport policy experts (Pisarski 2009a) oppose these objectives claiming that VMT reductions necessarily harm consumers and the economy, are cost inefficient and unfair. Poole (2009b) calls VMT reduction goals “a terrible idea” and challenges proponents to prove they are cost effective. I accept that challenge.

VMT reductions are not *goals* (things you ultimately want to achieve), they are *objectives* (specific ways to achieve goals). Common transport planning goals include accessibility, cost efficiency, safety, social equity and environmental protection. VMT reductions are not necessarily the most effective way of achieving any of these goals individually, but when all impacts (benefits and costs) are considered, they are often very cost effective. VMT reduction targets can be justified in several ways:

- To help achieve specific planning objectives including congestion reduction, facility cost savings, consumer savings, accident reductions, improved mobility for non-drivers, energy conservation, emissions reductions, and improved public health.
- To support worthwhile policy and planning reforms, such as more efficient pricing, more neutral transport funding practices, and more integrated transport and land use planning.
- For strategic guidance for multiple jurisdictions and agencies, for example, to encourage local governments to implement smart growth development reforms while regional and state transport agencies implement walking, cycling and public transport improvements.
- As a way to anticipate future changes in travel demands which reduce the value of roadway expansions and increase the value of improvements to alternative modes.

This report investigates these issues. It discusses justifications for VMT reduction targets and evaluates criticisms of these policies. It discusses how mobility management objectives can help create a transport system that better responds to future needs.

## Accessibility Versus Mobility

To understand this issue it is useful to consider the distinction between *accessibility* (people's ability to reach desired goods, services and activities) and *mobility* (physical movement). Accessibility is the ultimate goal of most transportation activity, excepting the small portion of travel for which movement is an end in itself such as jogging or cruising; even recreational travel usually has a destination such as a picnic site or resort (Litman 2003). Several factors affect accessibility:

- Mobility. All else being equal faster and cheaper travel increases accessibility.
- The variety of transport options available.
- Path and road network connectivity, and the quality of connections between modes.
- Land use patterns (the distribution of destinations).
- The quality of mobility substitutes such as telecommunication and delivery services.

Planning decisions often involve tradeoffs between different types of access accessibility. For example, wider roads and increased traffic volumes and speeds reduce pedestrian access, and therefore public transit access since most transit trips involve walking links; automobile-oriented land use patterns (dispersed, urban fringe development with abundant parking) tends to be difficult to access by walking, cycling and public transit); and resources devoted to automobile transport are unavailable for alternative modes.

Critics of VMT reduction targets tend to assume that *transportation* means automobile travel, so any reduction in vehicle travel reduces accessibility. Advocates of VMT reduction targets tend to consider a broader range of accessibility factors, so VMT reductions need not reduce accessibility overall if implemented with improvements to alternative modes and more accessible land use development. They argue that appropriate VMT reduction strategies can improve overall accessibility, transport system efficiency, and user benefits.

VMT reduction advocates argue that current planning practices are distorted in various ways that favor automobile dependency, and therefore result in economically excessive vehicle travel, that is, vehicle travel for which total costs exceed total benefits (Beimborn and Puentes 2003; Levine 2006; Litman 2006b). For example, automobile travel is significantly underpriced (road, parking, insurance and fuel prices do not reflect marginal costs); a major portion of transport funding is dedicated to roads and parking facilities and cannot be used for other modes or mobility management strategies even if they are more cost effective overall; and many land use planning practices discourage compact, mixed, infill development. Correcting these distortions tends to reduce automobile travel in ways that increase economic efficient and benefits consumers overall (Clarke and Prentice 2009; Litman 2008).

## Mobility Management Defined

*Mobility management* (also called *transportation demand management* [TDM] and *VMT reduction strategies*) refers to policies and programs that change travel activity to increase transport system efficiency (VTPI 2008). Table 1 lists common mobility management strategies.

**Table 1** Mobility Management Strategies (VTPI 2008)

Improved Options	Incentives	Land Use Policies	Programs
Transit improvements	Congestion pricing	Smart growth	Commute trip reduction programs
Walking and cycling improvements	Distance-based fees	New urbanism	School and campus transport management
Rideshare programs	Parking cash out	Parking management	Freight transport management
Flextime	Parking pricing	Transit oriented development	TDM marketing
Telework	Pay-as-you-drive vehicle insurance	Car-free planning	
Carsharing	Fuel tax increases	Traffic calming	

*This table lists various mobility management strategies.*

Mobility management is more than individual solutions to individual problems, such as road pricing to reduce congestion and transit improvements to reduce pollution; it is most effective if implemented as an integrated program that includes improved transport options and incentives to use the most efficient option for each trip. It is supported by professional organizations such as the [Institute of Transportation Engineers](#) and the [Federal Highway Administration](#). Even roadway expansion advocates often support mobility management strategies such as efficient road and parking pricing (Staley and Moore 2008). It reflects a paradigm shift, as summarized in Table 2.

**Table 2** Transport Planning Paradigm Shift (Litman and Burwell 2006)

Factor	Old Paradigm	New Paradigm
Definition of transportation	Vehicle travel – mobility	Accessibility (ability to reach desired goods, services and activities)
Modes considered	Automobile and truck	All modes (walking, cycling, public transit, automobile, telework, etc.)
Land use development	Low-density, automobile-dependent	Compact, mixed, multi-modal
Performance indicators	Vehicle traffic speeds, roadway Level-of-Service	Multi-modal Level-of-Service, overall accessibility
Favored improvements	Expanded road and parking capacity, increased traffic speeds	Multi-modal improvements, mobility management,

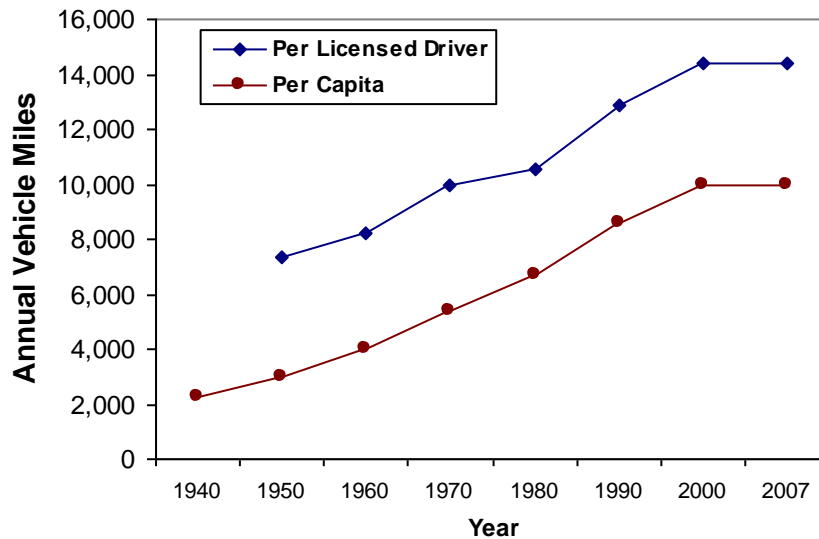
*A paradigm shift is changing the way transportation problems are defined and solutions evaluated.*

Disagreements about the merit of mobility management often reflect differences in analysis scope – the range of benefits and costs considered. Critics generally consider just one or two benefits, while proponents consider more, including some often overlooked in conventional transport project evaluation such as parking cost savings, vehicle ownership

cost savings, and health impacts. For example, Poole (2009a and 2009b) and Pisarski (2009a) criticize VMT reduction policies as an inefficient way to reduce pollution emissions; such criticism would be justified if pollution reduction was the only benefit these policies provide, but when other impacts are considered mobility management is often cost effective overall.

Critics often assume that everybody (at least, everybody who matters) drives, and so ignore the benefits of improving mobility for non-drivers. They tend to assume that past vehicle travel growth rates will continue into the future. They ignore current demographic and economic trends (aging population, rising fuel prices, increased urbanization, increasing traffic congestion, and increased health and environmental concerns) which are reducing VMT growth and increasing the value of alternative modes (Litman 2009b).

**Figure 1** U.S. Average Annual Vehicles Mileage (FHWA, Various Years)



*This figure shows average motor vehicle mileage per driver and per capita. These rates increased significantly through the 1990s, but peaked about 2000.*

Mobility management critics often ignore *rebound effects*, the additional vehicle travel that results from roadway expansion and increased vehicle fuel economy (UKERC 2007). Ignoring these effects exaggerates the value of highway expansion and fuel efficiency standards and so undervalues mobility management solutions. Critics often argue that mobility is very inelastic, citing research Small and Van Dender (2007) which implies that even large price increases have little effect on vehicle travel. But that study was based on U.S. data from 1960 to 2000, a unique period of rising vehicle ownership, increasing employment and real incomes, declining real fuel prices, highway expansion, declining transit service quality, and suburbanization. More recent analysis indicates that motorists are becoming more price sensitive (Brand 2009; Litman 2010).

## Mobility Management Justifications

*This section discusses justifications for mobility management and therefore VMT reduction targets.*

### **Helps Solve Multiple Problems and Provide Multiple Benefits**

Mobility management can provide multiple benefits, including congestion reduction, road and parking cost savings, consumer savings, traffic safety, improved mobility for non-drivers, energy conservation, emission reductions, efficient land development, and improved public fitness and health (VTPI 2008; Leather 2009). Although mobility management strategies are not necessarily the most cost effective solution to any single problem, they are often the most cost effective transport improvement strategy when all impacts are considered, particularly when induced travel effects are considered. For example, roadway expansion can reduce traffic congestion, and increased vehicle fuel efficiency conserves energy, but these strategies tend to induce additional vehicle travel which exacerbates other problems, as illustrated in Table 3.

**Table 3 Comparing Strategies (Litman 2011)**

Planning Objective	Roadway Expansion	Fuel Efficient Vehicles	Win-Win Solutions
<i>Motor Vehicle Travel Impacts</i>	<i>Increased</i>	<i>Increased</i>	<i>Reduced</i>
User convenience and comfort	✓		✓
Congestion reduction	✓	✗	✓
Road and parking cost savings	✗	✗	✓
Consumer savings		✓/✗	✓
Reduced traffic accidents	✗	✗	✓
Improved mobility options			✓
Energy conservation		✓	✓
Pollution reduction	✗	✓	✓
Physical fitness & health			✓
Economic development	?	?	✓
Land use objectives	✗	✗	✓

*(✓ = Achieve objectives. ✗ = Contradicts objective.) Roadway expansion and more fuel efficient vehicles provide a limited range of benefits, and by increasing total vehicle travel they can exacerbate other problems such as congestion, accidents and sprawl. Win-Win Solutions tend to reduce total vehicle travel and increases economic efficiency, which helps achieve many planning objectives.*

Most mobility management strategies only affect a small portion of total travel and so are seldom considered the best solution to a particular problem. However, their impacts are cumulative and synergistic (total impacts are larger than the sum of individual impacts) so integrated programs can provide large benefits (Kendra et al. 2007). For example, public transit improvements alone may only reduce a few percent of total vehicle traffic, and so are not considered a very effective emission reduction strategy, but an integrated package of transit improvements, pricing reforms, and supportive land use policies can provide significant emission reductions in addition to other benefits to users and society.

**Supports Policy And Planning Reforms**

Mobility management includes various reforms that increase economic efficiency and equity. An efficient transport system should reflect these principles:

- *Consumer options.* Consumers have a variety of transport and location options so they can choose the combination that best meets their needs and preferences.
- *Efficient pricing.* The prices that consumers pay for a good reflect the full marginal costs of supplying that good, unless a subsidy is specifically justified.
- *Economic neutrality.* Public policies and planning practices are not arbitrarily biased in favor of one good over others.

Current policies and planning practices are distorted in various ways that tend to increase motor vehicle travel beyond what is economically optimal, as summarized in Table 4.

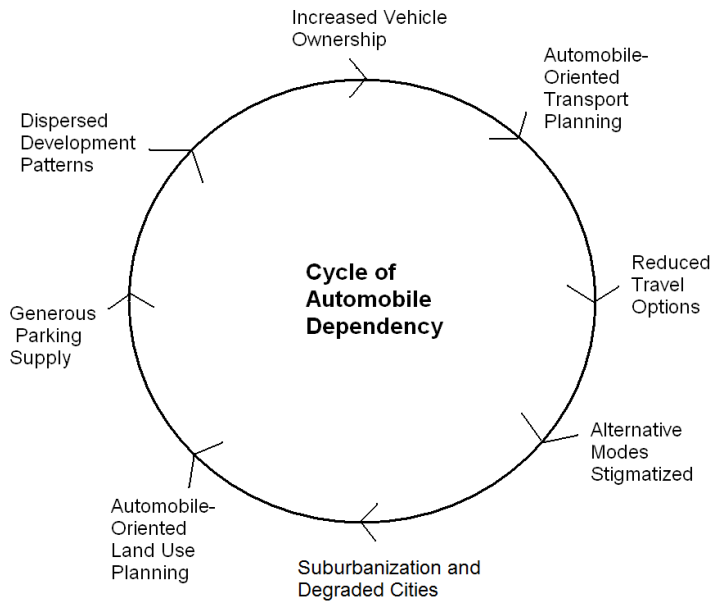
**Table 4** Transport Planning Distortions (Clarke and Prentice 2009; Litman 2006b)

	Description	Examples	Potential Reforms
Inadequate consumer options	Consumers often have limited alternatives to automobile transportation and automobile-oriented location.	Poor walking and cycling conditions.  Inadequate public transit service.  Lack of housing in accessible, multi-modal locations.	Improve alternative modes such as walking, cycling, public transit and carsharing.  Integrate alternative modes.  Make more affordable housing available in accessible areas.
Efficient Pricing	Many motor vehicle costs are fixed or external.	Unpriced roads.  Unpriced parking.  Fixed insurance and registration fees.  Low fuel prices.	As much as feasible, charge marginal prices for roads, parking and emissions, and convert fixed costs, such as insurance and registration fees, into variable costs.
Transport Planning Practices	Transportation planning and investment practices favor automobile-oriented improvements, even when other solutions are more cost effective.	Dedicated roadway funding.  Transportation system performance indicators based on vehicle traffic conditions.  Incomplete impact analysis.	Apply least-cost planning. Fund alternative modes and mobility management whenever cost effective.  Apply multi-modal transport performance indicators.
Land Use Polices	Current land use planning policies encourage lower-density, automobile-oriented development.	Generous minimum parking requirements.  Restrictions on land use density and mix.  Development and utility fees that fail to reflect the higher costs of dispersed locations.	Smart growth policy reforms that support more accessible, multi-modal land use development. Location-based development and utility fees.

*This table summarizes various transportation market distortions and potential reforms.*

These distortions help create a self-reinforcing cycle of increased automobile dependency and sprawl (Figure 2). Mobility management tends to correct these distortions, leading to more balanced and efficient transport systems.

**Figure 2** Cycle of Automobile Dependency and Sprawl



*This figure illustrates the self-reinforcing cycle of increased automobile dependency and sprawl. Establishing objectives to reduce vehicle travel and increase use of alternative modes can help correct existing market distortions that lead to inadequate transport options, economically excessive automobile travel, and sprawled land use patterns.*

Various policy and planning reforms are justified on economic efficiency and planning principles, such as more efficient road, parking, insurance and fuel pricing; more comprehensive and integrated planning; least-cost funding and neutral tax policies. Transportation professionals categorize these reforms as mobility management strategies.

Critics might argue that VMT reductions should be an outcome of market reforms rather than planning objectives. They could suggest, “Let’s just implement efficient pricing and let consumers decide how much to reduce their mobility.” But the first step in reforming outdated policies is to establish new goals and performance targets. VMT reduction targets are often the best way to begin implementation of economically-justified policy and planning reforms; they focus political and institutional actions toward reform. For example, VMT reduction targets encourage legislative changes to support efficient road and parking pricing, and for transportation agencies to apply least-cost investments and develop more multi-modal planning practices. Similarly, these targets encourage local governments to reform zoning codes and implement more efficient parking management.



***Provides Strategic Guidance for Individual Policy and Planning Decisions***

A fundamental principle of good planning is that individual, short-term decisions should be consistent with strategic, long-term goals. Current transportation policies often fail to reflect this principle: individual planning decisions often contradict strategic objectives, resulting in inefficiency. Mobility management objectives can help guide individual policy and planning decisions so they are more integrated. For example, mobility management objectives encourage policy makers to choose efficient pricing and investments, transportation agencies to develop mobility management programs, and transportation professionals to learn about mobility management techniques.

Many policy and planning decisions affect the amount of mobility that occurs in an area, as summarized in Table 5. Although individually decisions that stimulate automobile travel may seem modest and justified, their impacts are cumulative and synergistic. People who live or work in automobile-oriented areas typically drive 40-60% more annual miles and rely less on alternative modes than they would in more multi-modal communities (Pratt 1999-2009; Ewing, et al. 2007; VTPI 2008; TransForm 2009).

**Table 5 Examples of Policy and Planning Decisions That Affect Mobility**

Transport Policies	Land Use Policies
Fuel taxes and prices	Location of facilities and activities (jobs, housing, services, etc.)
Road tolls	Land use density and mix
Roadway supply and design	Parking supply and price
Sidewalk and path supply and quality	Building orientation
Public transit service supply and quality	
Mobility management programs	

*Many policy and planning decisions affect the amount and type of mobility that occurs in an area.*

Conventional planning tends to ignore these long-term impacts. Many transport and land use policy decisions are based on narrow, short-term objectives with little consideration of strategic goals. For example, transportation agencies often expand roadways to reduce traffic congestion, although this induces additional vehicle travel which increases downstream traffic and parking congestion, accidents, energy consumption and pollution emissions, although other congestion reduction strategies are available. Similarly, most local governments have generous minimum parking requirements to improve parking convenience, although this induces additional vehicle traffic, which increases traffic congestion, accidents, energy consumption and pollution emissions. VMT reduction targets encourage decision makers to choose the congestion reduction strategies that also help reduce parking problems, and the parking solutions that also help reduce congestion problems. Such comprehensive, strategic planning maximizes efficiency and benefits.

### ***Helps Prepare For Future Travel Demands***

Several demographic and economic trends reduce demand for automobile travel and increase demand for alternative modes.

### **Trends Shifting Travel Demands (Litman 2006)**

- *Vehicle saturation.* During the last decade per capita vehicle ownership and annual mileage have reached saturation levels. Although total traffic may increase somewhat in areas with rapid population growth, growth rates will be much lower than what occurred during the last century and many areas will experience no growth or even negative VMT growth.
- *Aging population.* As the Baby Boom generation retires per capita vehicle travel will decline and their demand for alternatives will increase.
- *Rising fuel prices.* This will increase demand for energy efficient travel options such as walking, cycling and public transit, and more accessible land use development.
- *Increasing urbanization.* As more people move into cities the demand for urban modes (walking, cycling and public transportation) increases.
- *Increasing traffic and parking congestion.* This increases the relative value of alternative modes that reduce urban traffic congestion.
- *Rising roadway construction costs.* This reduces the feasibility and economic justification of major urban highway expansion.
- *Shifting consumer preferences.* Various indicators suggest that an increasing portion of consumers prefer multi-modal urban neighbourhoods and alternative modes.
- *Increasing health and environmental concerns.* Many individuals, organizations and jurisdictions plan to reduce pollution and increase physical fitness.

As a result of these trends, per capita annual automobile travel has peaked in most wealthy countries (Figure 1), and demand for alternatives is growing.<sup>1</sup> This is not to suggest that automobile travel will disappear, but vehicle travel demand will grow much less than in the past and demand for alternative modes will increase. It is sensible for transportation policies to reflect these changes, which means creating more diverse and efficient transportation systems, and more accessible, multi-modal communities. Mobility management objectives are a practical way to help implement these changes.

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<sup>1</sup> In public lectures I often ask the audience, “Compared with your current travel patterns, how many of you would prefer to drive more than you currently do, and how many would prefer to drive less, provided that alternative modes are convenient, comfortable and affordable?” In virtually every case most audience members indicate that they would prefer to drive less and few want to drive more than they currently do.

## Evaluating Criticisms

*This section evaluates specific criticisms of mobility management objectives.*

### **Harms Consumers**

Critics argue that, since consumers freely choose automobile travel and automobile-dependent locations, they must be harmed by vehicle travel reduction and smart growth policies (Pisarski 2009a and 2009b; Moore, Staley and Poole 2010). This is not necessarily true: many mobility management strategies use positive incentives that directly benefit consumers by improving travel options or rewarding vehicle travel reductions (Table 6), and real estate market research indicates that consumers increasingly prefer smart growth home locations (Litman 2009b).

**Table 6** Mobility Management Strategy Impacts (VTPI 2008)

Positive Incentives	Mixed	Negative Incentives
Public transit improvements	Smart growth	Road tolls
Walking and cycling improvements	New urbanism	Parking pricing
Rideshare and carshare programs	Parking management	Fuel tax increases
Flextime and telework	Transit oriented development	
Pay-As-You-Drive pricing	Car-free planning	
Parking cash out and unbundling	Traffic calming	

*This table categorizes mobility management strategies according to user impacts. Far more provide positive than negative incentives, and even negative incentives, such as road pricing, can benefit users overall if revenues are used to reduce other taxes or provide new valued services.*

Even negative incentives, such as higher fees or traffic calming, can benefit consumers overall. For example, people who drive less due to higher road tolls, parking fees or fuel prices may be better off overall if revenues are used to reduce other taxes or provide new valued services, or if they benefit from reduced congestion, accident risk, pollution exposure, or less need to chauffeur non-driving relatives and friends (Litman 2007b).

Although it would be inefficient to reduce vehicle travel arbitrarily, for example, by randomly forbidding vehicle trips or closing roads, efficient mobility management improves the convenience of higher value automobile trips (by reducing congestion when motorists are willing to pay directly for road and parking use) while giving consumers incentives to reduce low-value automobile travel, such as trips that provide little benefit or that can easily shift to alternative modes or destinations.

To the degree that mobility management objectives help create a transportation system that better responds to future travel demands, applies positive incentives and efficient pricing, resulting vehicle travel reductions can maximize consumer benefits and minimize consumer costs.

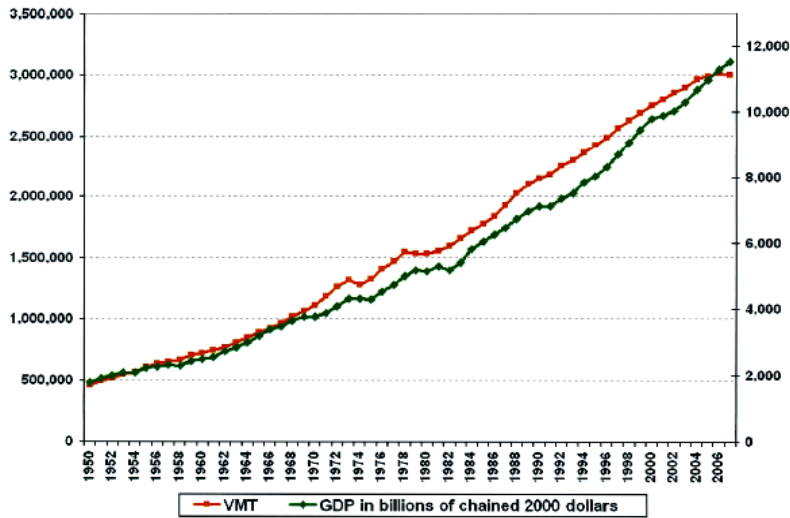
### Harms the Economy

Some critics argue that because vehicle travel tends to increase with economic development, any effort to reduce vehicle travel is economically harmful. For example, the Highway Users Alliance (HUA 2009) claims that the graph below proves that, because VMT and GDP are correlated, efforts to reduce vehicle travel must reduce economic productivity.

**Figure 3 US VMT and GDP Trends (HUA 2009)**

Vehicle Miles Traveled (VMT) and Gross Domestic Product (GDP) are extremely closely correlated:

Since 1950, the cumulative correlation rate between VMT and Real GDP, calculated using Pearson's R, is 0.997. This is an extraordinarily strong correlation even when calculating the R-square value of 98.9% which indicates the predictive value between the two variables (VMT or GDP).

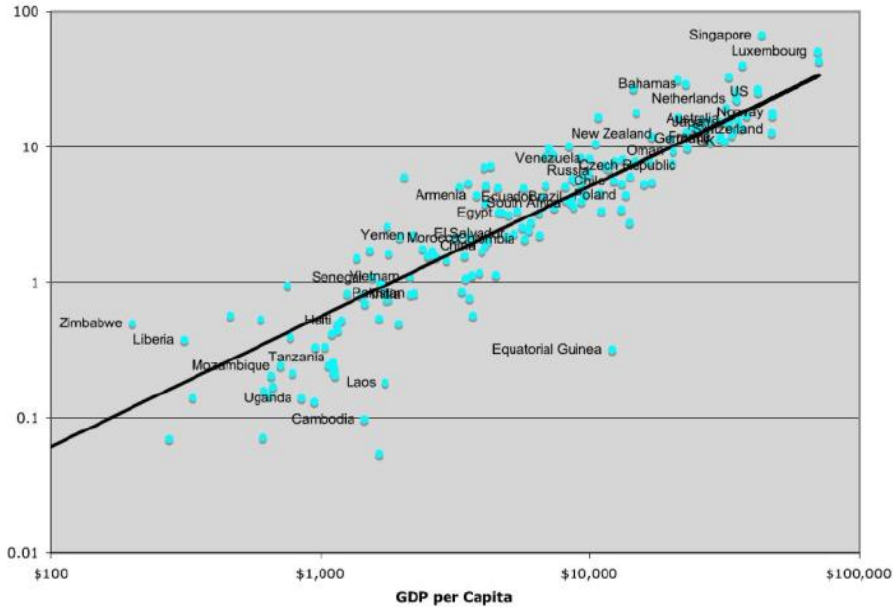


*The Highway Users Alliance claims that this graph proves that a reduction in vehicle travel will reduce economic productivity, but correlation does not prove causation.*

Similarly, economist Randall Pozdena claims that Figure 4 proves there is a strong positive relationship between income and energy use, and that because recessions often follow petroleum price spikes, efforts to reduce per capita vehicle travel reduce economic productivity. He concludes that, “a one percent change in VMT/capita causes a 0.9 percent change in GDP in the short run (2 years) and a 0.46 percent in the long run (20 years).” This analysis misrepresents these issues in important ways.

The log-log format in Figure 4 exaggerates the relationships between energy and economic development. For example, although the U.S. and Norway are located close together, Norwegians actually consume about half as much fuel per capita as U.S. residents. The graph includes countries with very different levels of industrialization. An increase in per capita vehicle travel in very poor countries such as Zimbabwe and Liberia has a very different productivity impacts than in wealthy, industrialized countries. Similarly, although oil price spikes harm oil consumers, gradual and predictable fuel tax increases can be economically beneficial by encouraging energy conservation and reducing the wealth transferred to oil producers.

**Figure 4 Per Capita GDP Versus Barrels of Oil (Pozdena 2009)**



*Pozdena claims this graph proves that increased energy consumption increases economic productivity. A log-log graph such as this exaggerates such relationships.*

Certainly energy use, vehicle travel and GDP tend to increase together, as figures 3 and 4 indicate, but this reflects several factors:

1. Motor vehicle travel can increase economic productivity, particularly when used for high value transport such as freight and service delivery, business travel and emergency trips.
2. Increased wealth tends to increase vehicle ownership and use, although marginal impacts decline as illustrated in Table 7.

**Table 7 Annual Per Capita Vehicle Mileage By Income Quintile (BLS 2007)**

Income Quintile:	1	2	3	4	5
Income before taxes	\$6,195	\$12,579	\$18,485	\$24,986	\$49,496
Annual mileage	4,733	6,182	7,440	7,926	8,885
Mileage increase per \$1,000 additional income	764	227	213	75	39

*Increased wealth causes declining marginal mileage increases.*

3. Increased wealth allows some wealthy households to choose more accessible locations, allowing them to reduce their vehicle travel.
4. Vehicle travel imposes external costs (congestion, accident damages, import exchange burdens, pollution emissions) that can reduce economic productivity.
5. Increased vehicle travel tends to create more automobile-dependent transport system and dispersed land use patterns which increases the amount of travel needed to maintain a given level of accessibility. This tends to reduce economic productivity.

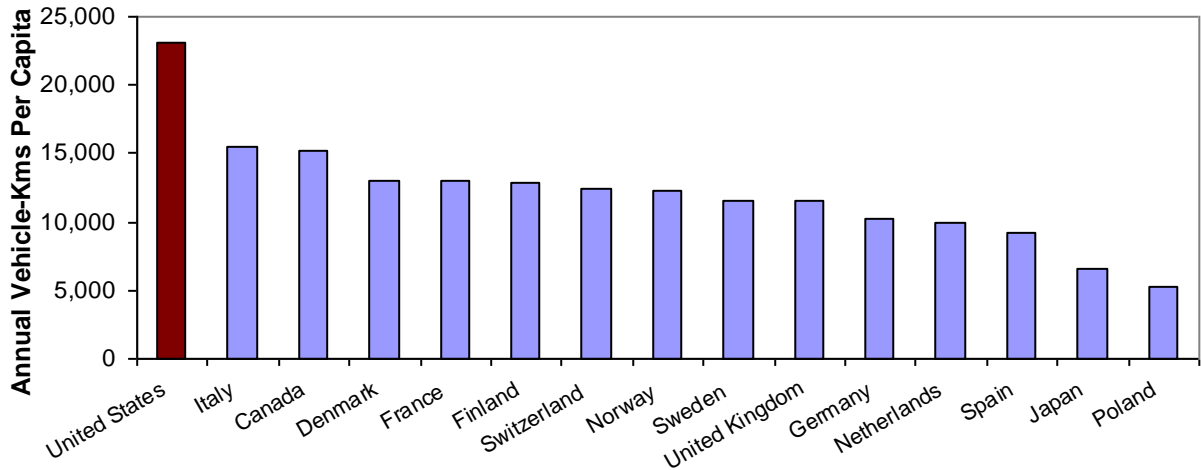
Only Factor 1 *causes* wealth to increase with VMT, while factors 2-5 *result from* increased wealth. Factors 1 and 2 cause *positive* relationships between VMT and GDP, while factors 3, 4 and 5 cause negative relationships. Because these effects vary, the overall relationships between vehicle travel and economic productivity depend on specific conditions, including a region's level of development, economic factors such as the costs of importing fuel, and the policies that are applied.

It is unsurprising that VMT and GDP correlate since vehicle expenditures account for a significant portion of household, business and government consumption (typically 15-25% in automobile-oriented regions), so all else being equal, doubling VMT increases GDP about 10%. However, this does not necessarily reflect increased social welfare: it could simply reflect an increase in costs. For example, policies that stimulate sprawl will increase both VMT and GDP, since residents must drive more annual miles, spend more on vehicles and fuel, although consumers and society could be worse off overall. In such situations, VMT reductions can support economic development (Zheng, et al. 2011).

Researchers find only a weak positive relationship between personal vehicle travel and economic productivity (Baird 2005; Ecola and Wach 2012; Kooshian and Winkelman 2011; McMullen and Eckstein 2011; O'Fallon 2003). Empirical evidence suggests that increasing from very low to moderate levels of mobility increases productivity since motor vehicles are used for high-value trips, but at higher levels of per capita VMT, marginal benefits decline and eventually becomes negative as external costs and inefficiencies increase (Kooshian 2011; Zheng, et al. 2011). An international study found that per capita vehicle ownership peaks at about \$21,000 (1997 U.S. dollars) annual income (Talukadar 1997). Similarly, a World Bank study found that beyond an optimal level (about 7,500 kilometers annual motor vehicle travel per capita, with considerable variance due to geographic and economic factors), vehicle travel marginal costs outweigh marginal benefits (Kenworthy, et al. 1997). The researchers conclude that, "*there are no obvious gains in economic efficiency from developing car dependence in cities,*" and, "*There are on the other hand significant losses in external costs due to car dependence.*"

Among wealthy countries there is considerable variation in per capita vehicle travel. Although per capita VMT grew during most of the last century, it has saturated in most wealthy countries and the level at which this saturation occurs varies depending on transport and land use policies (Millard-Ball and Schipper 2010). The U.S. averages more than twice the per capita vehicle travel as most other OECD countries, as indicated in Figure 5. Of particular interest is Norway, which produces petroleum but maintains high fuel prices and has other policies to discourage vehicle travel and support alternative modes. These policies minimized domestic fuel consumption, leaving more oil to export. As a result, Norway has one of the world's highest incomes, a competitive and expanding economy, a positive trade balance, and the world's largest legacy fund.

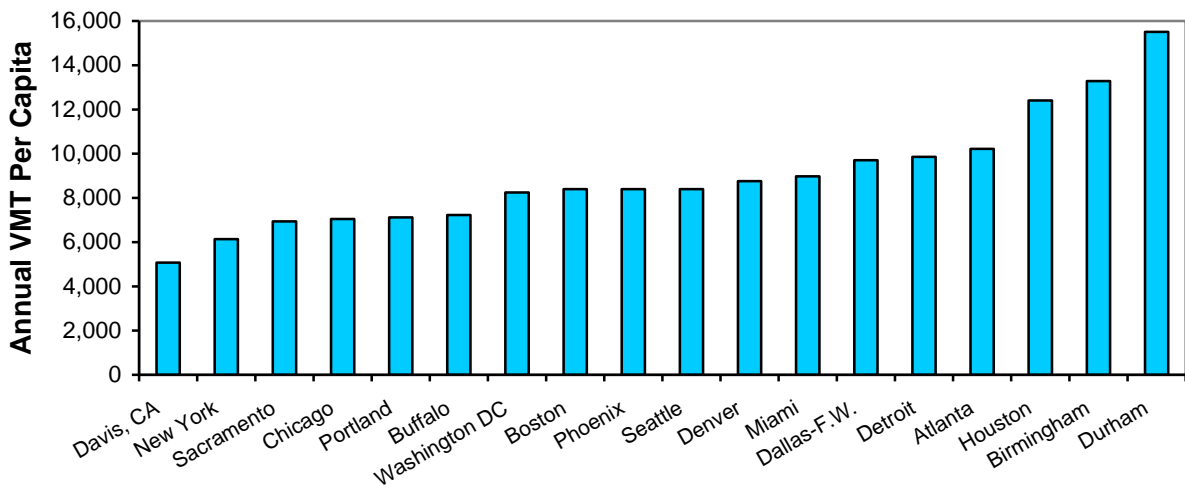
**Figure 5 Per Capita Annual Vehicle Travel By Country (OECD 2009)**



*Per capita vehicle mileage is significantly higher in the U.S. than in other industrialized countries. Residents of wealthy countries such as Switzerland, Norway and Sweden drive about half as much as in the U.S. due to policies and planning practices that increase transport system efficiency.*

Similarly, annual per capita vehicle mileage varies significantly among U.S. cities, from fewer than 5,000 average annual vehicle-miles per capita to more than 15,000 (Figure 6). Although many factors influence these differences, they result, in part from transport and land use policies that affect the travel options available, travel incentives, and land use patterns. There is no evidence that lower VMT cities such as New York, Sacramento, Chicago and Portland, are less economically successful or have inferior quality of life than higher VMT cities such as Atlanta, Houston, Birmingham or Durham; in fact, the lower VMT cities tend to have higher per capita GDP, as indicated later in this report.

**Figure 6 Per Capita Annual Vehicle Travel Selected U.S. Cities (FHWA 2007)**

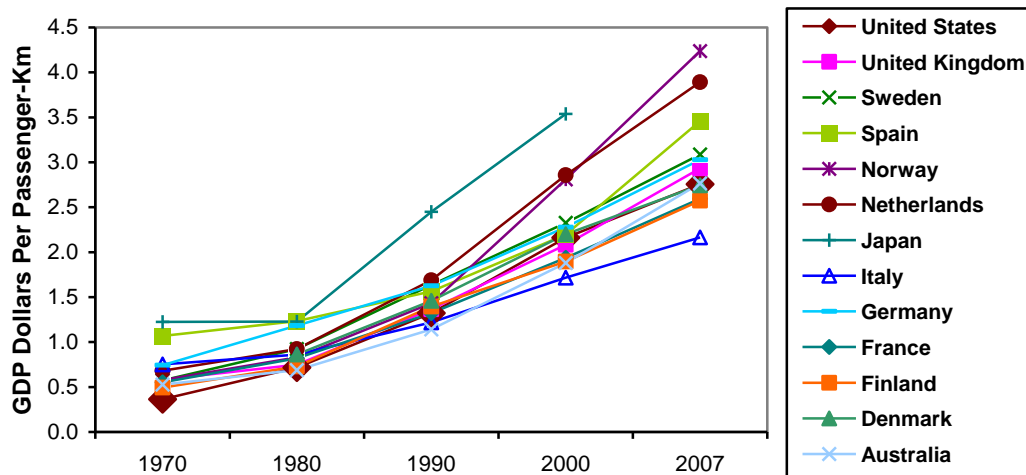


*Per capita vehicle travel varies from fewer than 5,000 to more than 15,000 average annual miles among U.S. cities. This variation results, in part, from different transport and land use policies.*

The data presented by HUA and Pozdena do not really prove that increased energy consumption and vehicle travel necessarily support economic development. For example, although in an undeveloped country, transport system improvements that cause average per capita annual vehicle travel to rise from 1,000 to 2,000 VMT may increase economic productivity, this does not prove that VMT reduction policies in a developed country, such as more efficient road and parking pricing, and greater investments in alternative modes, which cause average annual vehicle travel to decline from 16,000 to 15,000 VMT reduce productivity, although this is what Pozdena implies. Per capita annual vehicle travel varies widely among wealthy countries due to differences in pricing and planning practices. By reducing costs (congestion, road and parking facility costs, fuel expenses, accident and pollution damages, etc.) they can increase productivity.

Described differently, the amount of energy and vehicle travel required per unit of GDP varies widely. Virtually all developed countries are increasing GDP per unit of energy and mobility, and some extract far more productivity (material wealth and income) per unit of energy and mobility than others, as illustrated in Figure 7, due, in part to policies that encourage efficiency. All else being equal, policies that encourage more efficient transport increase economic productivity and competitiveness, and this will become increasingly important in future as oil prices rise. This is sometimes called *decoupling*.

**Figure 7 GDP per Passenger-Kilometer for Various Countries (OECD 2009)**



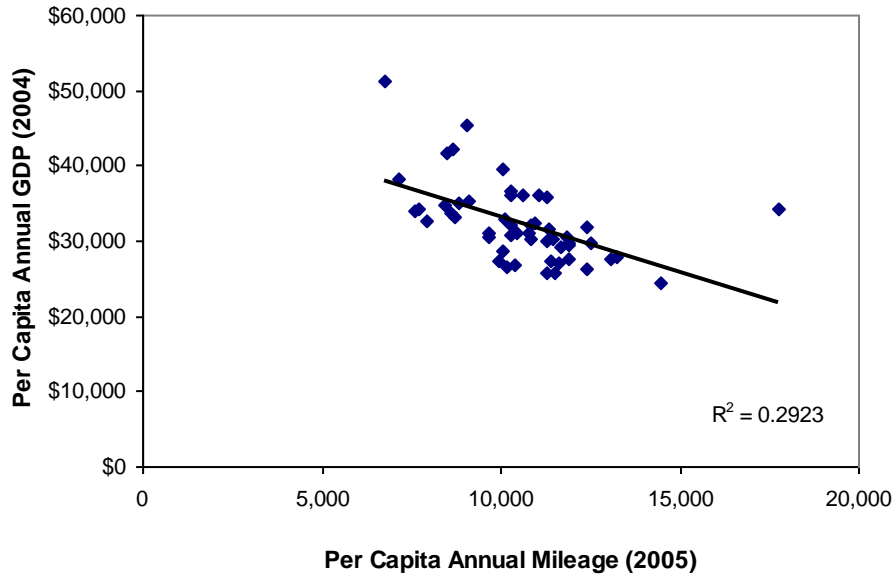
*Most countries are increasing GDP per passenger-mile, some much more than the U.S.*

A rigid relationship between mobility and economic productivity implies that economies are inflexible: there is only one efficient way to produce goods, and that economic development requires ever more energy and movement. A flexible relationship between mobility and economic productivity implies that economies are responsive and creative: if energy and mobility are cheap, businesses and consumer use a lot, but if prices increase or other policies encourage conservation, the economy becomes more efficient.

Within developed countries there is a negative relationship between vehicle travel and economic productivity as illustrated in the following figures (also see Kooshian 2011).



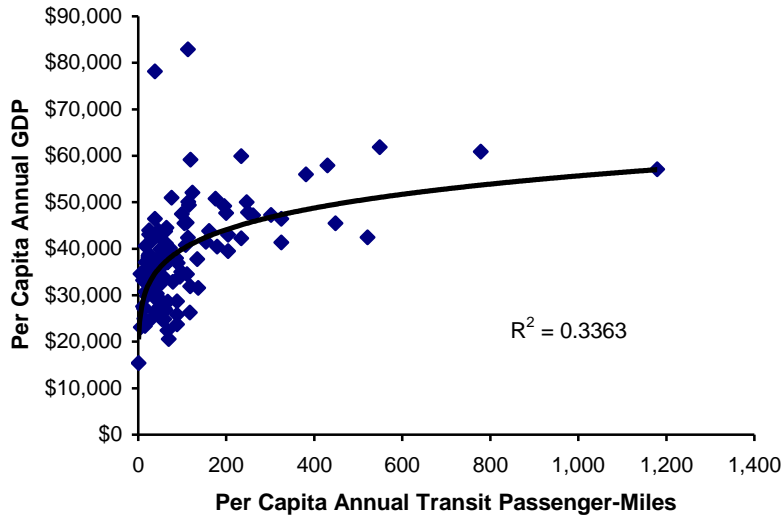
**Figure 8** Per Capita GDP and VMT For U.S. States (2009)<sup>2</sup>



*Per capita economic productivity increases as vehicle travel declines. (Each dot is a U.S. state.)*

Similarly, *GDP tends to increase with public transit travel*, as illustrated in Figure 9.

**Figure 9** Per Capita GDP and Transit Ridership (VTPI 2009)

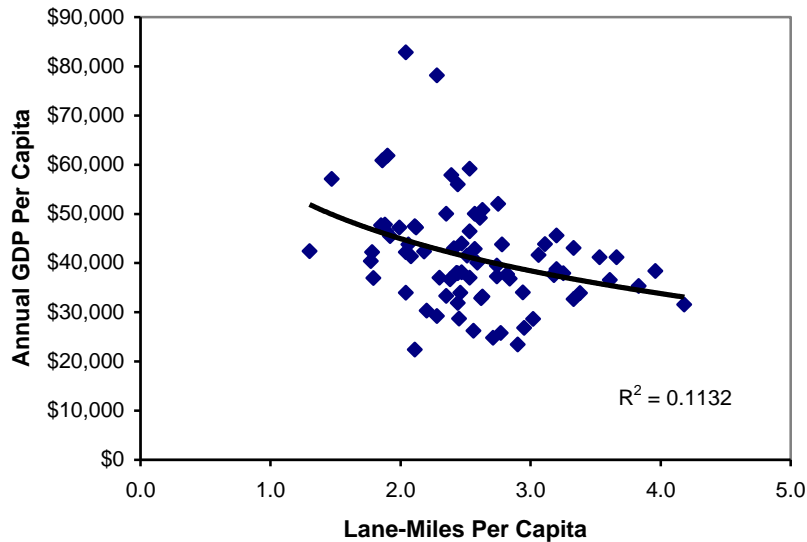


*GDP tends to increase with per capita transit travel. (Each dot is a U.S. urban region.)*

<sup>2</sup> Information in this and subsequent graphs is contained in the *2009 Urban Transportation Performance Spreadsheet* ([www.vtpi.org/Transit2009.xls](http://www.vtpi.org/Transit2009.xls)), based on data from the FHWA's *Highway Statistics*, the TTI's *Urban Mobility Report*, and the Bureau of Economic Account's *Gross Domestic Product By Metropolitan Area* ([www.bea.gov/regional/gdpmetro](http://www.bea.gov/regional/gdpmetro)). Also see Litman 2010a.

Per capita GDP tends to decline with roadway lane miles, as illustrated in Figure 10.

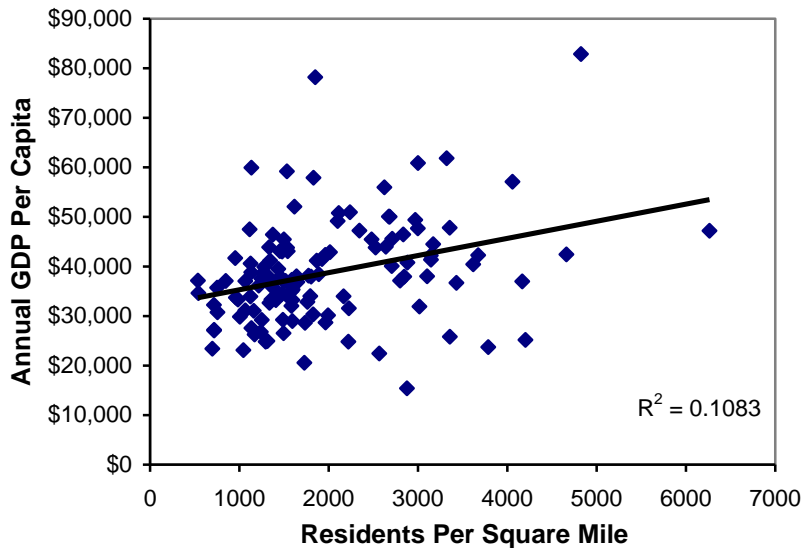
**Figure 10 Per Capita GDP and Road Lane Miles (VTPI 2009)**



*Economic productivity declines with more roadway supply, an indicator of automobile-oriented transport and land use patterns. (Each dot is a U.S. urban region.)*

Per capita GDP tends to increase with population density, as illustrated in Figure 11. These *agglomeration efficiencies* reflects the benefits that result from improved land use accessibility (reduced distances between activities) and increased transport system diversity, which both tend to increase with density.

**Figure 11 Per Capita GDP and Urban Density (BTS 2006 and BEA 2006)**

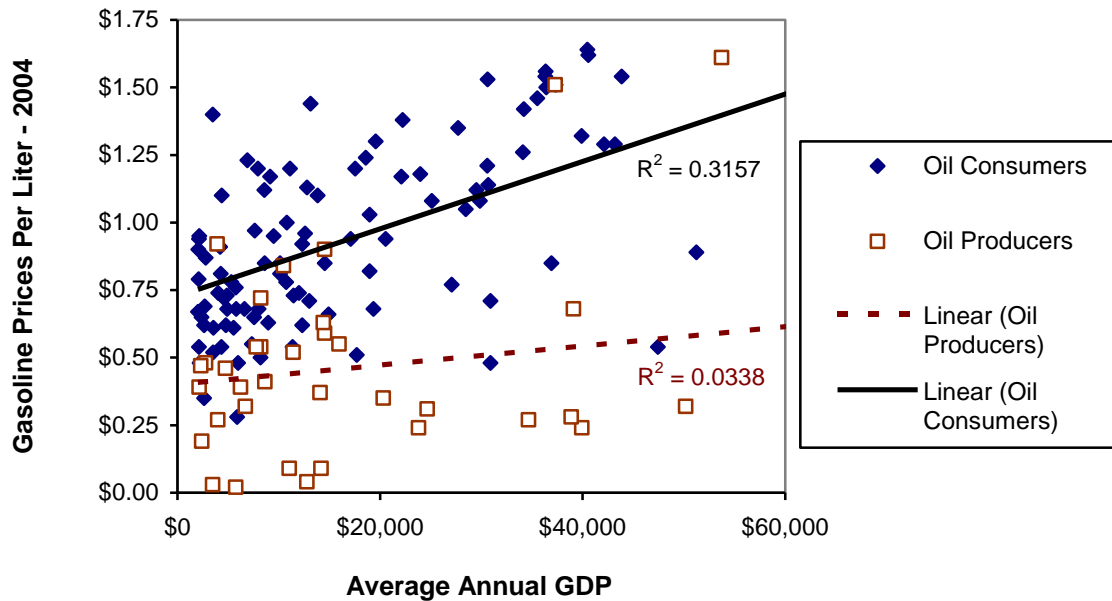


*Productivity tends to increase with population density. (Each dot is a U.S. urban region.)*

Zheng, et al. (2011) find similar results: per capita economic productivity tends to be higher in states with less automobile-dependent transport systems. Chapple and Makarewicz (2010) analyzed business growth trends in California between 1990 and 2005. They find that most expanding firms locate near transportation infrastructure, such as highways and major airports, but the majority of growth occurred near existing infrastructure in urban areas rather than expanding to undeveloped sites at the urban fringe. They conclude that policies that encourage infill development need not reduce economic development, and may support economic development by improving affordable and accessible housing.

Figure 12 shows that per capita GDP increases with fuel prices, particularly among oil importing countries (“Oil Consumers”). This suggests that, contrary to popular belief, high fuel prices (and therefore, high vehicle operating costs) increase economic productivity and development by increasing transport system efficiency and reducing the wealth lost to importing fuel.

**Figure 12 GDP Versus Fuel Prices, Countries (Metschies 2005)<sup>3</sup>**



*Economic productivity tends to increase with higher fuel prices, indicating that substantial increases in vehicle fees can be achieved without reducing overall economic productivity.*

Two factors help explain why GDP tends to decline at high levels of VMT:

1. Marginal productivity benefits decline as a declining portion of travel is for productive uses, such as freight and service delivery, and business travel.
2. The additional VMT imposes increasing economic costs (vehicle expenses, road and parking facility costs, traffic service costs, accident and pollution damages, etc.).

<sup>3</sup> Fuel price ([www.internationalfuelprices.com](http://www.internationalfuelprices.com)), GDP ([http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(PPP\)\\_per\\_capita](http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita)), petroleum production (<http://en.wikipedia.org/wiki/Petroleum>); excluding countries with average annual GDP under \$2,000.

### **Critique of Pozdena**

*Pozdena's 2009 paper, which claims that, because there is a strong positive correlation between vehicle travel and economic development, mobility management policies are economically harmful, makes several discussed below.*

- Correlations between energy use, VMT and GDP do not prove causation. Increased wealth often increases energy use and vehicle travel. This does not mean that increases in vehicle travel will increase wealth or reductions in vehicle travel reduce wealth.
- The log-log graph exaggerates the perceived correlation. There is actually considerable variation in per capita energy use and vehicle travel between countries and cities with comparable GDP due to differences in energy and transportation policies.
- Pozdena's evidence (international data including very low-income countries, long-term trends beginning at the start of the automobile age, and the effects of oil shocks) are not relevant for evaluating the economic impacts of typical mobility management strategies.
- Most experts agree with Pozdena that transportation policy reforms should reflect economic principles, but he only considers congestion and pollution problems, and therefore only supports congestion pricing and carbon taxes. He ignores other transport system inefficiencies such as road and parking facility subsidies, accident and pollution damages, and inadequate mobility options for non-drivers. More comprehensive analysis justifies additional mobility management strategies, such as parking and insurance pricing reforms, more comprehensive planning and least-cost funding.
- Pozdena argues that "excessive" fuel taxes, VMT fees, or disincentives to driving are unjustified, although, until other impacts are efficiently priced they can be justified on second-best grounds. For example, until comprehensive road pricing is implemented, higher fuel taxes, VMT fees and parking pricing will provide some congestion and road cost saving benefits.
- Pozdena implies that VMT reductions are implemented primarily by regulations, but most VMT reduction strategies reflect market principles and good planning: more efficient pricing for roads, parking, insurance and fuel; more multi-modal planning and least-cost investment practices; land use planning reforms. This may reflect a semantic confusion: VTM reduction policy targets themselves can be considered a type of regulation, but most of the specific mobility management strategies applied to achieve these targets are not; they are planning and pricing reforms that can be justified for economic efficiency and equity.
- Pozdena assumes that smart growth primarily involves regulations that increase development density (they actually involve a variety of policy reforms, many of which reduce rather than increase regulations, or simply shift development location and design), and that smart growth does not reduce vehicle travel (he claims, incorrectly that "there is no evidence to support implied causality flowing from density to VMT"), reduce transport costs or increase economic productivity. His criticism assumes that consumers dislike smart growth communities so urban living necessarily harms consumers and society. Abundant research indicates otherwise (Levin 2006; Ewing et al. 2007; Litman 2009b).

Transportation market distortions encourage economically inefficient transportation activity, in which marginal costs exceed marginal benefits. More efficient pricing and planning practices encourage efficiency, and so tend to increase economic development. For example, more efficient road and parking pricing encourage travelers to use alternative modes under congested conditions, which reduces congestion and parking costs borne by businesses. Although some reforms are most efficient (such as time-and-location based fees), less optimal fees (such as fuel tax increases) are often justified on second-best ground, until optimal policies are fully implemented.

***Ignores Mobility Benefits***

Critics sometimes argue that motor vehicle travel provides benefits that are overlooked by advocates of VMT reduction targets, but this is generally untrue. Most public officials and planners are quite aware of the benefits of mobility to people and businesses, and its importance in a successful economy. However, they are also aware of the direct and indirect costs that result from excessive motor vehicle travel and the benefits that can result from a more diverse and efficient transportation system. Table 8 indicates mobility management benefits and costs.

**Table 8      Mobility Management Benefits and Costs**

Benefit Categories	Cost Categories
Direct user benefits (from positive incentives)	Reduced mobility benefits
Revenues (from pricing strategies)	Subsidies
Congestion reduction	User fees
Roadway costs savings	Transaction costs (costs to pay and collect fees, and any additional enforcement costs)
Parking cost savings	
Consumer savings	
Reduced chauffeuring burdens	
Accident reductions	
Improved mobility options	
Energy conservation	
Pollution reduction	
Physical fitness and health	

*This table indicates the categories of benefits and costs that should be considered when evaluating mobility management cost effectiveness.*

As discussed earlier, the ultimate benefit of transportation is *accessibility*. If transportation is defined only as mobility the only solution to traffic and parking congestion is to expand roads and parking facilities. Defining transportation based on accessibility allows a much broader range of solutions to be considered, including improvements to alternative modes and mobility substitutes, pricing incentives, and more accessible land use. Better management can increase the benefits provided by mobility, for example, by reducing traffic and parking congestion so there is less delay when people do drive, and improving travel options so motorists are not required to spend as much time chauffeuring non-driver friends and family members.

### **Pollution Reduction Cost Efficiency**

Critics argue that mobility management is an inefficient way to reduce pollution emissions (Poole 2009b). This might be true if that were the only benefit of VMT reductions, but more comprehensive analysis often indicates that mobility management is cost effective compared with alternatives considering all benefits and costs (Winkelman, Bishins and Kooshian 2009).

Described differently, a ton of emission reductions provided by mobility management provides many times the total benefits as the same amount of emissions reduced by more efficient and alternative fuel vehicles (e.g. hybrids and electric cars), because VMT reductions achieves other planning objectives, while increased vehicle fuel efficiency makes driving cheaper, which stimulates more vehicle traffic that exacerbates problems such as congestion, parking costs, accidents and sprawl (Litman 2005).

Some mobility management strategies are particularly effective strategies (Burbank 2008; Yang, et al. 2008; Cambridge Systematics 2009). For example, fuel tax increases, distance-based insurance and registration fees, more efficient parking management, and land use policy reforms often have modest incremental costs and substantial economic and environmental benefits (CBO 2003; Parry 2005). Efficient road pricing reduces VMT and congestion, providing extra emission reductions. Aviation transport management reduces high altitude pollution emissions which have particularly severe climate change impacts. Freight transport management can reduce travel by heavy vehicles that have high emission rates per vehicle-mile.

### **Crowding**

Critics argue that smart growth land use policies cause crowding. This is generally untrue and reflects a misunderstanding of the concept. Although smart growth increases *density* (people per acre) it does not necessarily increase crowding (people per square foot of interior building space). For example, in a typical 1,800 square foot house requires a 10,000 square foot (quarter acre) lot if it is single-story with a large garage and yard, but the same size house needs only 2,000 square foot if it is three stories with a single car garage and a small yard.

Current and projected market trends favor smart growth (Litman 2009b). Demand for dispersed, automobile-dependent housing is declining while demand for housing in more accessible, multi-modal neighborhoods is growing due to factors such as aging population, rising fuel prices and shifting consumer preferences (Thomas 2009). Since sprawl has been the primary development pattern for the last half-century there is still plenty of low-density, single-family, sprawled housing available for people who want it (Leinberger 2008) but the demand for accessible, multi-modal housing will be inadequate (Reconnecting America 2006). Past development policies (such as generous minimum parking requirements and building setbacks, and excessive limits on development density and mix) caused sprawl; it makes sense to change these policies to encourage more urban infill and multi-modal development patterns (Levine 2006).

### **Consumer Sovereignty**

*Consumer sovereignty* means that, as much as possible, consumers should be free to choose the goods that best meet their needs, without bias or coercion, to maximize their welfare. This principle suggests that transportation policies should allow consumers to choose how and how much to travel without external intervention. Critics argue that mobility management and smart growth policies constitute violates this principle. The Highway User Association claims that mobility management attempts to “alter behavior and personal choice” (HUA 2009), and Pisarski (2009a and 2009b) argues that such policies prevents consumers from choosing the lifestyles they prefer.

But many current policies and planning practices tend to favor automobile travel over other modes and more dispersed land use development, depriving consumers of options that involve alternative modes or more compact locations. To the degree that current levels of automobile dependency and sprawl result from market distortions, mobility management and smart growth policies help achieve modal neutrality and consumer sovereignty. These policies tend to improve travel and housing options, allowing consumers to choose the combination that best meets their needs. They do not eliminate driving and single-family housing, even with programs that critics consider aggressive and “radical,” automobile travel would continue to have the largest mode share, Americans would continue to drive more than residents of peer countries, and most residents would live in single-family homes in most communities.

### **Harms Poor People**

Some studies indicate that economically disadvantaged workers (such as former welfare recipients) tend to work and earn more if they have an automobile (Blumenberg and Ong 2001; Wachs and Taylor 1998), and motor vehicles can provide access to basic services such as medical care and shopping. This leads some people to conclude that increased vehicle ownership increases social equity, that mobility management strategies in general, and efficient pricing in particular are regressive (Pisarski 2009), and that social equity requires vehicle subsidies (subsidized vehicles, low fuel prices, unpriced roads and parking, etc.). This misinterprets the issues.

Most studies showing large economic gains from vehicle ownership were performed in automobile-dependent regions, such as Los Angeles, where non-drivers are particularly disadvantaged. Other studies indicate that high quality public transit also increases labor participation (CTS 2010; Sanchez, Shen and Peng 2004), even in automobile-oriented cities such as Houston, Texas (Yi 2006). Analysis by Gao and Johnston (2009) indicates that transit improvements provide greater total benefits to all income groups than subsidizing automobiles for lower-income groups.

Automobile subsidies only benefit a subset of disadvantaged people, those able to drive, and incur significant direct and indirect costs. Low income motorists must typically spend \$250 to \$500 per month to own and operate a vehicle. Their insurance premiums

tend to be high, and the older vehicles they own tend to be unreliable, imposing large repair costs. As a result, much of the additional income provided by automobile ownership must be spent on vehicle expenses, reducing net gains. Automobile travel incurs other user costs, including accident risk and reduced physical fitness (APHA 2010; Lachapelle, et al. 2011), and increases external costs imposed on disadvantaged communities including traffic congestion, road and parking facility costs, accident risk, and pollution emissions.

Increased vehicle travel does not necessarily increase overall economic productivity or employment. On the contrary, productivity rates (per capita GDP) tend to increase with transit ridership and decline with automobile use, indicating that a more multi-modal transport system support community economic development (Litman 2010a).

An automobile dependent transportation system is inherently inefficient and inequitable. Subsidies intended to help lower-income people own and operate automobiles treat one symptom but exacerbate other problems. Creating a more diverse and efficient transport system addresses the root of the problem, which provides the greatest total benefits to society, including increased social equity by improving mobility and accessibility for physically, economically and socially disadvantaged people.

This analysis indicates that although automobile use can benefit some disadvantaged people, other transport improvement strategies are often more cost effective and beneficial overall. These include improved walking and cycling conditions, improved rideshare and public transit services, carsharing, distance-based vehicle insurance and registration fees, and more affordable housing in accessible locations (Sullivan 2003; Litman 2010c). These solutions tend to benefit all residents, and especially those who are physically, economically or socially disadvantaged.



**Summary Of Mobility Management Impacts**

Table 9 evaluates the impacts of various mobility management strategies. This indicates that most of these strategies increase economic efficiency, and many provide direct consumer benefits and support equity objectives. This indicates that an appropriate set of strategies can provide overall economic, social and environmental benefits.

**Table 9 Impacts of Mobility Management Strategies**

Strategy	Efficiency	Consumer (Users)	Equity
<b>Incentives to Choose Efficient Modes</b>			
Congestion pricing	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but reduces congestion.	Mixed. Benefits some people but burdens others.
Cost-recovery road tolls	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but provides revenues.	Positive. More equitable than most other funding.
Distance-based registration fees	Positive. Reflects efficient pricing.	Positive. Gives motorists a new way to save money.	Positive. Charges users for the costs they impose.
Cost-recovery parking fees	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but provides revenues.	Positive. Charges users for the costs they impose.
Fuel tax increases	Positive if raised gradually and predictably.	Mixed. Increases motorist costs but provides revenues.	Positive if taxes internalize costs.
TDM marketing (information and encouragement campaigns)	Generally positive, since improved user information tends to increase efficiency.	Generally positive, although overly aggressive campaigns can be annoying.	Generally positive.
No-drive days	Generally negative.	Generally negative.	Mixed. May be more equitable than pricing.
<b>Improved Options</b>			
Transit improvements	Mixed. Is cost effective on major urban corridors.	Generally positive, provided it meets consumer demands.	Generally positive. Provides basic mobility.
Walking and cycling improvements	Improvements justified to meet growing demand.	Generally very positive.	Generally positive. Provides basic mobility.
Rideshare programs	Mixed. Is cost effective on major urban corridors.	Generally positive, provided it meets consumer demands.	Generally positive.
Telework and flextime	Generally cost effective and beneficial.	Generally very positive as a user option.	Generally positive.
Carsharing	Generally cost effective and beneficial.	Generally very positive as a user option.	Generally positive.
<b>Land use Policies</b>			
More flexible zoning (more density, mix, housing types, etc.)	Generally reflects market principles and increases efficiency.	Mixed. Benefits some consumers but disadvantages others.	Generally achieves equity objectives
Location-efficient development.	Generally reflects market principles and reduces public service costs.	Mixed. Benefits some consumers but disadvantages others.	Generally achieves equity objectives.
Urban growth boundaries.	Mixed. Restricts development but increases public service efficiency.	Mixed. Benefits some consumers but disadvantages others.	Mixed.

*This table summarizes efficiency, consumer and equity impacts of various mobility management strategies.*

## Legitimate Criticisms of VMT Reduction Targets

*This section discusses legitimate criticisms of VMT reduction targets and mobility management strategies and how they can be addressed.*

Some mobility management strategies can be inefficient and unfair. For example, it would be inappropriate to arbitrarily forbid driving at certain times or locations if no suitable alternatives are available. Some strategies, such as “no drive days,” are blunt, they fail to give consumers maximum flexibility so they can reduce their least-valued vehicle travel while retaining higher-value trips. As much as possible, mobility management strategies should reflect market principles, including consumer sovereignty, efficient pricing, and neutral planning.

Mobility management programs can be uncoordinated. For example, it would be inequitable to increase user fees if alternatives (good walking and cycling conditions, convenient ridesharing and public transit service, telework options, affordable housing in accessible communities, etc.) are unavailable. Similarly, it would be inefficient to spend a lot of money on alternative modes (walking and cycling facilities, public transit service improvements, etc.) without sufficient incentives to encourage their use.

Mobility management requires public support. For example, it would be inappropriate to tell people that they must reduce their automobile travel without communicating why and how. It will be important to show consumer benefits.

VMT reduction targets may be nothing more than words. For example, a community may establish long-term VMT reduction targets while continuing existing transportation and land use planning practices that stimulate automobile dependency and sprawl. It is important that VMT reduction targets actually lead to positive and rational change.

### **Two Narratives (Litman 2009b)**

This debate over VMT reduction targets reflects two conflicting narratives. Reader must decide which to believe:

VMT reduction critics claim that virtually everybody wants to lead highly mobile lifestyles and live in low-density, automobile-oriented communities, so any policy intended to reduce vehicle travel is either futile or harmful.

VMT reduction supporters believe that North America’s high level of mobility is an anomaly resulting from a unique combination of rising incomes, cheap fuel and population growth, stimulated by overly-enthusiastic planning that exaggerated the benefits and ignored many costs of automobile dependency.

## Conclusions

There are many reasons to reform current transportation policies. The last century was the period of automobile ascendancy during which it made sense to invest significant resources to build roads and parking facilities, and in other ways accommodate increased motor vehicle travel. The next century requires very different policies. Demographic and economic trends are reducing vehicle travel demand increasing demand for alternative modes. Economic competitiveness will require more efficient transportation systems. To meet these needs, transport policies must place more emphasis on efficient management. No single strategy will suffice: a variety of integrated transport and land use policy reforms are needed to prepare for the future.

To facilitate these changes policy makers can establish mobility management objectives to reduce vehicle travel and increased use of alternative modes. Such objectives help coordinate individual planning decisions to create a more diverse and efficient transportation system.

Mobility management criticism tends to reflect an older planning paradigm which assumes that *transportation* means driving, and transport agencies have limited responsibilities and solutions. Critics tend to ignore many costs of automobile travel and many benefits of alternatives. The new paradigm applies *systems analysis* which considers a variety of objectives, impacts and options.

Critics argue that mobility management and smart growth harm consumers and the economy, but such criticisms are often inaccurate and do not apply to appropriate, integrated mobility management programs which reduce vehicle travel in ways that reflect efficient market principles (consumer options, cost-based pricing, neutral policies). Until efficient road, parking, insurance and fuel pricing are fully implemented, and planning practices are more neutral, blunter strategies (such as regulations and subsidies) may be justified to reduce economically excessive automobile travel.

Many VMT reduction critics actually support certain mobility management strategies, such as efficient road and parking pricing, more flexible zoning codes, and ridesharing incentives. Mobility management tends to be most effective if implemented as an integrated program, so some criticism are really justifications for additional strategies, such as investments to improve public transit in conjunction with road pricing. In a more diverse and efficient transportation system, consumers will choose to drive less, rely more on alternative modes, and be better off overall as a result. Automobile travel will not disappear, but it will decrease compared with current planning practices.

Mobility management policies help create a transportation system that meets future needs. VMT reduction targets are the first step in implementing such policies.

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