

# On Demand Mass Transit System



Sri Jagannathan, PhD

CTO

next

Future Transportation inc.

V3.0 | 2015 <http://next-future-transportation.com/>

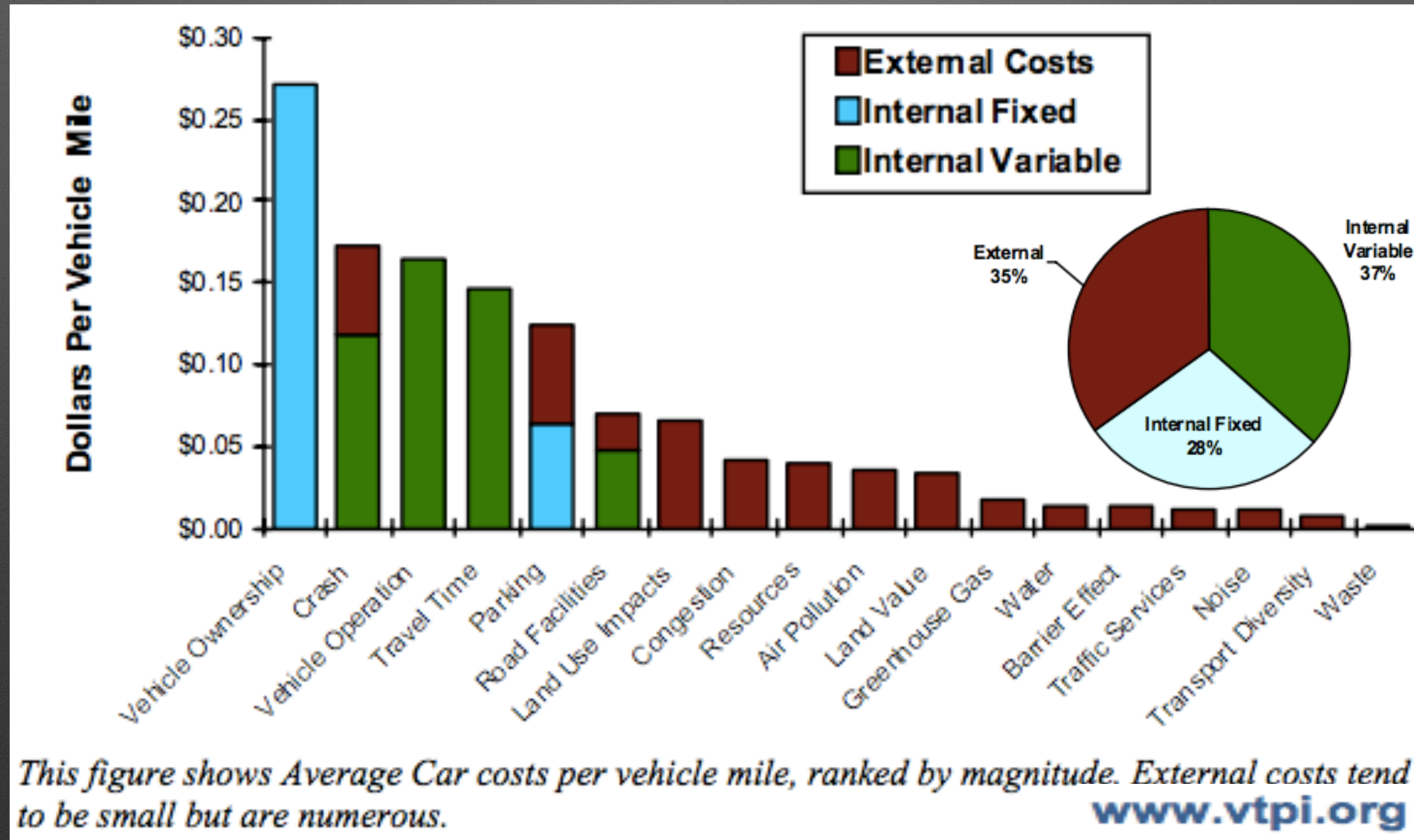
October 20, 2016

STANFORD  
UNIVERSITY

US-ASIA TECHNOLOGY MANAGEMENT CENTER  
SCHOOL OF ENGINEERING



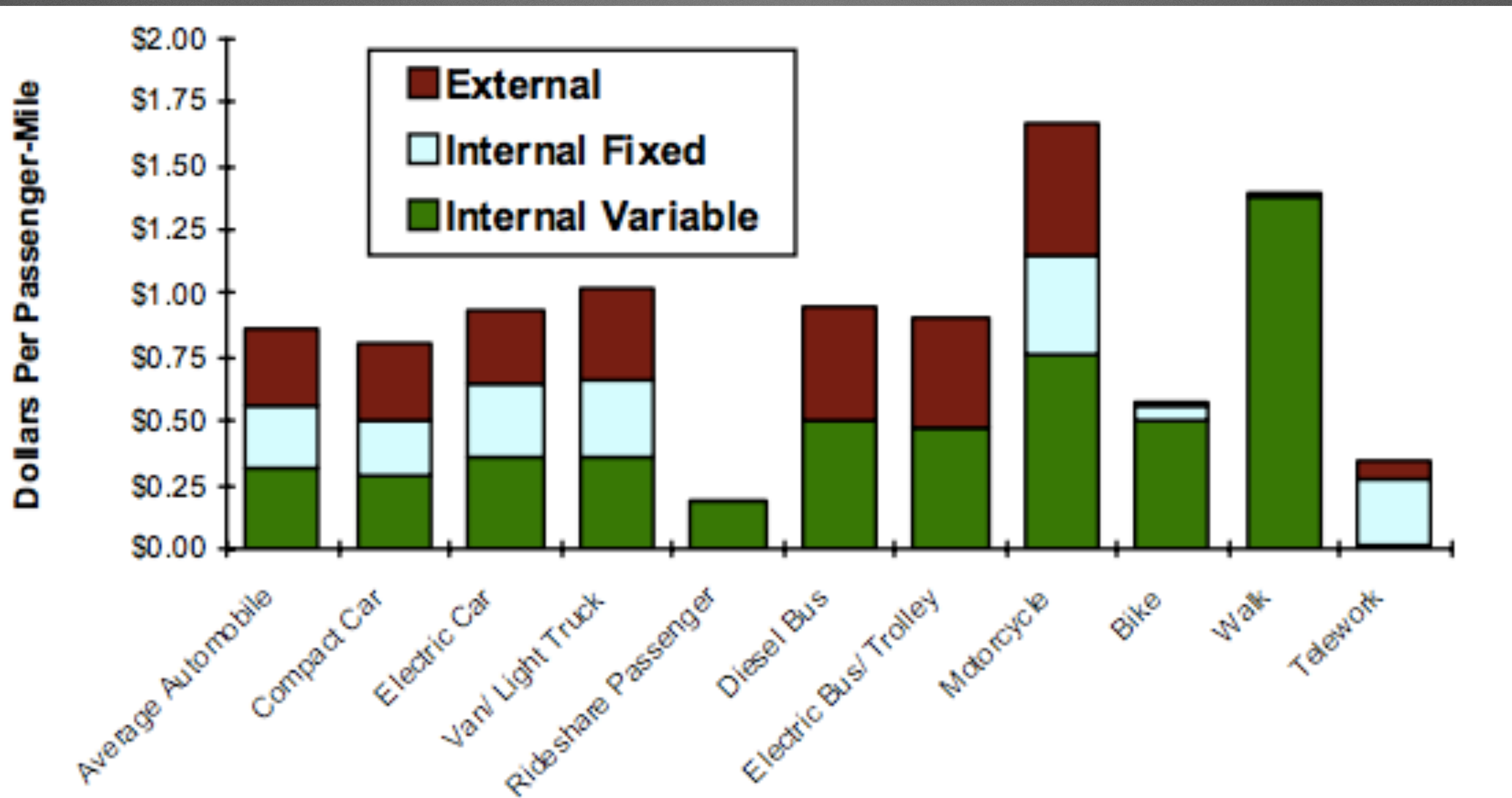
# The Personal Car is a Public Nuisance...



The Personal Car imposes a huge burden on society through externalities



# Real Costs of Transit By Mode



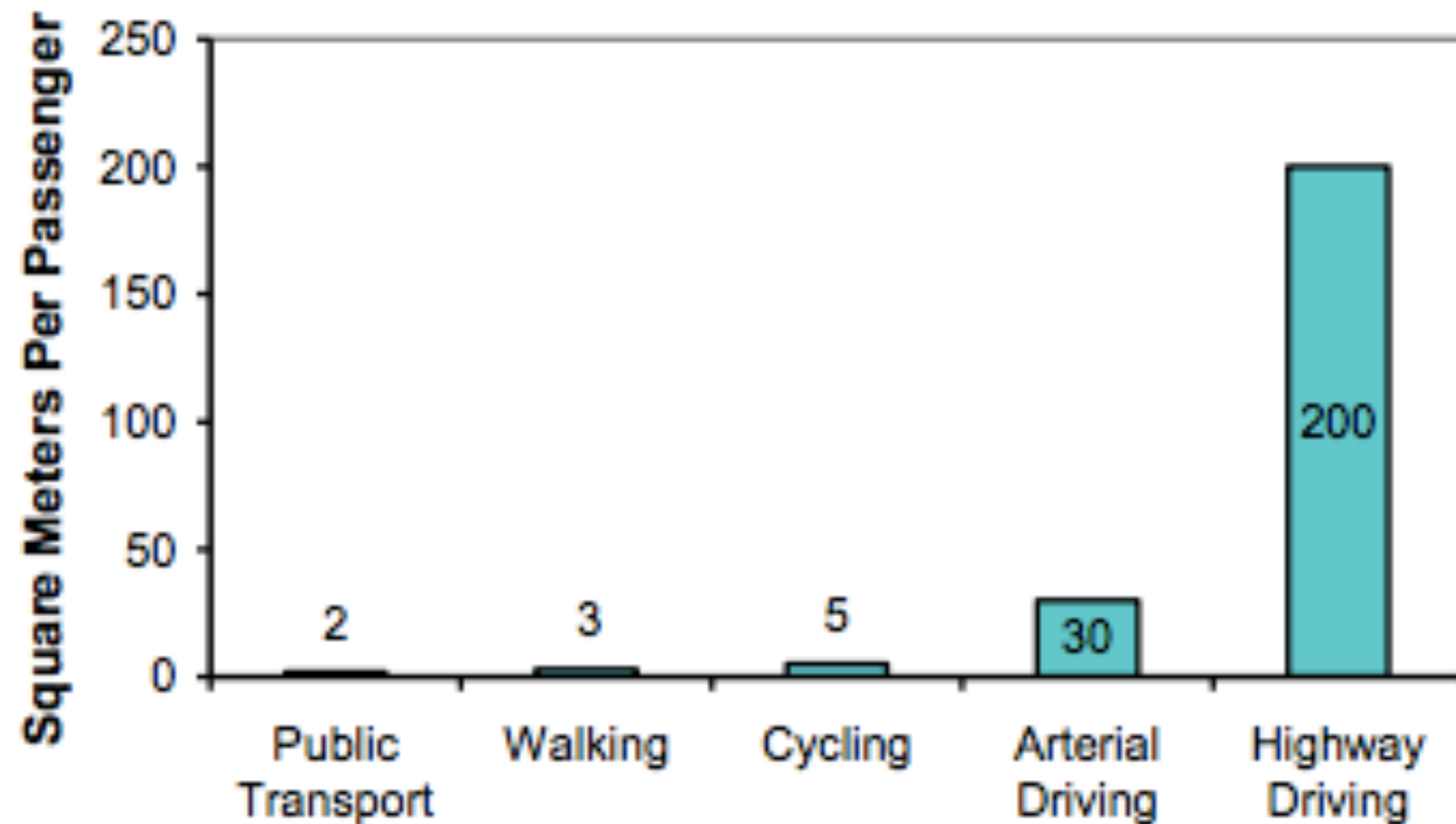
*This graph shows the cost distribution of each mode. Transit costs are based on average U.S. ridership levels and would be lower in areas with higher ridership rates. [www.vtppi.org](http://www.vtppi.org)*

Optimal mode is "Rideshare Passenger" with lowest real costs



# The Personal Car is a Space Hog

Typical Travel Space Requirements For Various Modes



*Travel space requirements increase with vehicle size and speeds (faster vehicles require more "shy distance" between them and other objects), and declines with more passengers per vehicle. Automobile travel requires ten to one hundred times as much road space as walking, cycling and public transport.*

[www.vtpi.org](http://www.vtpi.org)

The Personal Car occupies up to one hundred times the travel space as public transit



# The Urban Commuting Mess

City Rankings Change Depending On Indicators (TTI 2013)

Congestion Intensity (Travel Time Index)	Congestion Costs (Delay Hours Per Commuter)
1. Los Angeles-Long Beach-Santa Ana CA (1.37)	1. Los Angeles-Long Beach-Santa Ana CA (44.9)
2. <b>New York-Newark NY-NJ-CT (1.33)</b>	2. Washington DC-VA-MD (44.3)
3. Washington DC-VA-MD (1.32)	3. <b>Houston TX (41.0)</b>
4. <b>Boston MA-NH-RI (1.28)</b>	4. <b>Atlanta GA (39.4)</b>
5. <b>Houston TX (1.26)</b>	5. San Francisco-Oakland CA (37.7)
6. <b>Philadelphia PA-NJ-DE-MD (1.26)</b>	6. Dallas-Fort Worth-Arlington TX (36.6)
7. Seattle WA (1.26)	7. <b>Miami FL (36.5)</b>
8. Dallas-Fort Worth-Arlington TX (1.26)	8. <b>Boston MA-NH-RI (36.3)</b>
9. Chicago IL-IN (1.25)	9. Chicago IL-IN (36.2)
10. <b>Miami FL (1.25)</b>	10. <b>Philadelphia PA-NJ-DE-MD (35.4)</b>
11. <b>Atlanta GA (1.24)</b>	11. Detroit MI (33.6)
12. San Francisco-Oakland CA (1.22)	12. Seattle WA (33.4)
13. Detroit MI (1.18)	13. <b>New York-Newark NY-NJ-CT (29.7)</b>
14. San Diego CA (1.18)	14. San Diego CA (28.0)
15. Phoenix-Mesa AZ (1.18)	15. Phoenix-Mesa AZ (26.7)

More compact urban regions (blue) tend to have more intense congestion but lower congestion costs than sprawled, auto-oriented regions (red). Rankings change depending on which indicator is used.

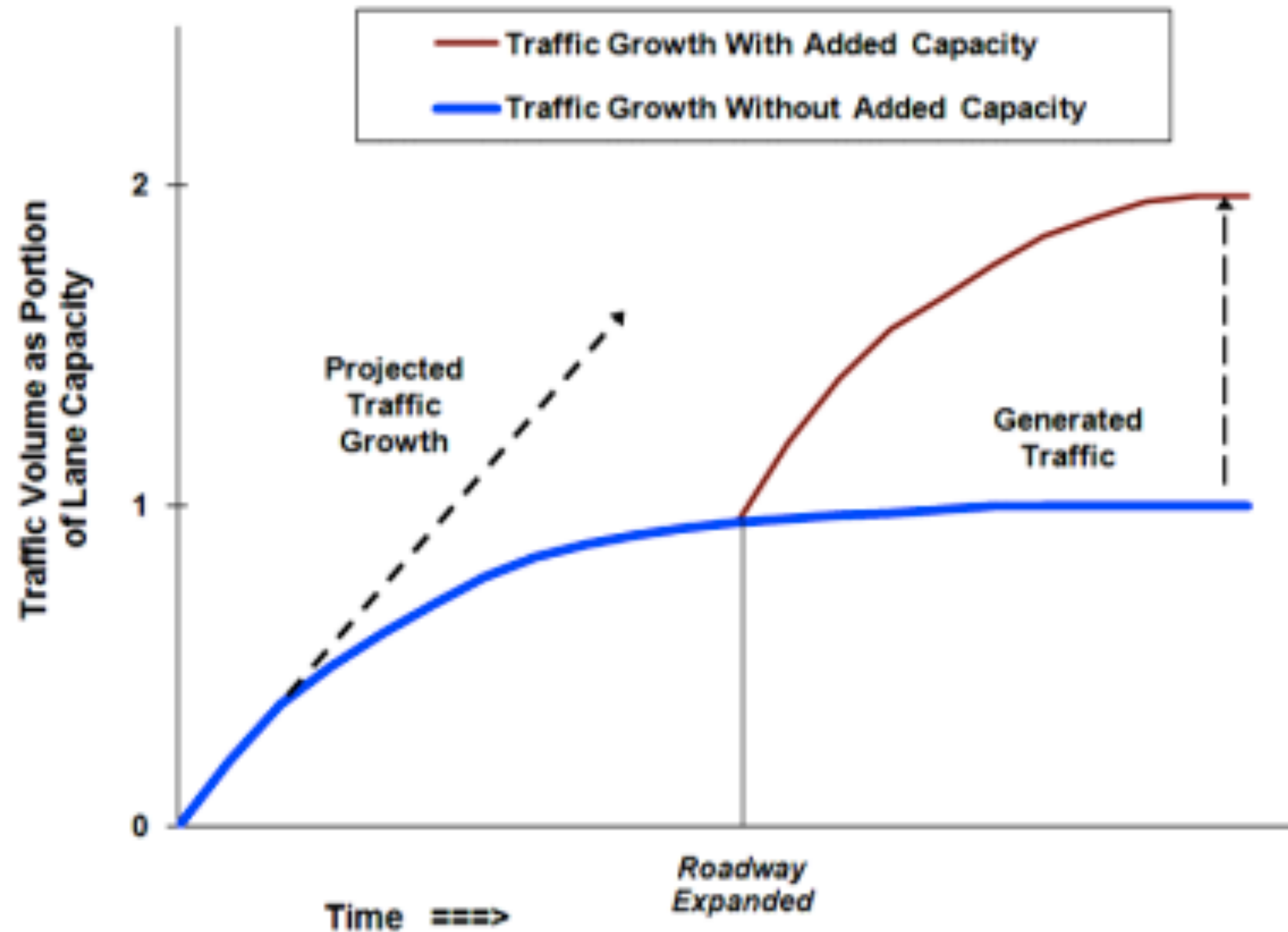
[www.vtpi.org](http://www.vtpi.org)

Due to personal cars, most cities are a commuting mess with congestion delays and costs



# Adding Infrastructure Makes it Worse

How Road Capacity Expansion Generates Traffic (Litman 2001)



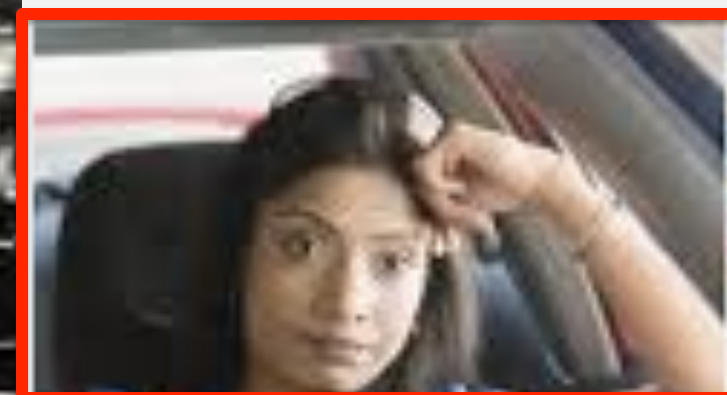
*Urban traffic congestion tends to maintain a self-limiting equilibrium: traffic grows until congestion delays cause travellers to forego some potential peak-period vehicle trips (indicated by the curve becoming horizontal). If road capacity is expanded, traffic increases until it reaches a new equilibrium. The additional peak-period vehicle traffic that results from roadway capacity expansion is called "generated traffic." The portion that consists of absolute increases in vehicle travel (as opposed to shifts in time and route) is called "induced travel."*

[www.vtpi.org](http://www.vtpi.org)

Traffic expands to occupy the additional capacity created



# The Price of Not Doing it Right



The personal car causes congestion, impacting the lives of millions, and ruining the planet...



# Economical Problems

**Traffic Jams due to Under-occupied Cars & Transit,**  
dramatically inefficient occupancy rate



**\$121 Billion**  
in fuel cost\*



**Source: IEA - ENERGY.GOV**

\*amount of money saved in fuel cost in one year in US if average occupation rate would raise from current rate to 75%