

# Quantifying TDM Strategies



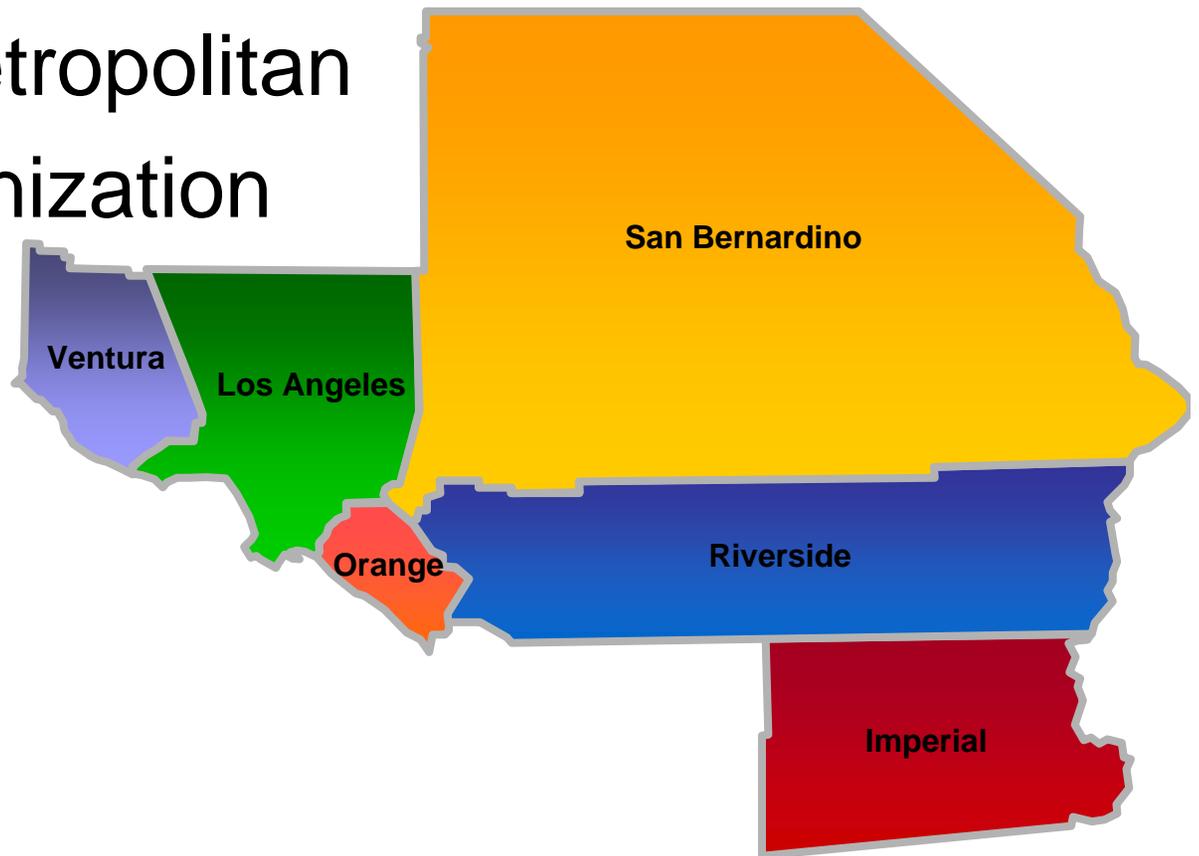
Alan Thompson

Southern California Association of Governments

May 24, 2011

# What is SCAG?

- Largest US Metropolitan Planning Organization
- Largest US Council of Governments
- 6 counties
- 190 cities



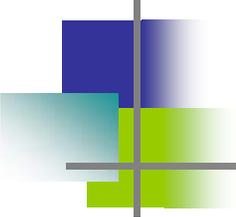
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# TDM vs TSM

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- TDM (Transportation Demand Management) represents strategies that encourage travelers to use something other than a single occupancy vehicle (SOV) or travel at non peak times or reduce or bundle discretionary trips
- TSM (Transportation System Management) represents strategies that improve efficiency of transportation system operation, primarily utilizing ITS technology, to achieve more balanced distribution of demand on the system and over time



# TDM vs TSM

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## TDM

Bike/Ped Facilities

Flexible Work Hours, 9/80

HOV Lanes

Park & Ride Lots

Ridesharing

Transit Subsidies

Telecommuting

Safe Routes to School

## TSM

Intelligent Transportation Systems

Ramp Metering

Traveler Information Systems

Signal Synchronization

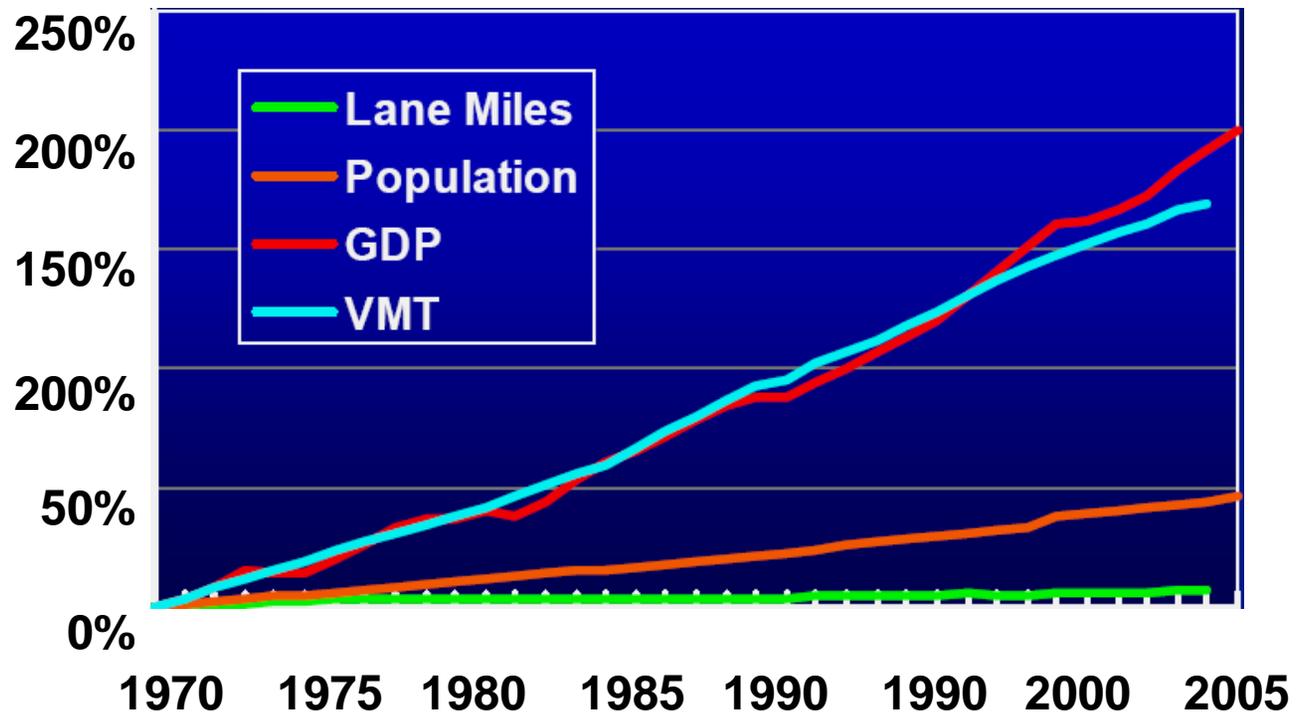
Transportation management Centers

Incident Response

# Why TDM Matters

- *According to RAND "Moving LA" Study,*

Growth in automotive travel has far outpaced growth in lane miles



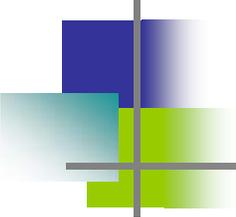
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# Why TDM Matters

We can't  
continue to  
build our way  
out of  
congestion.



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# Why TDM Matters

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	Average Daily Delay Per Capita (minutes)	Average Speed (mph)
Imperial County	4.5	49.2
Los Angeles County	23.3	27.4
Orange County	19.3	30.4
Riverside County	13.4	38.2
San Bernardino County	13.2	39.0
Ventura County	13.3	34.8
Regional Average	20.0	30.5

Source: SCAG 2008 Regional Transportation Plan

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# But Are Single Occupant Vehicles Really More Efficient?

Amount of space required to transport the same number of passengers by car, bus or bicycle.



Car?

Bus?

Bicycle?

(Poster in city of Muenster Planning Office, August 2001)

*Credit: Press-Office City of Münster, Germany*

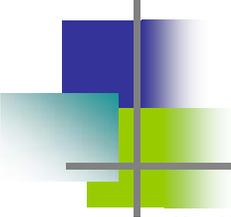
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# Relevant Requirements

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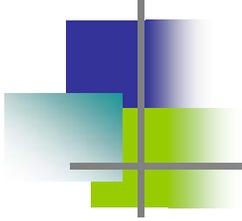
- **California Government Code 65089  
Congestion Management Program**
- The program shall contain all of the following elements ...A travel demand element that promotes alternative transportation methods, including, but not limited to, carpools, vanpools, transit, bicycles, and park-and-ride lots; improvements in the balance between jobs and housing; and other strategies, including, but not limited to, flexible work hours, telecommuting, and parking management programs.  
The agency shall consider parking cash-out programs during the development and update of the travel demand element.
- **TDM requirements made voluntary in 1996.**



# Relevant Requirements

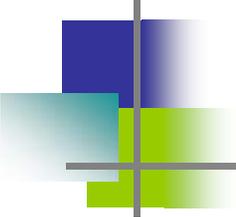
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- 23 C.F.R. § 450.320 Congestion management process in transportation management areas.
- (a) The transportation planning process in a TMA shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system... through the use of travel demand reduction and operational management strategies.



# *What Gets Measured Gets Managed* - *Peter Drucker*

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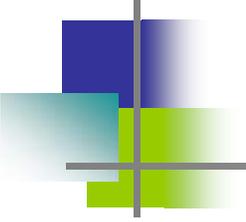


# Historical Methods for Measuring TDM

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- Household Travel Surveys
- Travel Demand Model Assumptions

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# Household Travel Surveys

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- Small sample size means any small subset has higher margin of error
- SCAG Region – 9 million households
- Survey of 25,000 households
- Sample size is <math><0.3\%</math>
- The smaller the mode share, the less likely it will be accurately sampled.



## Detailed Tables

You are here: [Main](#) ▶ [Data Sets](#) ▶ [Data Sets with Detailed Tables](#) ▶ [Geography](#) ▶ [Tables](#) ▶ [Results](#)

Use the links above to change your results

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### [B08006. SEX OF WORKERS BY MEANS OF TRANSPORTATION TO WORK - Universe: WORKERS 16 YEARS AND OVER](#)

Data Set: [2009 American Community Survey 1-Year Estimates](#)

Survey: American Community Survey

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the [official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties](#).

For information on confidentiality protection, sampling error, nonsampling error, and definitions, see [Survey Methodology](#).

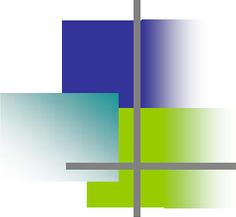
View the [collapsed version of this table](#). Geographies missing from this table are listed below the table.

	Santa Monica city, CA; Los Angeles-Long Beach-Santa Ana, CA Metro Area	
	Estimate	Margin of Error
Total:	47,290	+/-2,812
Car, truck, or van:	37,327	+/-2,791
Drove alone	35,810	+/-2,761
Carpooled:	1,517	+/-661
In 2-person carpool	1,075	+/-476
In 3-person carpool	442	+/-420
In 4-or-more-person carpool	0	+/-294
Public transportation (excluding taxicab):	2,025	+/-859
Bus or trolley bus	2,025	+/-859
Streetcar or trolley car (carro publico in Puerto Rico)	0	+/-294
Subway or elevated	0	+/-294
Railroad	0	+/-294
Ferryboat	0	+/-294
Bicycle	1,623	+/-714
Walked	1,707	+/-662
Taxicab, motorcycle, or other means	775	+/-451
Worked at home	3,833	+/-1,086

7.7% MOE

95% MOE

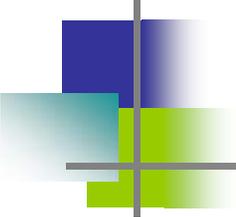
44% MOE



# Travel Demand Model

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- 4 Step Model: TDM share manually inputted by programmer for base year and forecast year
- These assumptions historically based on Survey data.



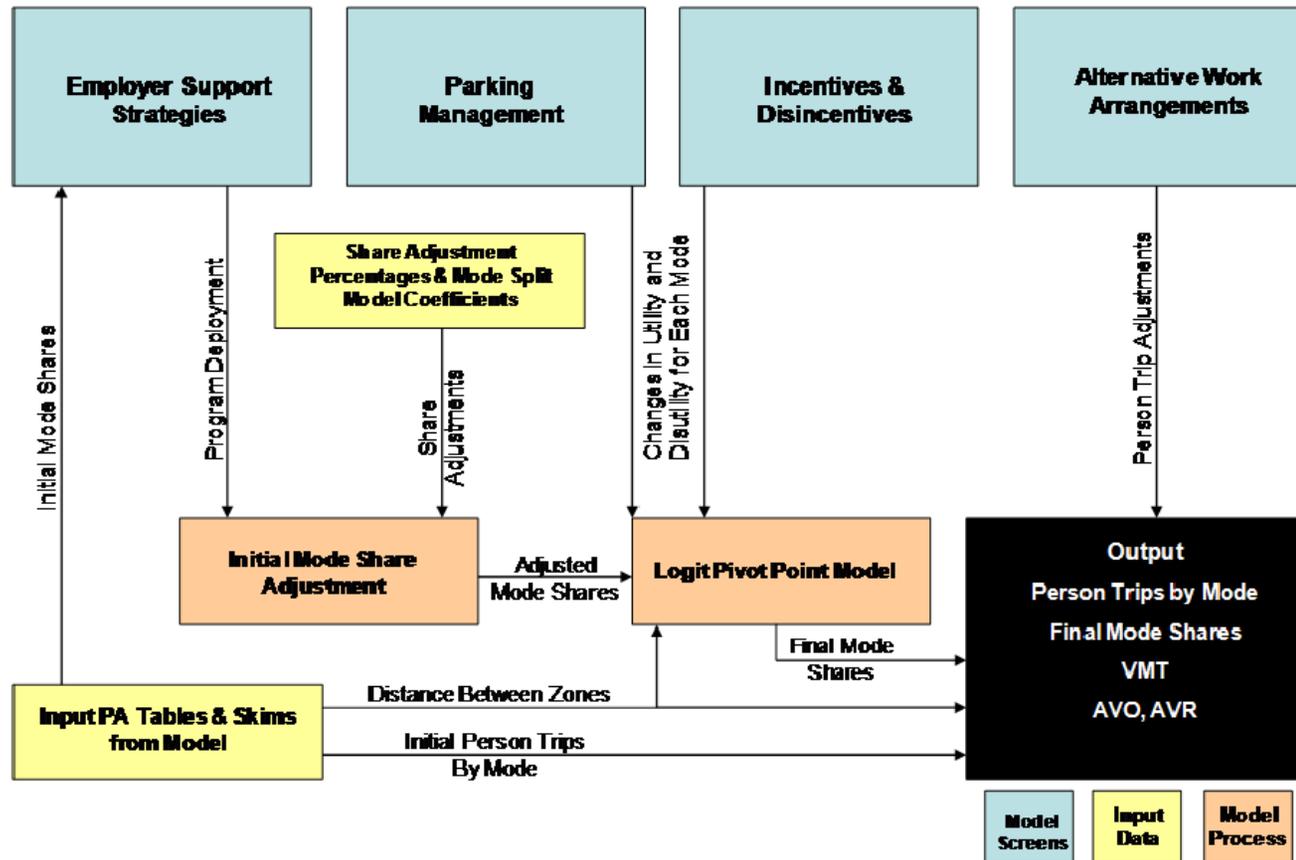
# TDM Tool

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- Sketch tool using MS Excel and TransCad
- Allows input based on targeted Surveys
- SCAG surveyed all cities and 900 employers (with over 250 employees) in region

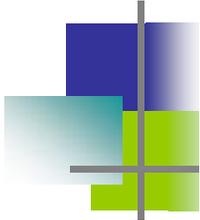
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# TDM Tool Structure

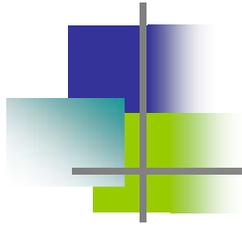


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# Sample TDM Packages



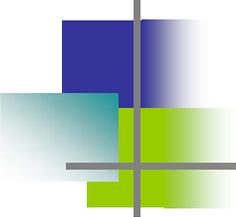
BASIC	MODERATE	MODERATE
<p>Transportation Coordinator: Existing rates of part-time/full-time transportation coordinator shifts from 65/35 to 60/40</p> <p>Flexible Schedules: 10% increase</p> <p>Rideshare Matching: 10% incr. in-house match, 0% incr. in group match 5% incr. in regional match</p> <p>Transit Assistance: 10% incr. in transit info, 0% incr. in on-site pass sales</p> <p>Walk/Bike Assistance: 5% increase in bike racks, 0% increase in showers/ changing areas</p> <p>Emergency Ride Assistance: 10% incr. in regional GRH 0% incr. in in-house GRH 0% incr. in use of company vehicles</p> <p>Fairs &amp; Promotions: 10% increase</p> <p>On-site services: 0% increase</p>	<p>Transportation Coordinator: Existing rates of part-time/full-time transportation coordinator shifts from 65/35 to 55/45</p> <p>Flexible Schedules: 20% increase</p> <p>Rideshare Matching: 20% incr. in-house match 10% incr. in group match 10% incr. in regional R/S</p> <p>Transit Assistance: 20% incr. in transit info 10% incr. in on-site pass sales</p> <p>Walk/Bike Assistance: 15% increase in bike racks 5% increase in showers/ changing areas</p> <p>Emergency Ride Assistance: 10% incr. in regional GRH 10% incr. in in-house GRH 0% incr. in use of company vehicles</p> <p>Fairs &amp; Promotions: 20% increase</p> <p>On-site services: 5% increase</p>	<p>Transportation Coordinator: Existing rates of part-time/full-time transportation coordinator shifts from 65/35 to 50/50</p> <p>Flexible Schedules: 30% increase</p> <p>Rideshare Matching: 30% incr. in-house match 20% incr. in group match 15% incr. in regional R/S</p> <p>Transit Assistance: 20% incr. in transit info 20% incr. in on-site pass sales</p> <p>Walk/Bike Assistance: 25% increase in bike racks 15% increase in showers/ changing areas</p> <p>Emergency Ride Assistance: 10% incr. in regional GRH 20% incr. in in-house GRH 10% incr. in use of company vehicles</p> <p>Fairs &amp; Promotions: 30% increase</p> <p>On-site services: 10% increase</p>
<p><b>VMT Reductions:</b> Pasadena: 0.7% Downtown LA: 0.6% Ontario: 1.1%</p>	<p><b>VMT Reductions:</b> Pasadena: 2.0% Downtown LA: 1.8% Ontario: 3.2%</p>	<p><b>VMT Reductions:</b> Pasadena: 2.0% Downtown LA: 1.8% Ontario: 3.2%</p>



# TDM Tool Output

	Percent By Mode					Occupancy		Person Trips	Vehicle Trips	VMT	Average Trip Length
	SOV	HOV	Transit	Walk	Bike	AVO	AVR				
<b>Downtown LA</b>											
<i>Internal to Internal</i>	71.8%	9.0%	12.1%	5.4%	1.7%	1.07	1.32	1,885	1,428	775	0.54
<i>External to Internal</i>	66.0%	18.2%	13.3%	2.0%	0.6%	1.14	1.36	208,343	153,642	2,210,766	14.39
<b>Total</b>	66.0%	18.1%	13.3%	2.0%	0.6%	1.14	1.36	210,228	155,070	2,211,541	14.26
<b>Pasadena</b>											
<i>Internal to Internal</i>	73.1%	13.7%	7.0%	4.9%	1.3%	1.10	1.26	3,507	2,781	9,445	3.40
<i>External to Internal</i>	66.4%	21.1%	9.2%	2.5%	0.7%	1.16	1.32	64,869	49,157	613,272	12.48
<b>Total</b>	66.8%	20.8%	9.1%	2.6%	0.7%	1.15	1.32	68,376	51,938	622,717	11.99
<b>Ontario</b>											
<i>Internal to Internal</i>	78.8%	14.4%	0.7%	4.9%	1.3%	1.09	1.17	248	211	429	2.03
<i>External to Internal</i>	78.0%	18.7%	1.6%	1.4%	0.4%	1.12	1.16	18,011	15,492	258,702	16.70
<b>Total</b>	78.0%	18.6%	1.6%	1.4%	0.4%	1.12	1.16	18,259	15,704	259,131	16.50

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# TDM Toolbox

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- A summary of strategies, indicating costs/benefits, performance measures, case studies, and complementary strategies.
- Designed as guide for implementing agencies.

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## TDM Toolbox – Bicycle Improvements

**TDM - Bicycling can reduce vehicle trips for short distances (most trips are less than three miles distance) where vehicle pollution control devices are least effective .**

### Bicycle and Pedestrian Infrastructure Investments

Developing bicycle facilities to reduce motorized vehicle use for both short (<5 miles) utilitarian/school trips, linkages to transit, medium (<10 miles) commute trips and for longer recreational/touring trips.

#### Pros:

Reduced congestion, Reduced emissions; Reduced capital expenditures; Regional Health Improvements

#### Cons:

May not be effective for longer commutes; Some roadways may require widening or innovative solutions to be effective

#### How do you measure this?

Bicycle Mode Share: Regularly scheduled bicycle counts combined with targeted surveys. This can be done through manual counts, or through ITS technologies to count bicyclists. Research indicates for every mile of bike lane added per square mile, regional bicycle ridership increases 1%.

#### Example of quantifiable Performance Goal:

Increase Bicycle Mode Share to X percent of all daily commutes by the year 20XX  
Reduce Bicycle Fatalities by at least XX percent by 20XX

- Miles of Bicycle Facilities as a percentage of roadway miles
- Increase in number of bicyclists by gender over baseline year.

- Reduction in bicyclist fatalities
- Bicycle Facility connectivity (gap closures, regional corridors)

#### Implementation Costs

Bike Lane \$5,000-\$50,000/mile  
Bike Path \$100,000 - \$1 million/mile  
Signage \$500-\$2,000/mile

#### Congestion Impacts:

Can result in lower speeds on some roads  
Can reduce accidents and severity of accidents

**Complementary Strategies:** Bicycle parking ordinances, Wayfinding signage, Safe Routes to School Plans, Compass Blueprint Strategies.

**Responsible Agency(s):** Caltrans, County Transportation Authorities, Cities

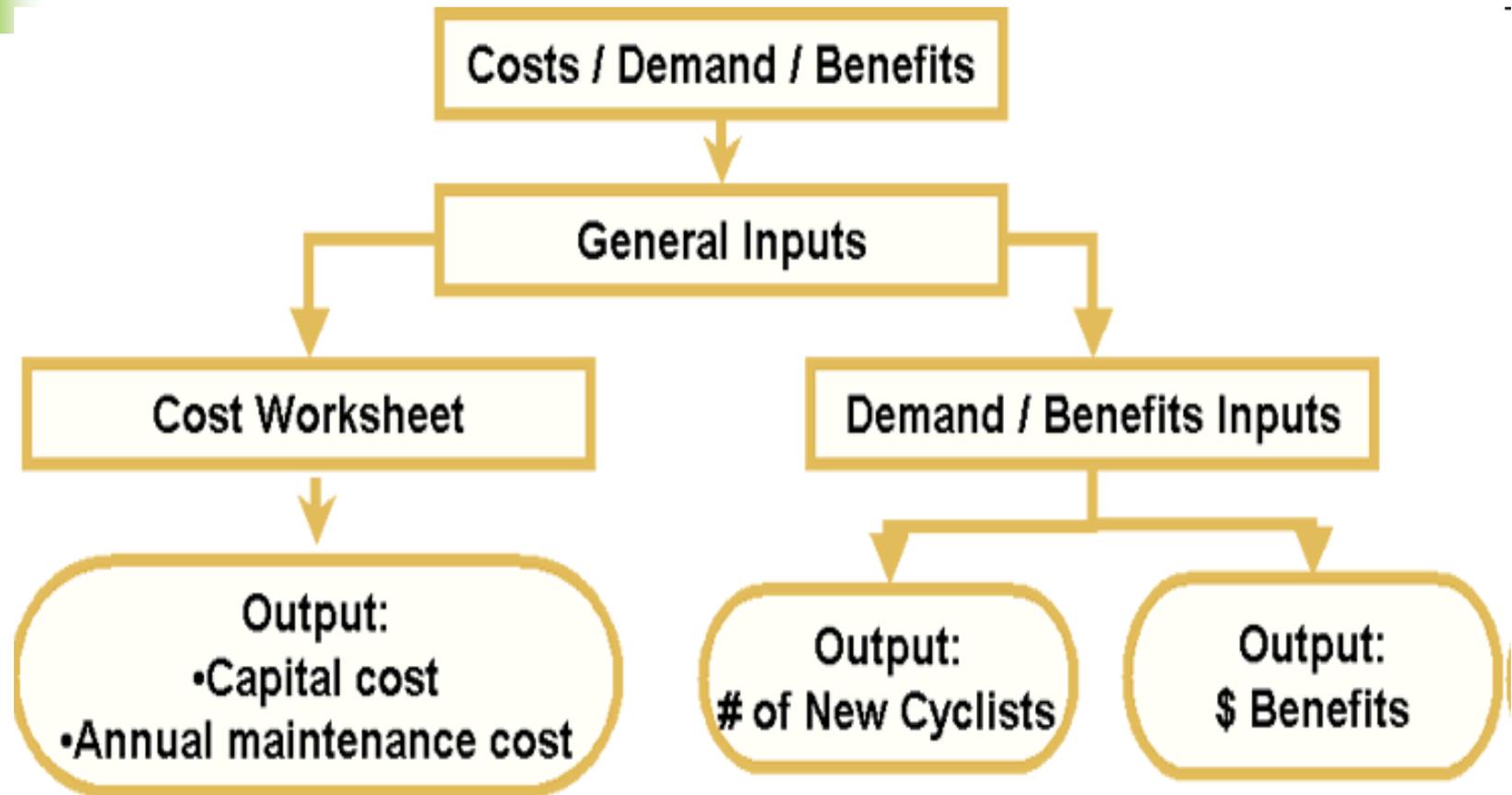
#### Primary Stakeholders:

Law Enforcement, Fire and Rescue Emergency Medical Services  
Transportation Agencies, Towing and Recovery, Emergency Managers

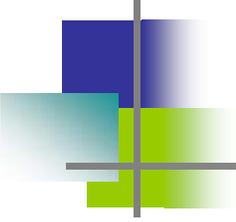
Hazardous Materials Responders, Medical Examiners and/or Coroners, Elected and Appointed Officials, Traffic Media  
Highway Users

[US DOT Policy Statement Integrating Bicycling and Walking into Transportation Infrastructure](#) Transportation Research Board, [Transportation Research Record 1538](#) 2007  
[National Cooperative Highway Research Program \(NCHRP\) Report 552: Guidelines for Analysis of Investments in Bicycle Facilities](#)  
Case Studies: [http://katana.hsrb.unc.edu/cms/downloads/pbic\\_case\\_study\\_compendium.pdf](http://katana.hsrb.unc.edu/cms/downloads/pbic_case_study_compendium.pdf)

# Bicycle Infrastructure Model



May 24, 2011



# Questions

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Alan Thompson

Senior Planner

213.236.1940

Thompson@scag.ca.gov

May 24, 2011