

Transportation-Related GHG Emissions and Strategies for Active Travel and Land Use

Susan Handy

Climate Action Team Public Health Workgroup

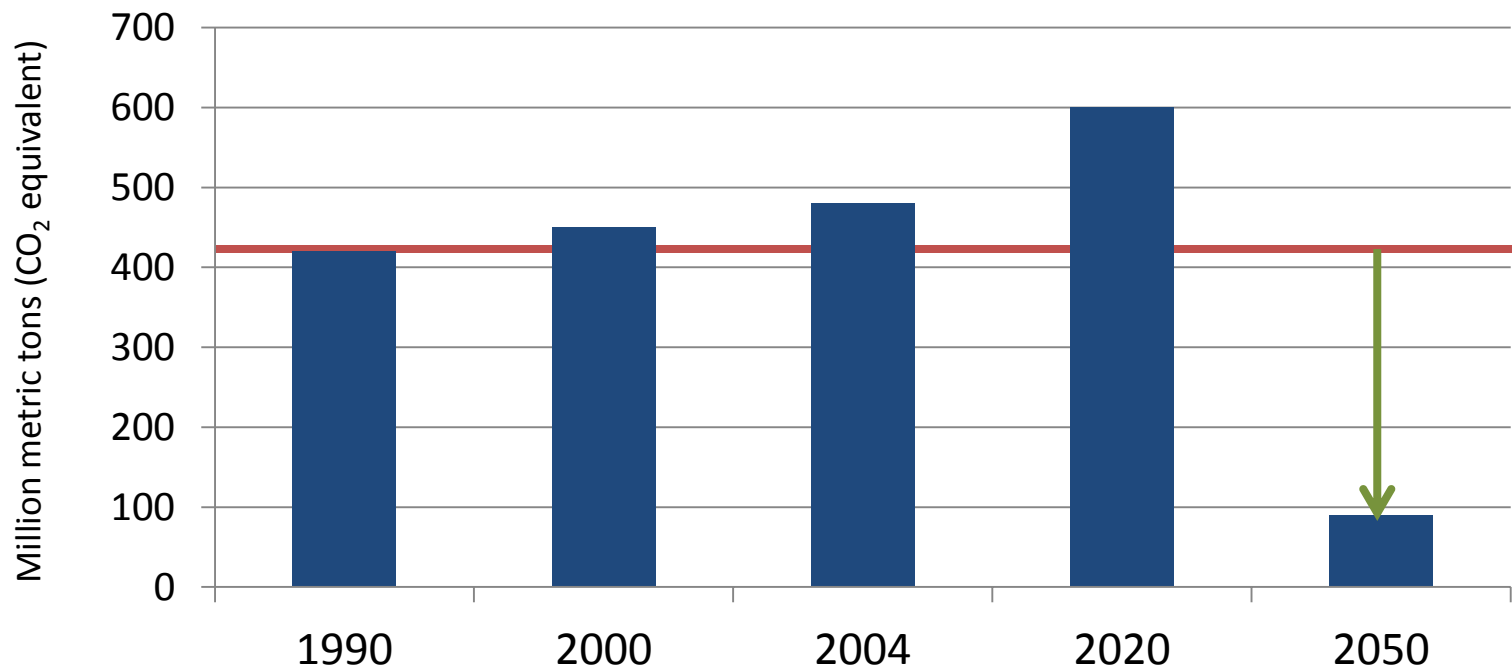
October 8, 2014



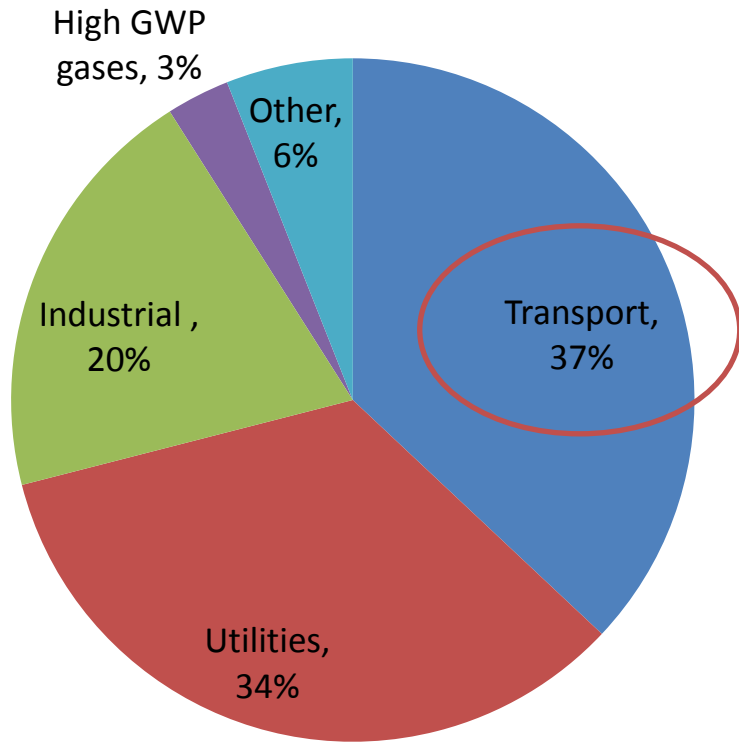
AB32

The California Global Warming Solutions Act of 2006

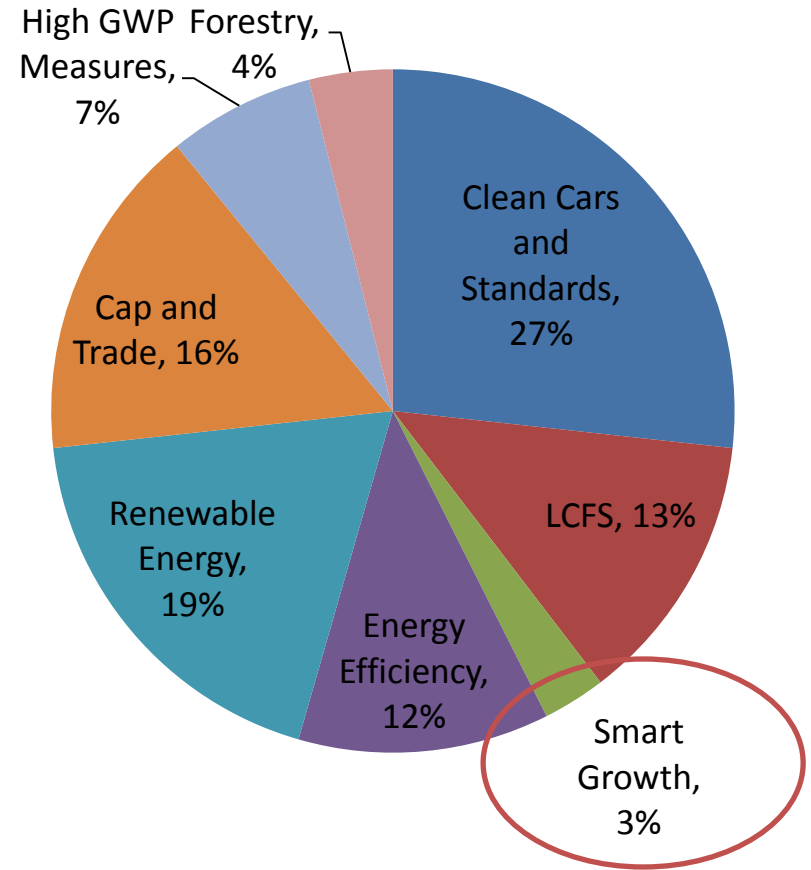
80% reduction of GHG from 1990 levels by 2050



California Emission Sources (2008)



AB32 Emission Reduction Strategies



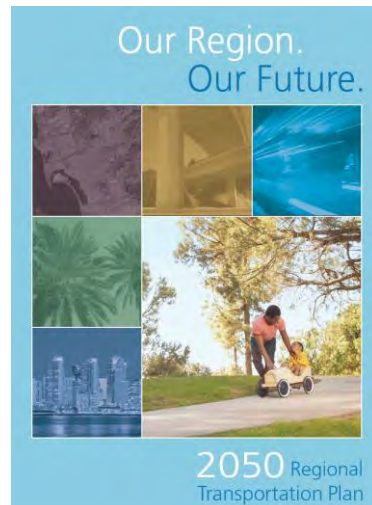
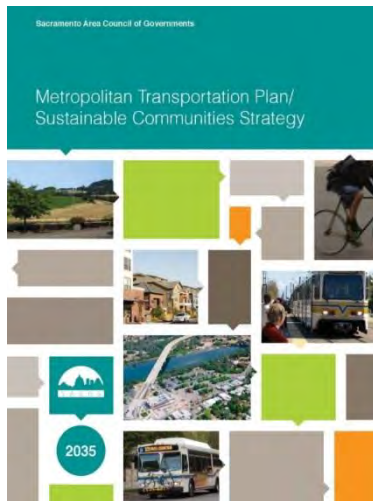
SB375

Sustainable Communities and Climate Protection Act of 2008

Targets for reducing per capita GHG emissions
from cars and light trucks for metropolitan areas

Examples	2020	2035
Sacramento	-7%	-16%
Bay Area	-7%	-15%
LA region	-8%	-13%
San Diego	-7%	-13%

Sustainable Communities Strategies adopted by Metropolitan Planning Organizations (MPOs)



How region will meet its greenhouse gas reduction target through integrated land use, housing and transportation planning.



Strategies Reviewed for ARB

Land Use Residential Density
Employment Density
Land Use Mix
Street Connectivity
Regional Access to Employment
Jobs-Housing Balance

**Infrastructure
and Services** Distance to Transit
Transit Service
Car sharing
Pedestrian infrastructure
Bike infrastructure
Roundabouts
Highway Capacity



Effect Sizes

Strategy	Strategy Unit	% VMT Change
<i>Land Use</i>		
Residential Density	1% increase	-0.05 to -0.19%
Employment Density	1% increase	-0.03 to +0.07%
Land Use Mix	1% increase	-0.02 to -0.10%
Street Connectivity	1% increase	0.0 to -0.12%
Regional Accessibility	1% increase	-0.13 to -0.25%
Jobs-Housing Balance	1% improvement	-0.29 to -0.35%
<i>Infrastructure and Services</i>		
Distance to Transit	1 mile closer	-1.3 to -5.8%
Transit Service	1% improvement	n/a
Car Sharing	for participants	-27 to -33%
Pedestrian Infrastructure	1% increase	0.0 to -0.19%
Bicycle Infrastructure	1% increase	n/a
Roundabouts	vs. stop sign or signal	-59 to +25%*
<i>Highway Capacity/Induced Travel</i>	<i>1% increase</i>	<i>+0.3 to +1.0%</i>

* Impact on fuel consumption and/or GHG emissions

TRB Special Report 298

Transportation Research Board | SPECIAL REPORT 298



Driving and the Built Environment

The Effects of Compact Development on Motorized Travel, Energy Use, and CO₂ Emissions



NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

“careful before-and-after studies of policy interventions to promote more compact, mixed-used development to help determine what works and what does not”

“Natural experiments”

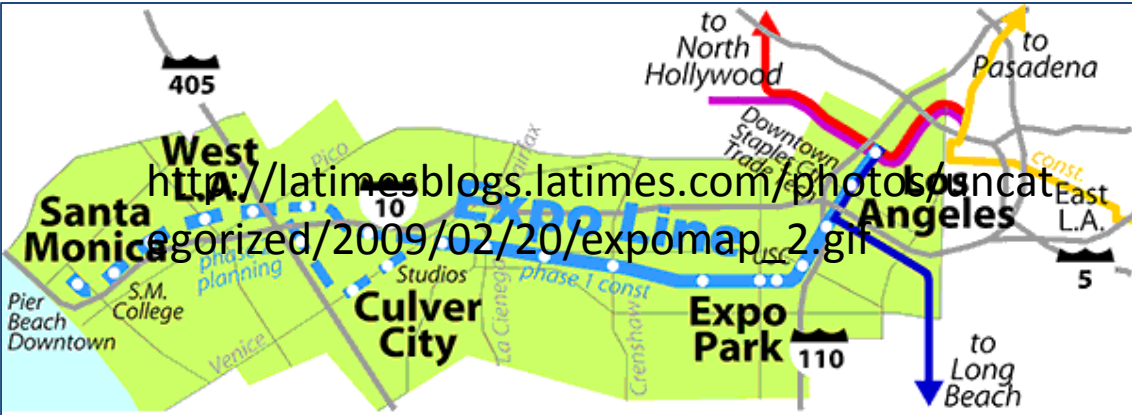
“Intervention studies”

“Policy evaluation”

Examples of Evaluation Studies



Green Lane Project
Portland State
University



Expo Line Opening
UC Irvine, USC



The Role of Active Travel



Transit-bicycle integration



Walking and Biking Potential

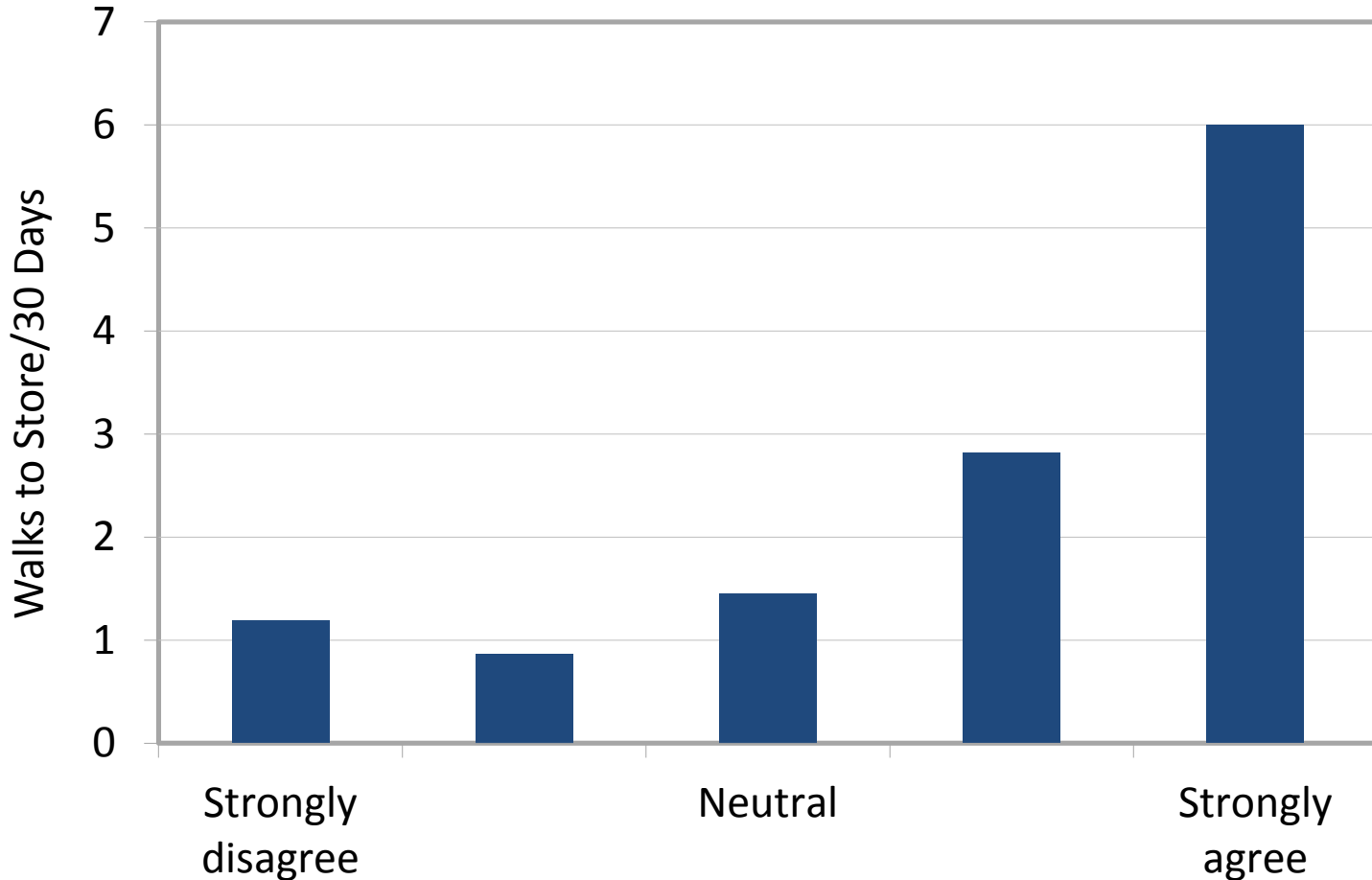
Trip Length	Share of Trips in US
< 1 mile	25 %
< 2 miles	40 %



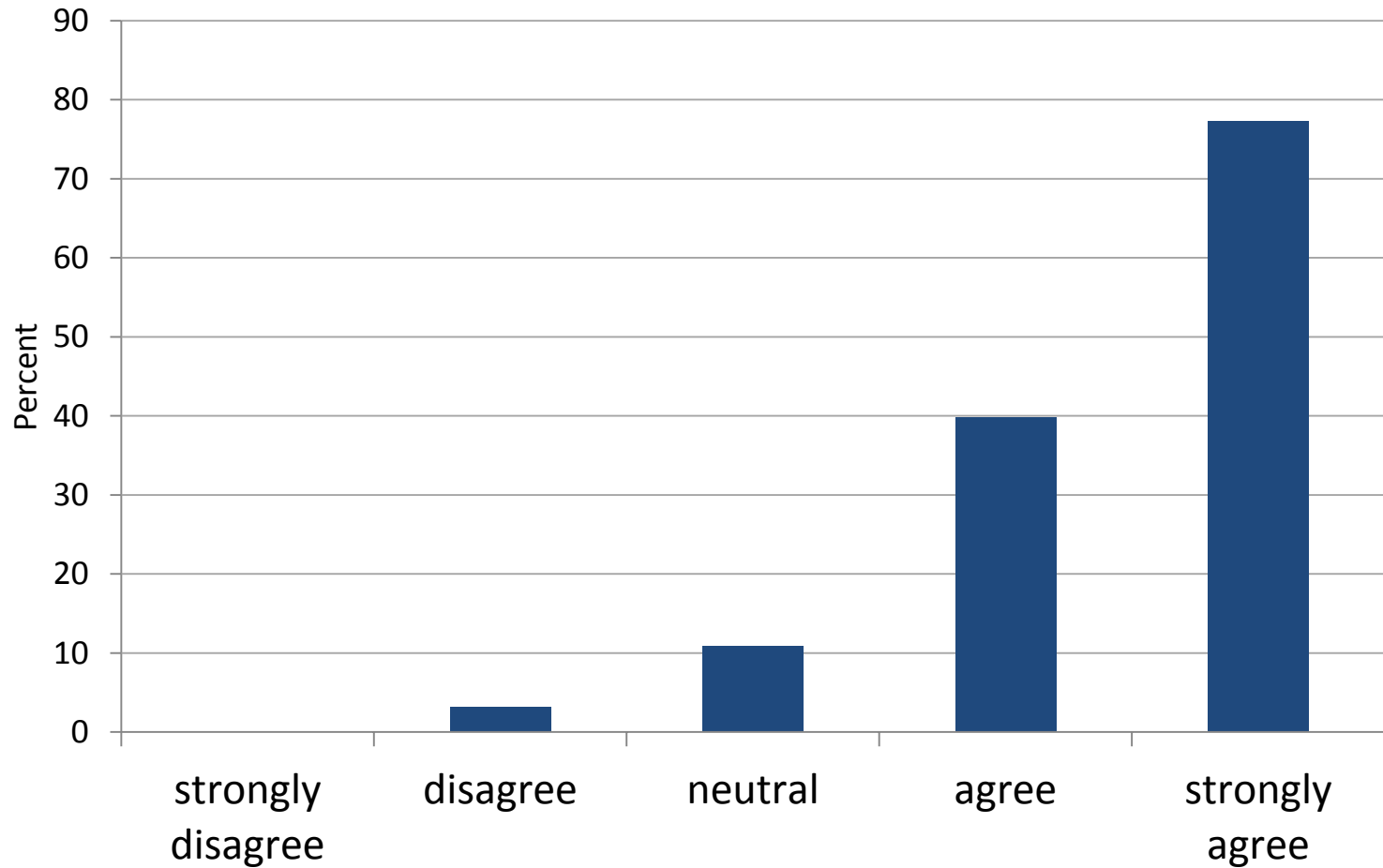
Walking vs. Biking Potential

	People Potential	Trip Potential
Walking	No equipment needed Almost everyone does it some	Only 2-5 mph so not many destinations within time available
Bicycling	Bicycle needed Many people don't have skills or confidence to do it	Faster at 5-15 mph so more destinations within time available

Walking to Store vs. “I like to walk”



Percent Biking Last Week vs. “I like riding a bike”



Last time walking to the store – if you had been unable to walk...?

Alternative	Share of Respondents
Driven to same place	64%
Drive to different place	8%
Stayed at home	13%
Other	6%
Not sure	10%

2.5 walks per month x 0.6 miles to nearest store x 2 x 0.64
= 2.1 miles per month

What we do know: We need a multifaceted approach to VMT reduction



Step 1: Make it possible to drive less



Land-Use Mix



Connectivity



Alternative modes

Land Use and Transportation Strategies

Step 2: Help people see how to drive less



Information

Education

Step 3: Make people want to drive less



The Stick: Make it harder to drive



Pricing



Restrictions

The Carrot: Make it cool to drive less



Hip design

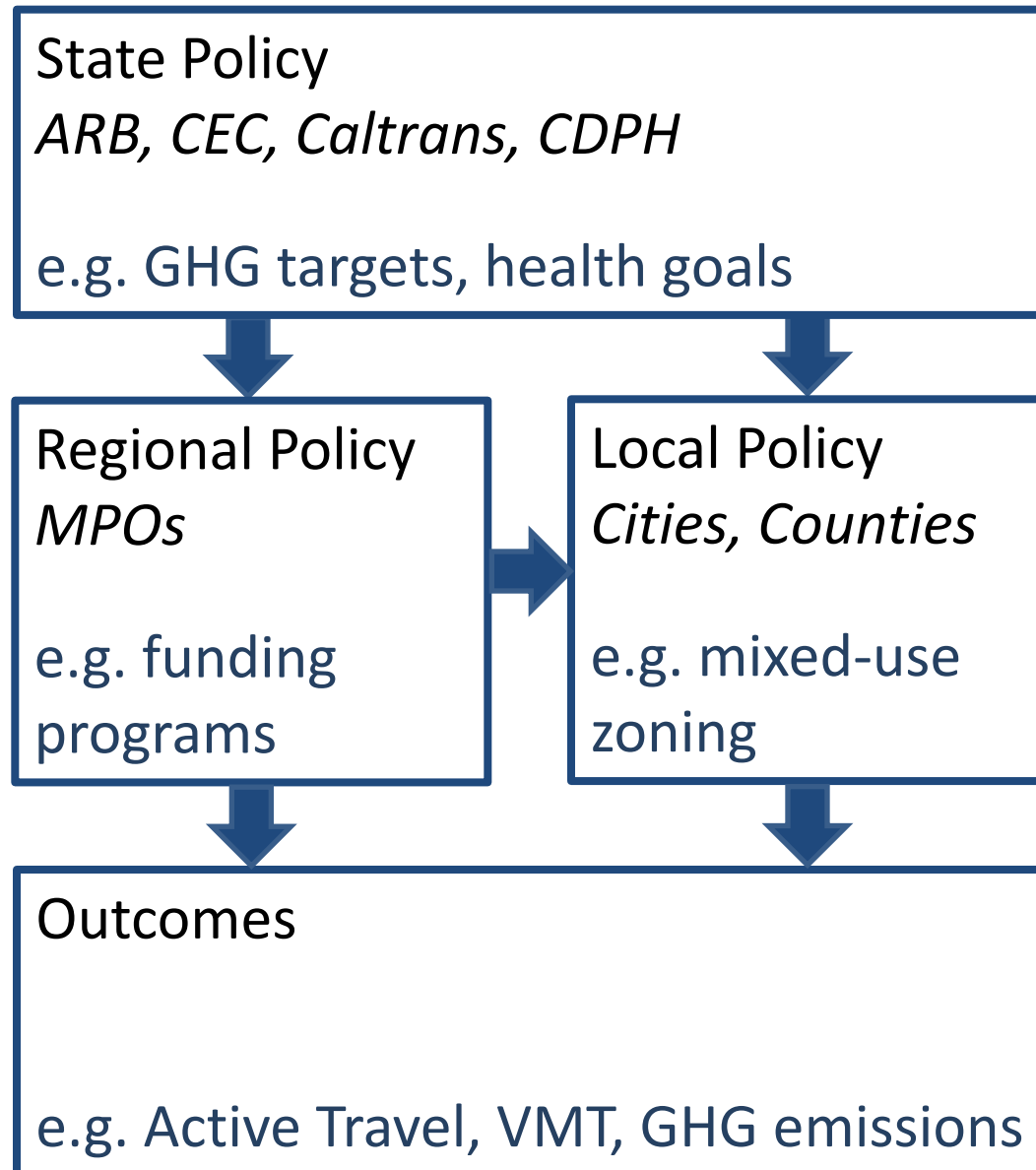


Social marketing

What we also know:
We need actions at all levels of
government



Action at
all levels of
government



Transportation Planning Philosophy

The Old Way:

Make it easier to drive



Focus on “level of service”
Planning for mobility

The New Way:

Make it easier to NOT drive



Focus on “livability”
Planning for accessibility



Thanks!

Questions? slhandy@ucdavis.edu