Eno
Center for Transportation

Stay tuned for our next webinar!

## Shifting Gears: Toward a New Way of Thinking about Transportation

1:00-1:45 pm ET

The webinar recording and slides will be emailed to all registrants within a day.

@Enotrans

# Shifting Gears

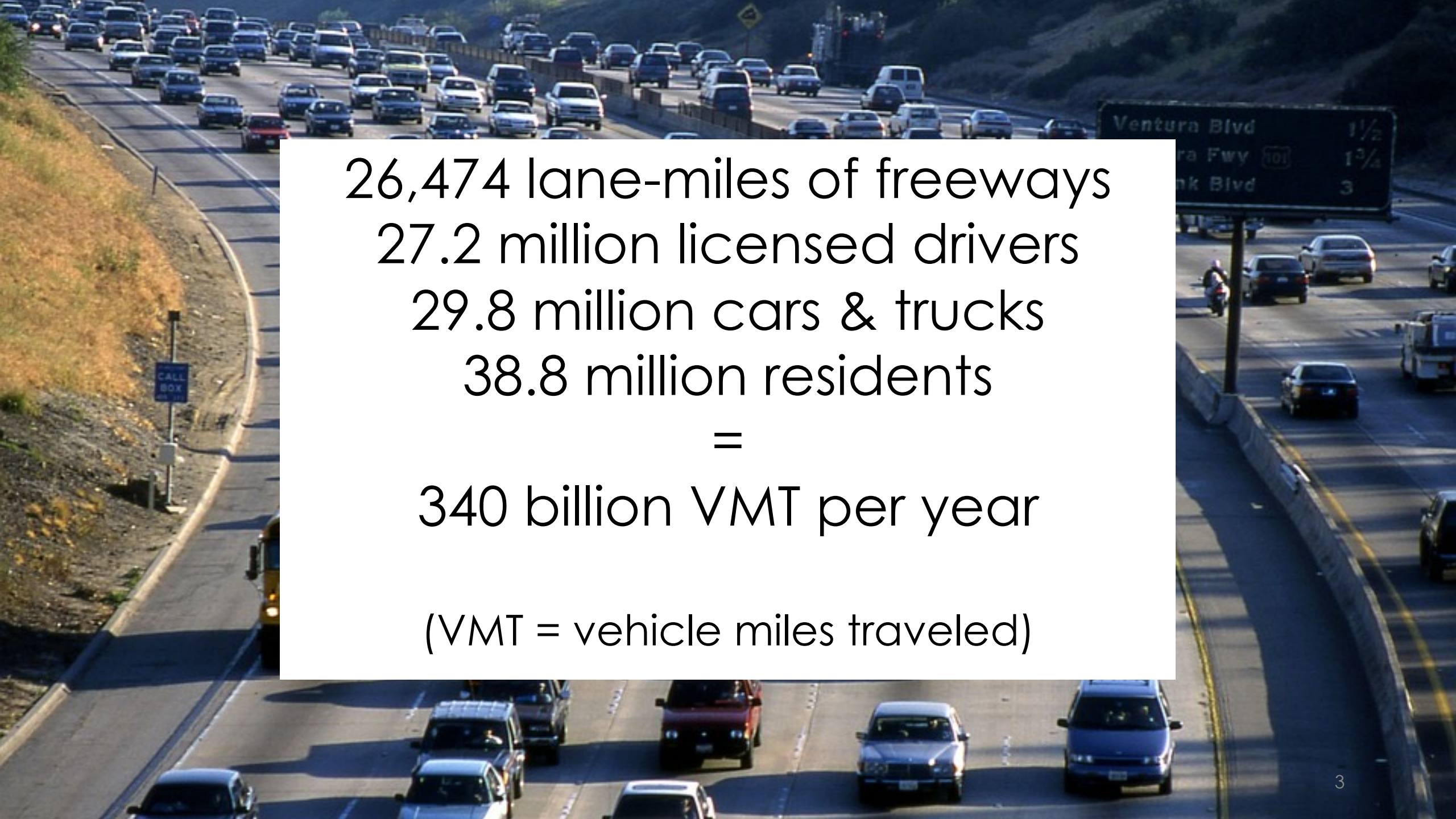
## Toward a new way of thinking about transportation

Susan Handy

February 2024

ITS UCDAVIS Institute of Transportation Studies

National Center for Sustainable Transportation
A USDOT University Transportation Center




26,474 lane-miles of freeways
27.2 million licensed drivers
29.8 million cars & trucks
38.8 million residents
=
340 billion VMT per year

(VMT = vehicle miles traveled)

# Sustainability concerns

Pollution

Congestion

Safety

Stress


Resiliency

Sprawl

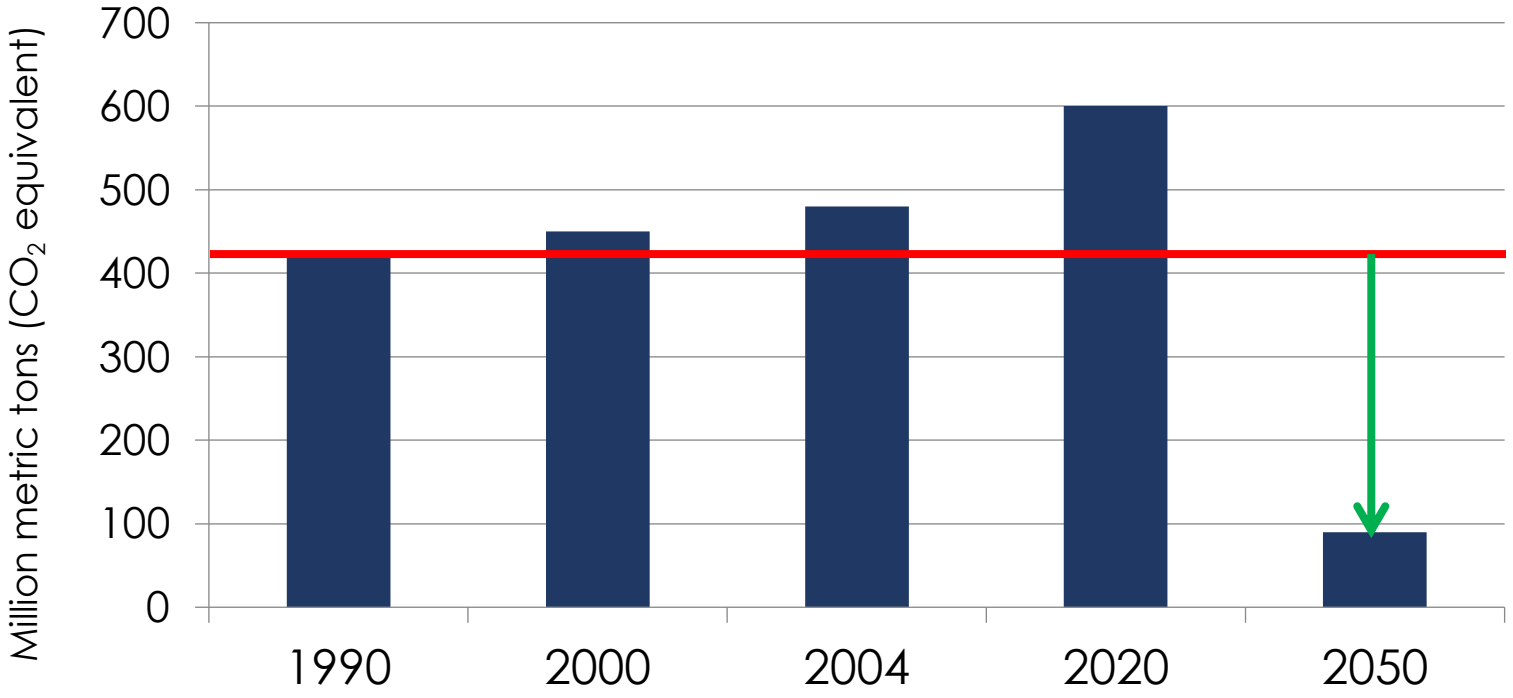
Wildlife

Equity

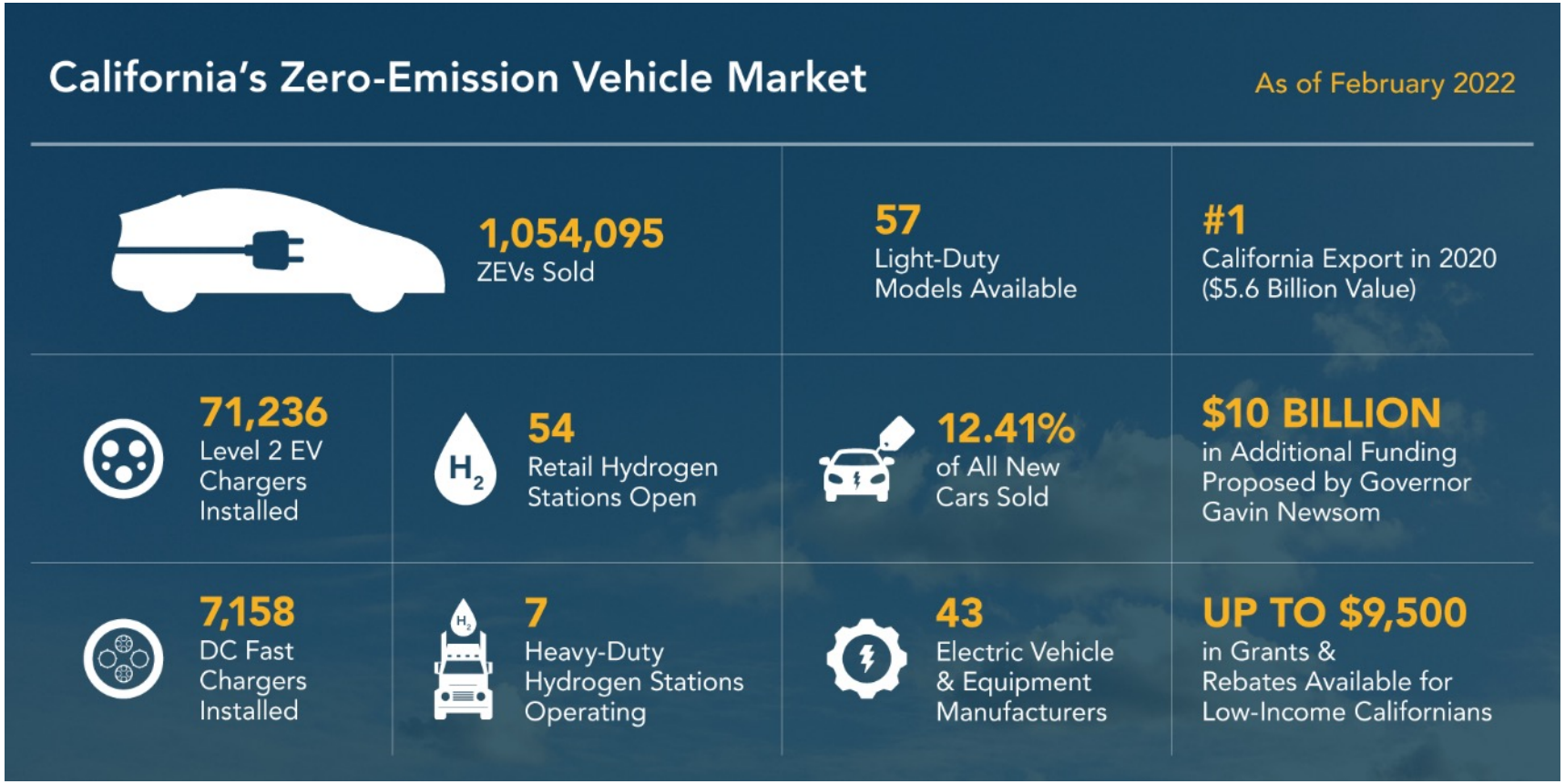
# California's goals for reducing GHGs

AB 32 of 2006: 80% reduction of GHG from 1990 levels by 2050

*SB 32 of 2016: 40% below 1990 by 2030*




# California's goals for zero-emission vehicles




## Advanced Clean Cars II Rule

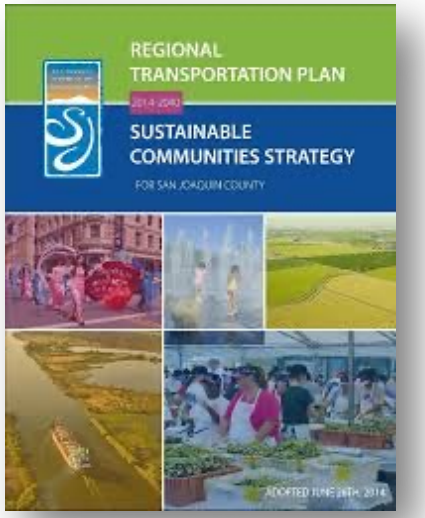
100% of new cars and light trucks sold in California will be zero-emission vehicles by 2035

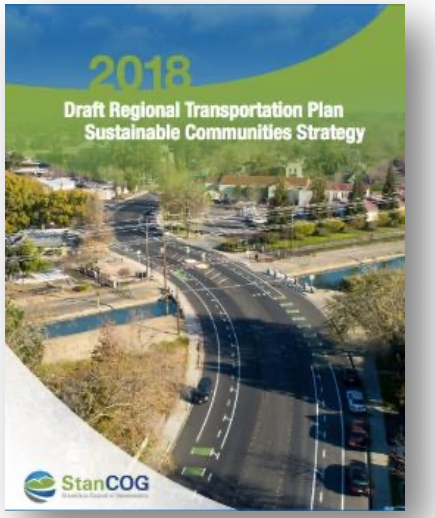
# California's goals for reducing VMT

Targets for per capita GHG emissions reduction from cars and trucks for metropolitan areas, by reducing vehicle-miles-traveled (VMT)

| | 2020 | 2035 |
|---|---|---|
| Sacramento | -7% | -19% |
| Bay Area | -10% | -19% |
| LA region | -8% | -19% |
| San Diego | -15% | -19% |

Regional Transportation Plan + Sustainable Communities Strategy



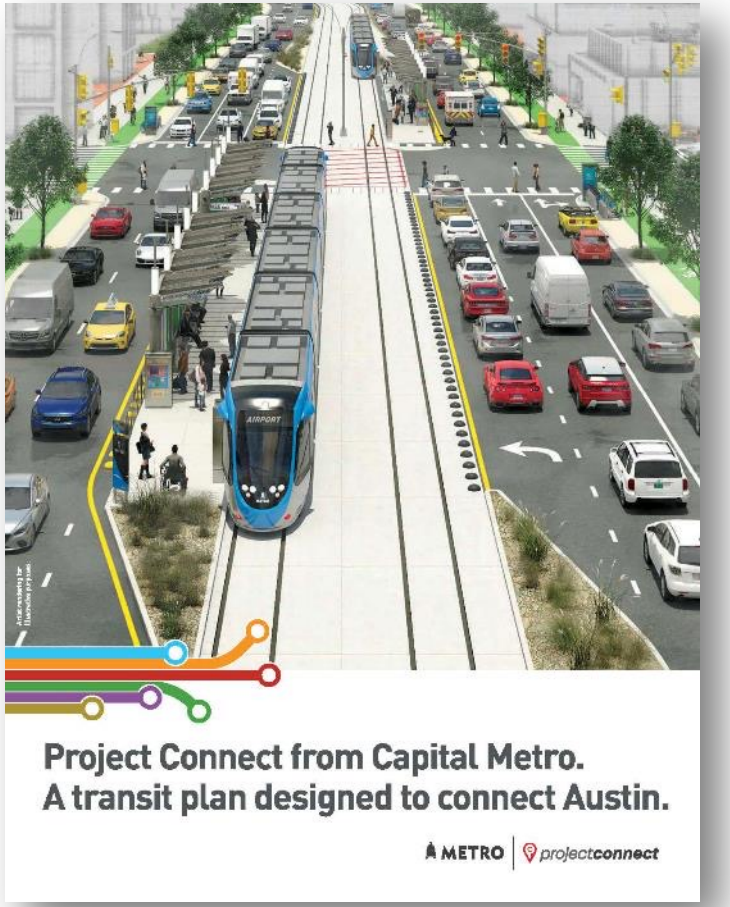
# More California freeways to come


https://dot.ca.gov/caltrans-near-me/district-3/d3-projects/d3-yolo-80-corridor-improvement


Why is California *widening freeways* at the same time that it is trying to *reduce driving*?

# An interesting transportation moment!


TxDOT's I-35 Expansion Plan
$4.9 billion to widen I-35

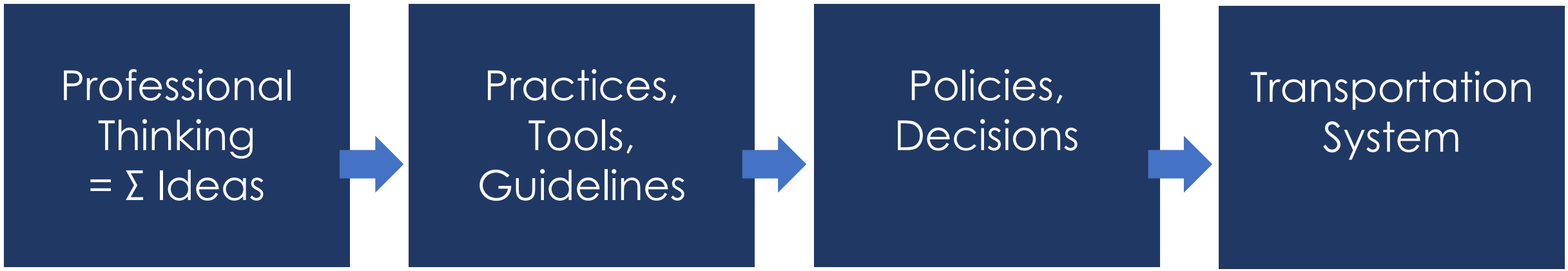



Austin's Project Connect
$7 billion to expand and improve transit

# My thesis about this moment

- The ideas embraced by the transportation profession at any moment in time shape the transportation system in fundamental ways.
- The ideas that have traditionally dominated the profession over the last century are shifting toward a new way of thinking that will lead to a different kind of transportation system.

# Professional thinking shapes the system




To change the system we have to change our thinking

# The transportation profession

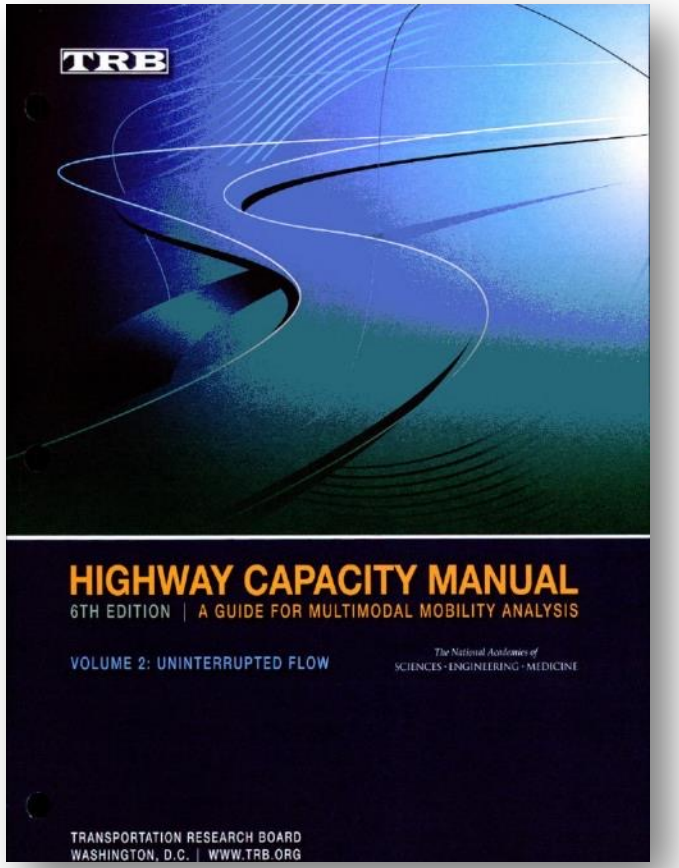
The employees of **federal, state, regional, and local agencies** who hold responsibility for planning, building, operating, and maintaining the transportation system, along with the **consultants** they often hire and the **professional associations** to which they belong. Plus **academics**!

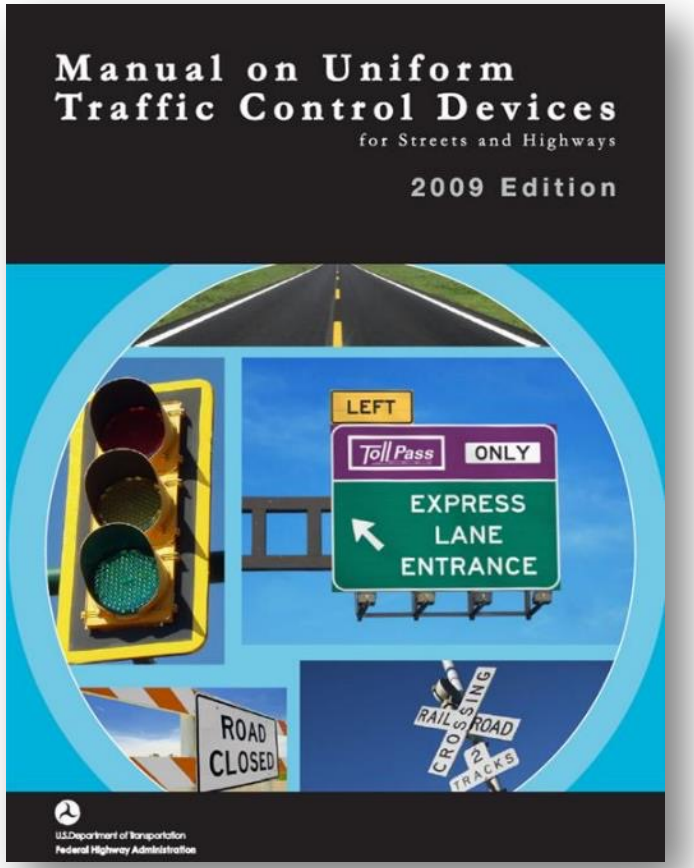
# Ideas at the core of the transport profession

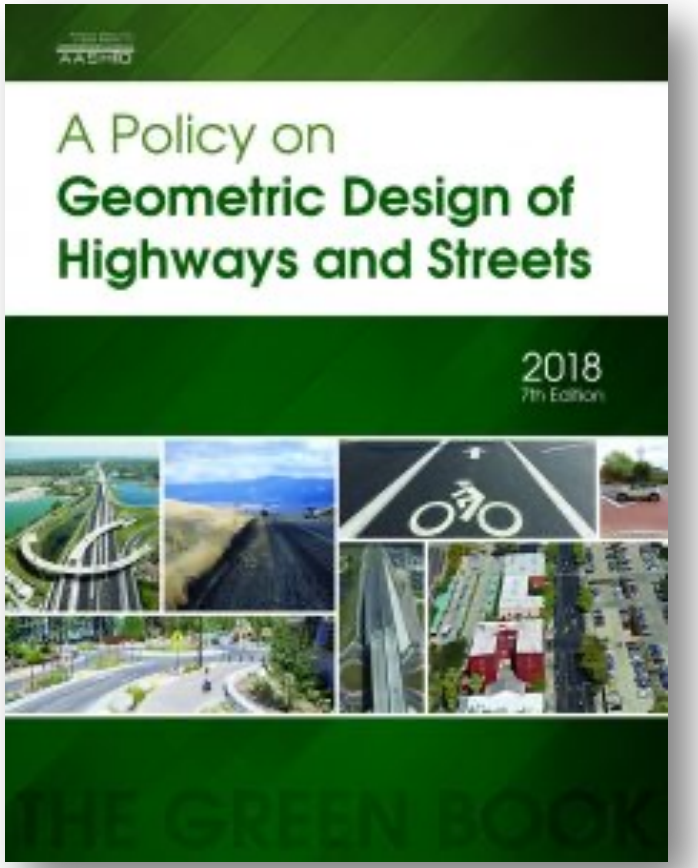
| | |
|---|---|
| **Freedom** | Cars give us freedom |
| **Speed** | Faster is better |
| **Mobility** | Congestion needs solving |
| **Vehicles** | Streets are for cars |
| **Capacity** | We need more of it |
| **Hierarchy** | Design to match function |
| **Separation** | Modes should not mix |
| **Control** | Drivers need rules |
| **Technology** | Segways solve everything |

= *Making it easier to drive*

# Traditional ideas embedded in transport practice



# Alternatives to the traditional ideas

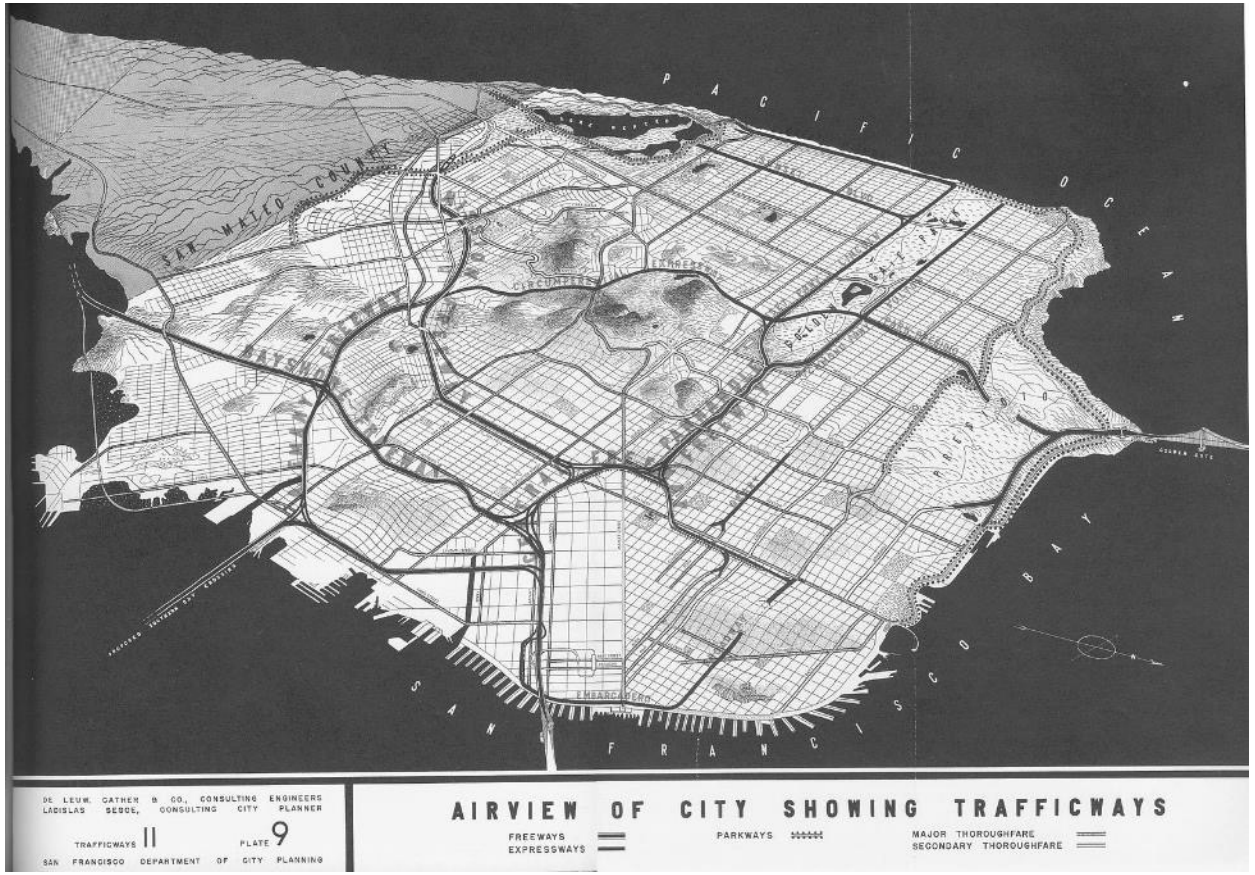
| | | | |
|---|---|---|---|
| **Freedom** | Cars give us freedom | But do they really? | **Justice** |
| **Speed** | Faster is better | But slow can be good | **Slow** |
| **Mobility** | Congestion needs solving | But not with access | **Accessibility** |
| **Vehicles** | Streets are for cars | And for people | **People** |
| **Capacity** | We need more of it | Or maybe not | **Demand** |
| **Hierarchy** | Design to match function | And networks that link | **Connectivity** |
| **Separation** | Modes should not mix | Except when they should | **Integration** |
| **Control** | Drivers need rules | But not always | **Chaos** |
| **Technology** | Segways solve everything | Depending on us | **Agency** |

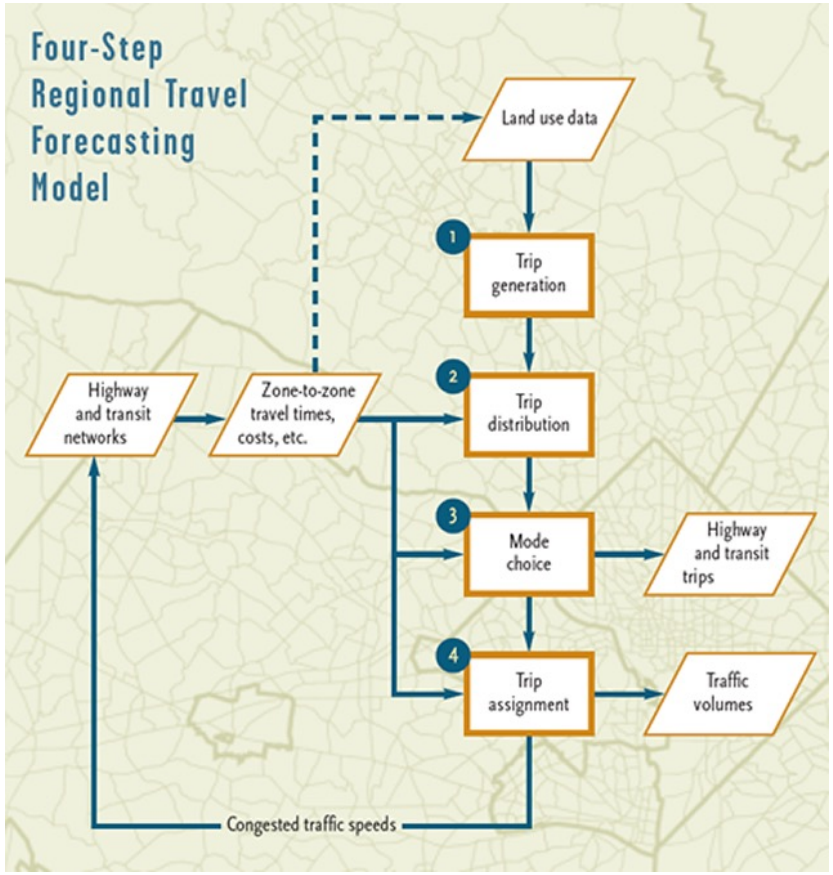
= *Making it easier and safer to NOT drive*

# Capacity

Provide enough lanes to accommodate demand.

# “Predict and Provide”



# Induced Travel

"A newly opened… or widened street immediately becomes glutted by the access of cars that hitherto have reposed more in their garages than they have utilized the streets."

– Los Angeles official, 1920s

16 dat' 190 · 48.3 (3/2012)

## "You can't build your way out of congestion." – Or can you?

*A Century of Highway Plans and Induced Traffic*

Brian Ladd

*Brian Ladd* is a Research Associate in history at the University at Albany, State University of New York, and the author of books on German urban history as well as *Autophobia: Love and Hate in the Automotive Age* (University of Chicago Press, 2008).

Abstract: The phenomenon of induced traffic was recognized (if rarely measured) even before the automotive age. Its existence calls into question the effectiveness of road construction as a solution to traffic congestion. Why, then, has it rarely been factored into highway investment decisions? An examination of references to induced traffic suggests that it posed an inconvenient complication to a consensus that had emerged by the 1920s. That consensus endorsed automotive mobility along with a commitment to keep building road space as long as traffic grew to fill it. Recent research challenges the factual assumptions underlying that consensus, but has not yet overturned the deeper beliefs upon which it rests.

### *Understanding Congestion*

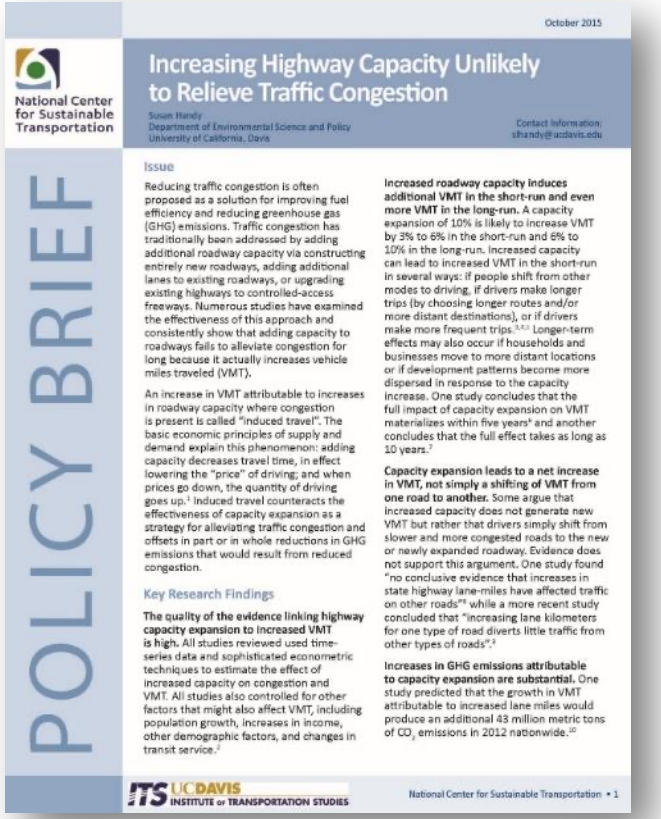
Transportation scholars often agree with anti-highway activists that the long-standing failure to take account of induced traffic has sometimes discredited transportation policies (e.g., Metz 2008b: 31–35; Gorham 2009; Litman 2011). However, little been done to incorporate the phenomenon into decisions about transportation investment. Indeed, its very existence has often been denied. To understand why, we must turn our attention to the history of urban street congestion. Disputes about the existence and extent of induced traffic are a consequence of efforts to reduce congestion, in particular, the long-standing belief that the solution to congestion is the construction of more road space.

Congestion has always been mainly an urban issue. Street congestion is an old problem in major cities, one that was much lamented, but little analyzed. In other words, those who decried congested streets rarely explained why they saw congestion as a problem, as Asha Weinstein's study of Boston in the 1890s and 1900s has shown (Weinstein 2002; Weinstein 2006). Furthermore, congestion was typically not defined with any precision. The American traffic expert Miller McClintock admitted as much in 1923: "The term congestion as generally applied to street traffic is used to designate almost every type of undesirable condition." His attempt at a useful definition was only a little more specific: "a condition resulting from a retardation of movement below that normally necessary for contemporary street users." A plausible if unprovable inference is that the perception of congestion was, at bottom, simply a frustrated reaction to busy streets (Why can't I go faster?) so it is hardly surprising that the problem was not analyzed with any precision. Congestion is, in fact, most easily measured if one assumes that what is "normally necessary" is uninterrupted high speed movement. In cities, however, free flows at high speeds have been the exception rather than the rule. Yet transportation planners since the 1920s have striven to make speed normal, with the automobile as their model of rapid urban transportation.[2] The gap between urban reality and the automobile's mechanical potential has framed a century of discontent.

Congestion was also measured as a cost – if crudely. Since it was essentially identified as an evil, cost measurements may have been mainly attempts to justify this established understanding. Weinstein (2006: 109–111) locates the origins of the cost accounting of congestion in the 1920s and argues that the need to quantify cost arose from the fact that those directly affected, motorists, were relatively few in number at the time. Certainly it is true that by the 1920s, congestion in US cities was equated with slow automobiles, and its causes were identified as a shortage of street space as well as the obstruction caused by pedestrians and other vehicles (Brown 2006: 13). The assumption that additional road space will increase speed, and thus create a measurable benefit in travel time-savings, has continued to justify road projects in many countries, despite mounting criticism.[3] Recent arguments in defense of congestion, as inevitable or even as a sign of urban prosperity (notably by the president of the Congress for New Urbanism, former Milwaukee Mayor John Norquist), have largely failed to influence policy because the established system of measurement promises statistical clarity and the hope of a solution, even if both are illusory.

Routledge
Taylor & Francis Group

# Induced Travel



October 2015

National Center for Sustainable Transportation

POLICY BRIEF

## Increasing Highway Capacity Unlikely to Relieve Traffic Congestion

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### Issue

Reducing traffic congestion is often proposed as a solution for improving fuel efficiency and reducing greenhouse gas (GHG) emissions. Traffic congestion has traditionally been addressed by adding additional roadway capacity via constructing entirely new roadways, adding additional lanes to existing roadways, or upgrading existing highways to controlled-access freeways. Numerous studies have examined the effectiveness of this approach and consistently show that adding capacity to roadways fails to alleviate congestion for long because it actually increases vehicle miles traveled (VMT).

An increase in VMT attributable to increases in roadway capacity where congestion is present is called "induced travel". The basic economic principles of supply and demand explain this phenomenon: adding capacity decreases travel time, in effect lowering the "price" of driving; and when prices go down, the quantity of driving goes up.[1] Induced travel counteracts the effectiveness of capacity expansion as a strategy for alleviating traffic congestion and offsets in part or in whole reductions in GHG emissions that would result from reduced congestion.

### Key Research Findings

**The quality of the evidence linking highway capacity expansion to increased VMT is high.** All studies reviewed used time-series data and sophisticated econometric techniques to estimate the effect of increased capacity on congestion and VMT. All studies also controlled for other factors that might also affect VMT, including population growth, increases in income, other demographic factors, and changes in transit service.[2]

**Increased roadway capacity induces additional VMT in the short-run and even more VMT in the long-run.** A capacity expansion of 10% is likely to increase VMT by 3% to 6% in the short-run and 6% to 10% in the long-run. Increased capacity can lead to increased VMT in the short-run in several ways: if people shift from other modes to driving, if drivers make longer trips (by choosing longer routes and/or more distant destinations), or if drivers make more frequent trips.[3,4,5] Longer-term effects may also occur if households and businesses move to more distant locations or if development patterns become more dispersed in response to the capacity increase. One study concludes that the full impact of capacity expansion on VMT materializes within five years[6] and another concludes that the full effect takes as long as 10 years.[7]

**Capacity expansion leads to a net increase in VMT, not simply a shifting of VMT from one road to another.** Some argue that increased capacity does not generate new VMT but rather that drivers simply shift from slower and more congested roads to the new or newly expanded roadway. Evidence does not support this argument. One study found "no conclusive evidence that increases in state highway lane-miles have affected traffic on other roads"[8] while a more recent study concluded that "increasing lane kilometers for one type of road diverts little traffic from other types of roads".[9]

**Increases in GHG emissions attributable to capacity expansion are substantial.** One study predicted that the growth in VMT attributable to increased lane miles would produce an additional 43 million metric tons of $CO_2$ emissions in 2012 nationwide.[10]

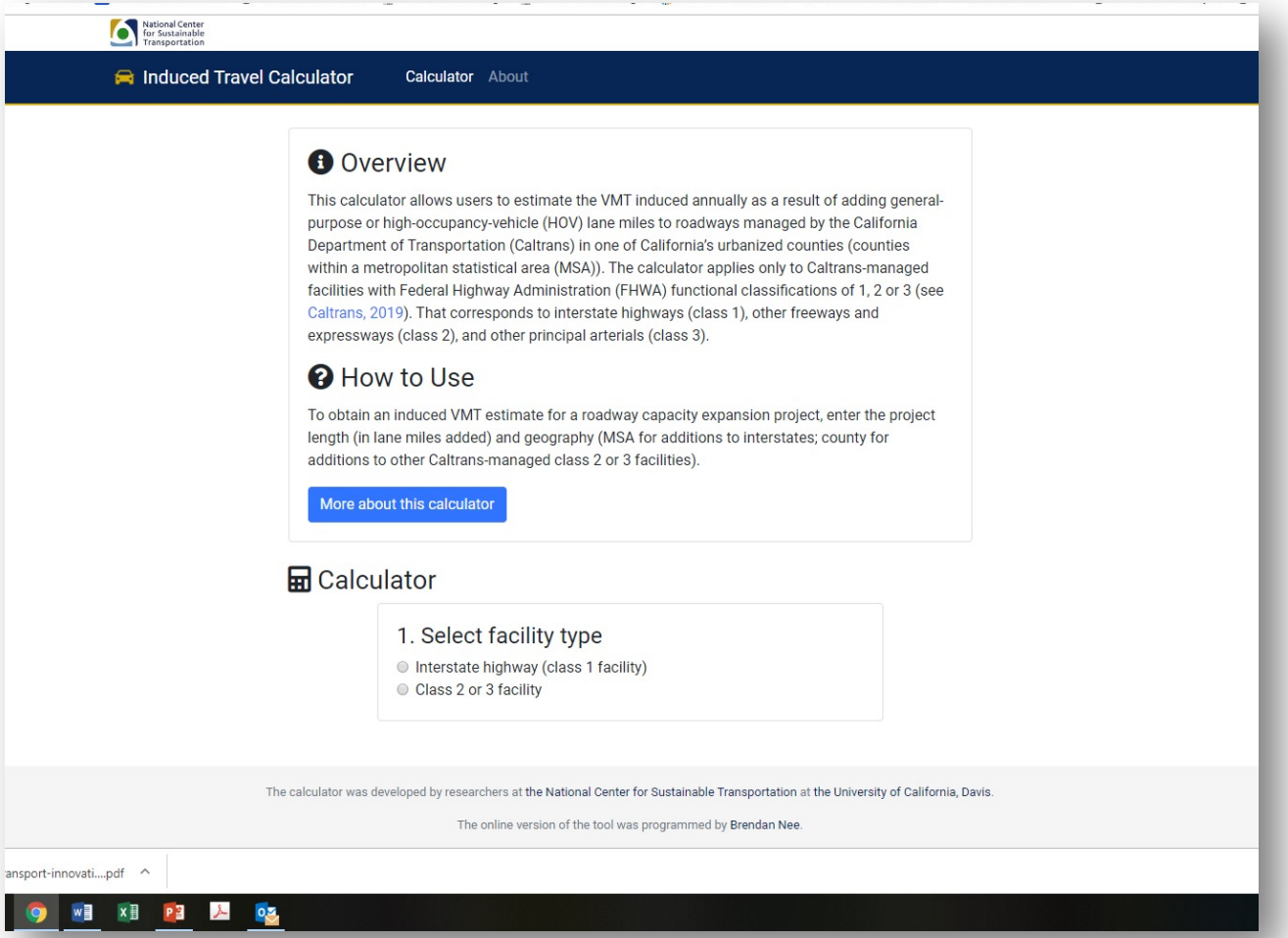
ITS UC DAVIS INSTITUTE of TRANSPORTATION STUDIES

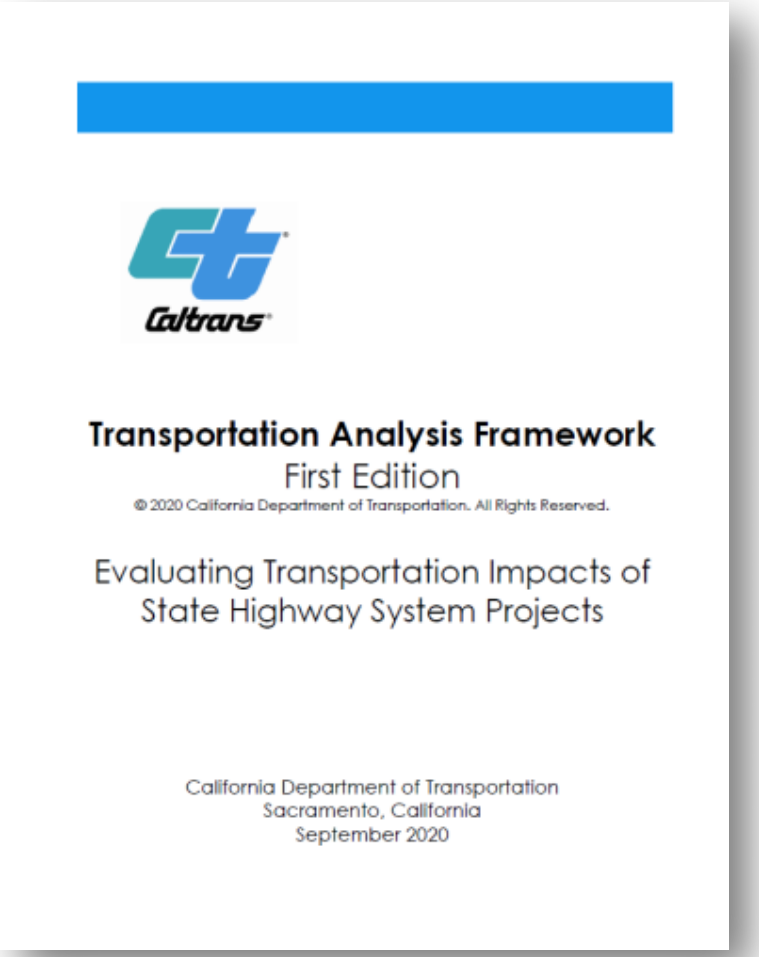


"A capacity expansion of 10% is likely to increase vehicle-miles-travelled by 3% to 6% in the short-run and 6% to 10% in the long-run."

# UC Davis' Induced Travel Calculator

https://travelcalculator.ncst.ucdavis.edu/



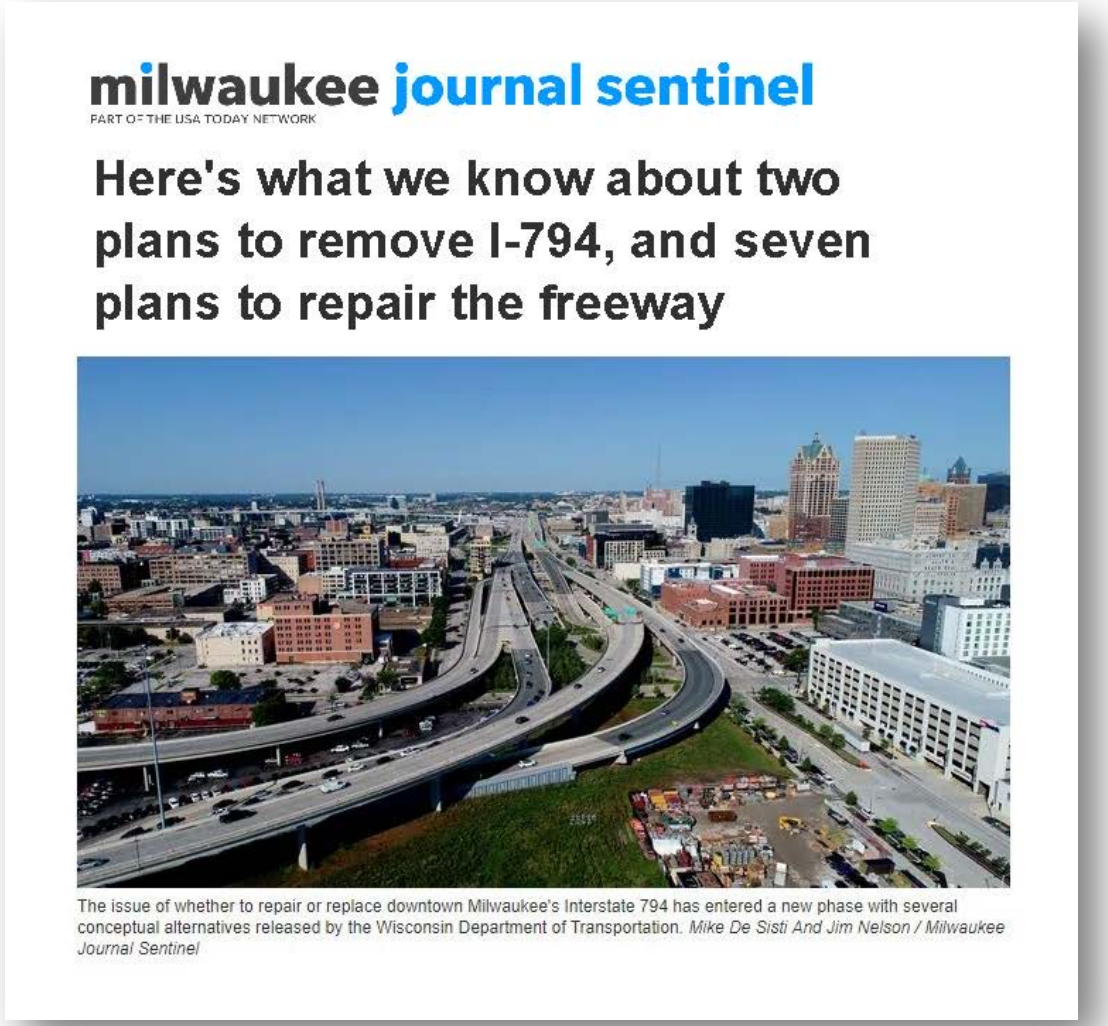
# Rethinking freeways

Los Angeles Times

710 Freeway expansion dropped after decades of planning, marking a milestone for L.A.

"A decades-old plan to widen one of America's busiest cargo corridors was scrapped Thursday, as transportation officials acknowledged they must find a new way to lessen traffic without adding lanes."

# Rethinking freeways



milwaukee journal sentinel

PART OF THE USA TODAY NETWORK

**Here's what we know about two plans to remove I-794, and seven plans to repair the freeway**

The issue of whether to repair or replace downtown Milwaukee's Interstate 794 has entered a new phase with several conceptual alternatives released by the Wisconsin Department of Transportation. *Mike De Sisti And Jim Nelson / Milwaukee Journal Sentinel*

"Freeway removal supporters say the streets can handle the change, which would open several blocks for commercial development – and tear down a barrier between downtown, the lakefront, and the Historic Third Ward."

# Manage demand instead

The New York Times

***Why Drivers Could Soon Pay $23 to Reach Manhattan***

New York City wants to reduce emissions, tackle congestion and increase transit investment. Experts say the plan is critical to the region's long-term health.

Give this article

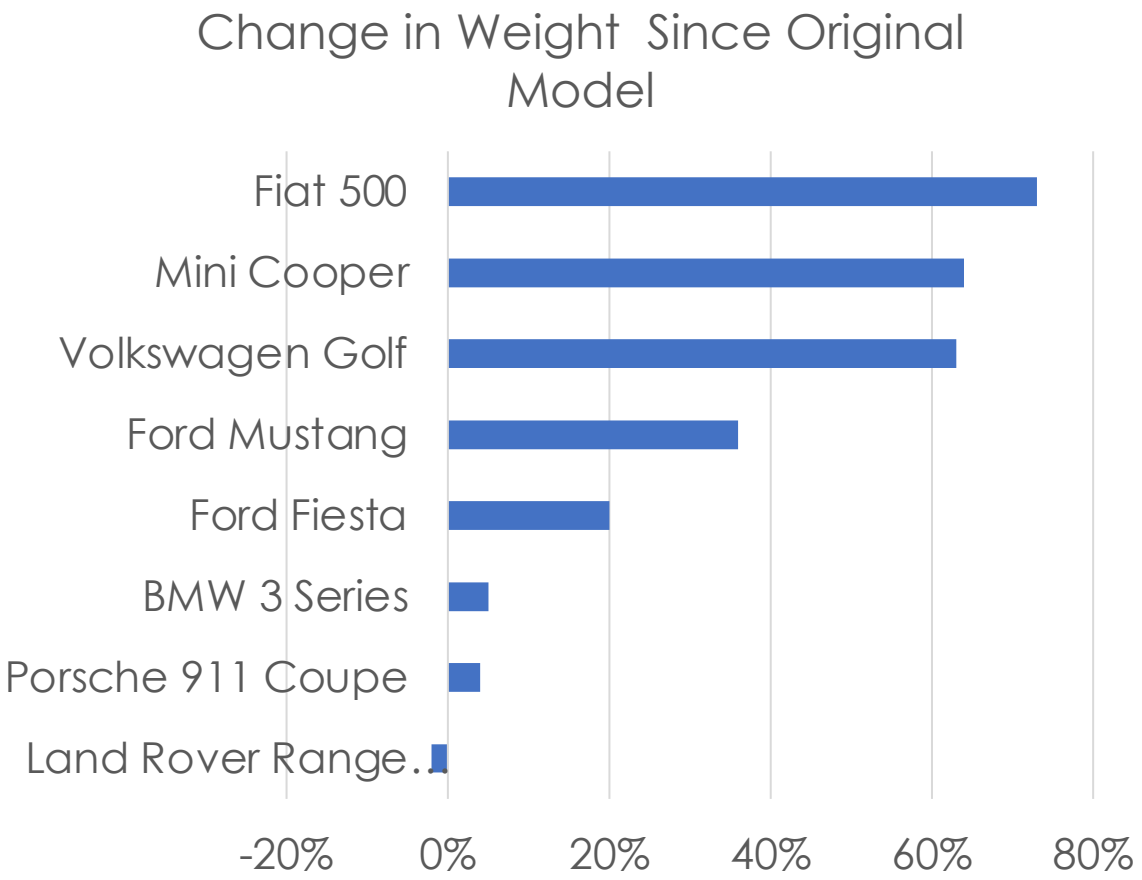
"It could soon be more expensive to drive through Manhattan's most densely packed streets, as a tolling program that aims to reduce traffic in New York City crossed a major hurdle this month."

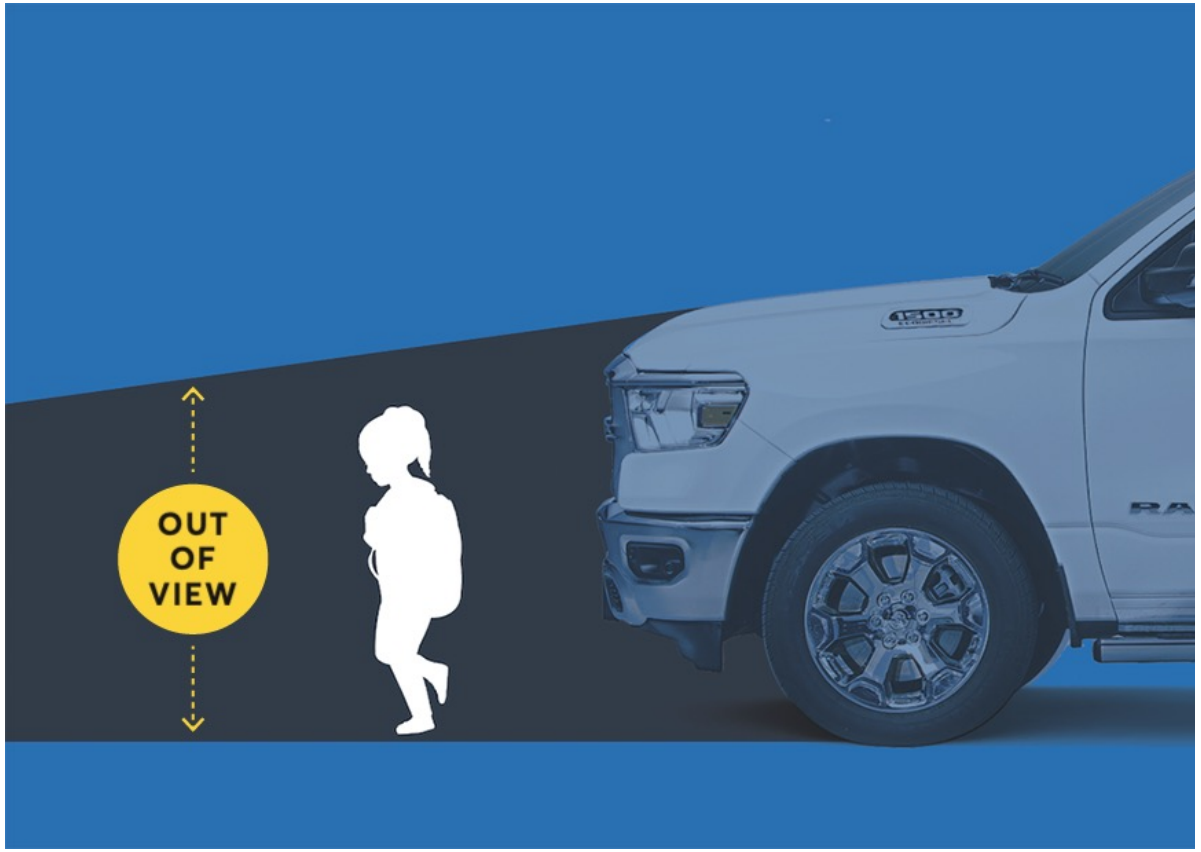
# Vehicles

Maximize vehicle throughput.

Accommodate cars.

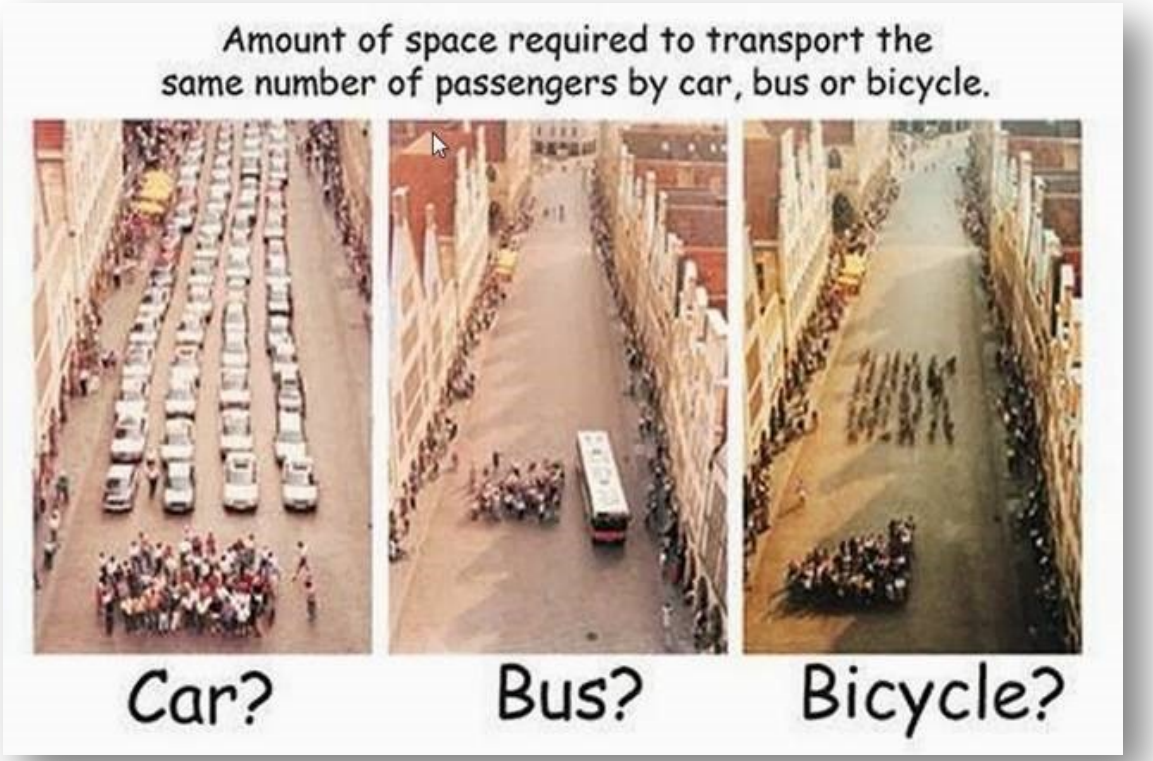
# Bigger vehicles



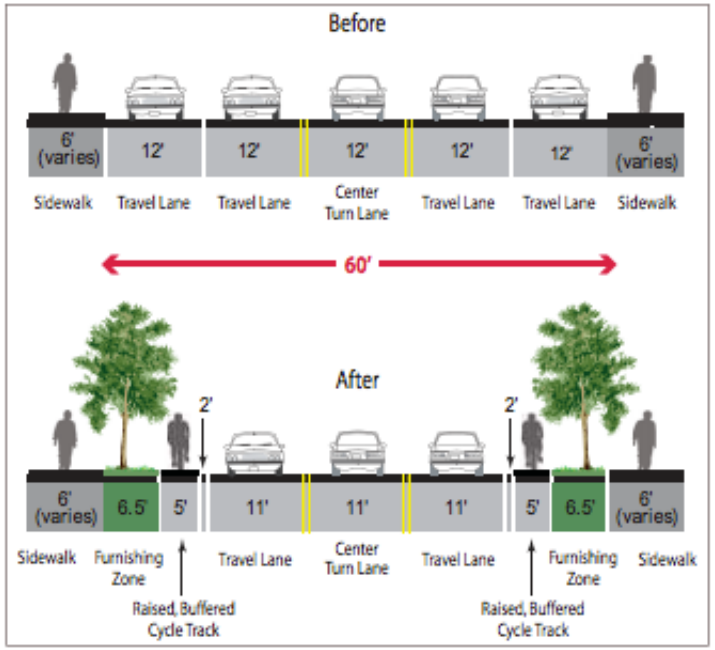

Source: Zuto

# Consumption of space

# Reallocation of space

## A road diet!




**Four Lanes w/o center turn lanes**

**center turn lanes, bike lanes, ped refuge island at bus stop**

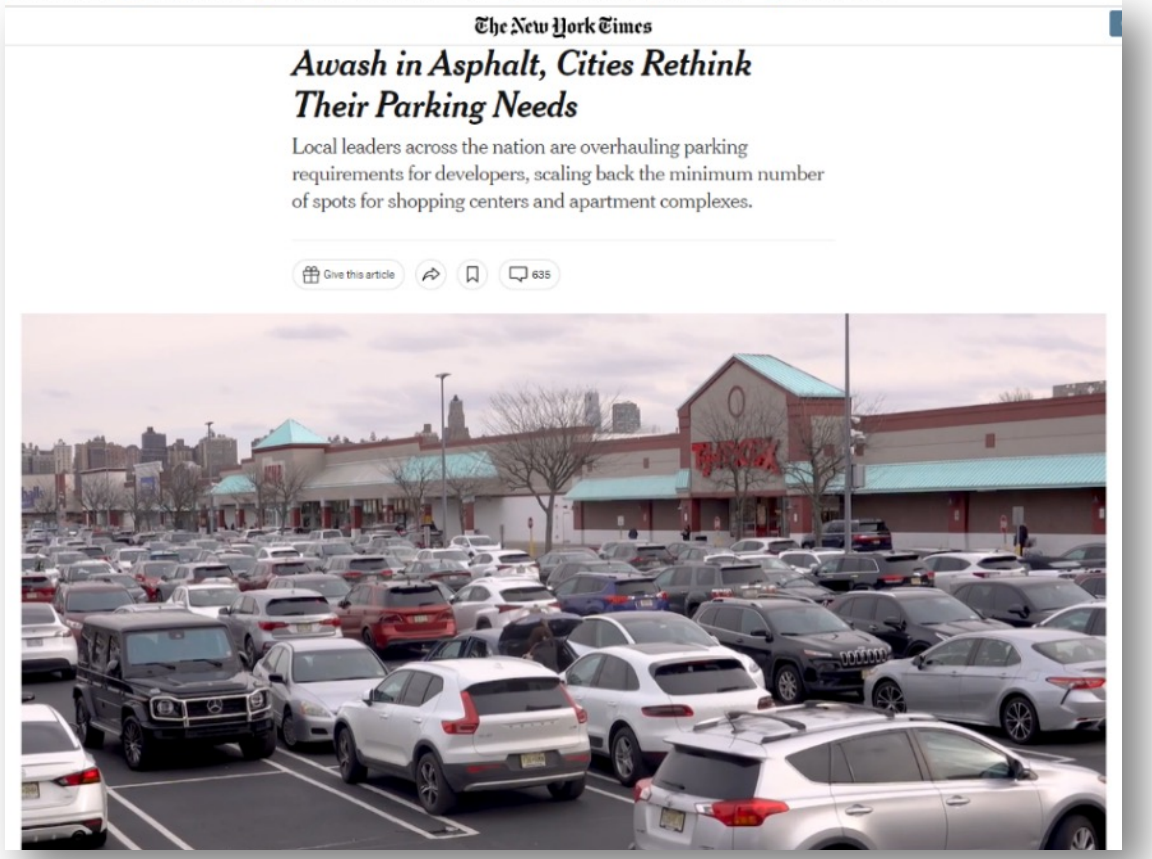
# Pandemic streets

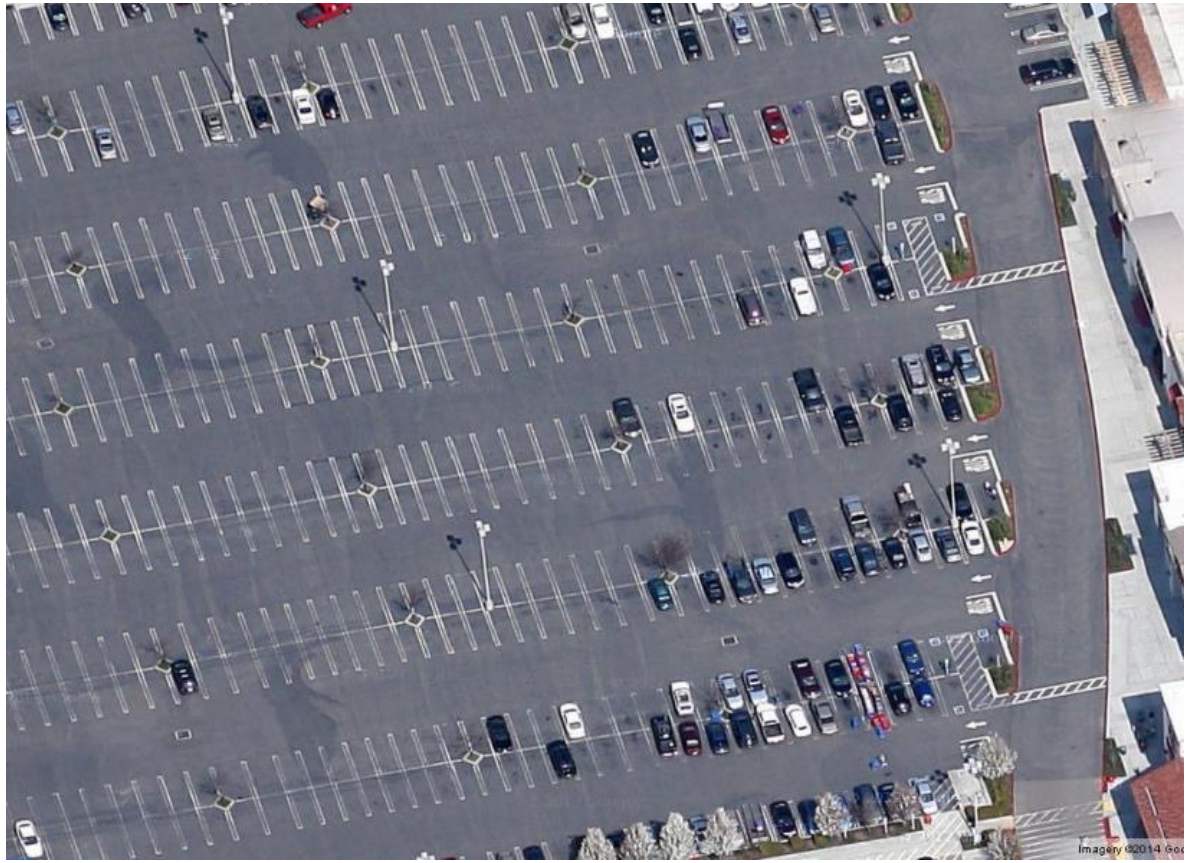

# Economic benefits

Narrowing the right-of-way from 55 to 16 feet would save home buyers $100,000 from reduced land consumption (Millard-Ball, 2021)

Business activity goes up when bike lanes are installed, even when parking is removed (Clifton, et al. 2012)

# Rethinking parking



Fun fact:  parking spaces outnumber cars 3.3 to 1 in LA
Another fun fact:  14% of land in LA County is parking!

# Mobility

The goal is movement.

Congestion is bad.

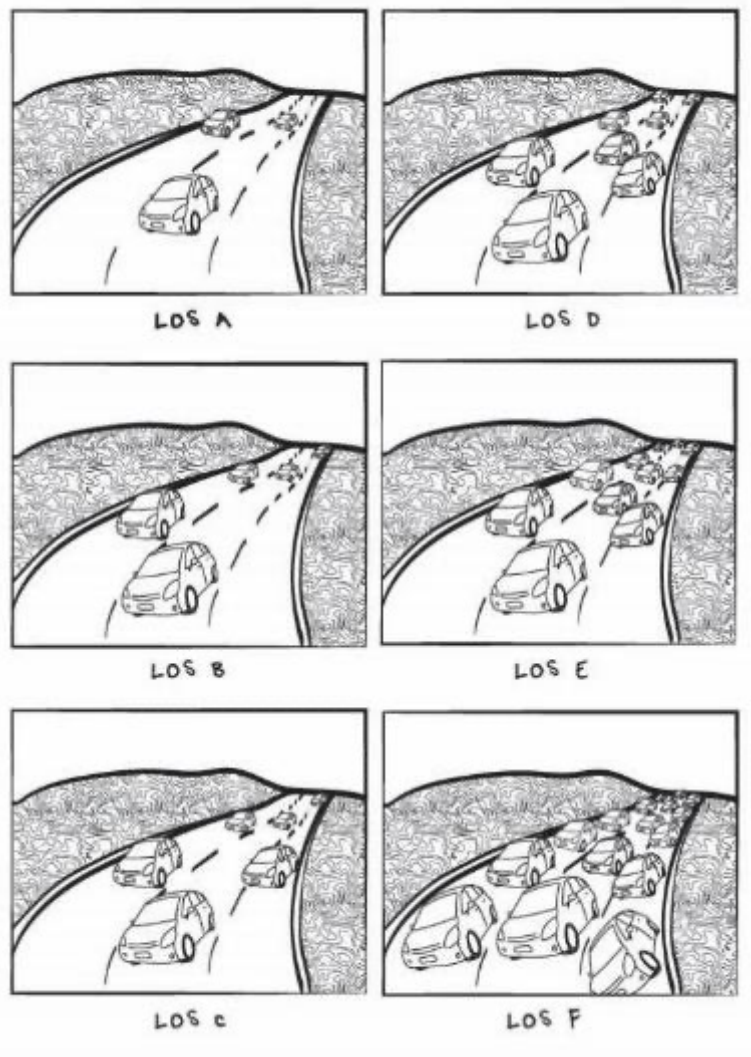
# Costs of congestion

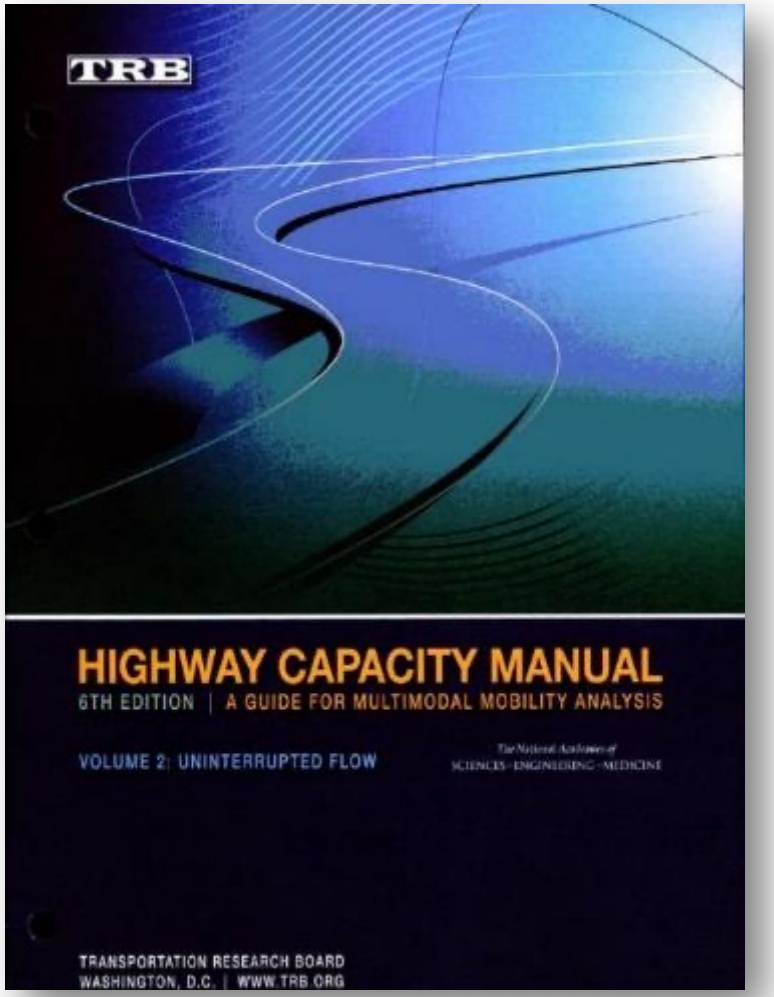
- Commuter stress
- Reduced worker productivity
- Lost economic activity
- And so on

"Eventually, we're talking billions of wasted hours, and the cost of delay at that scale is just enormous."

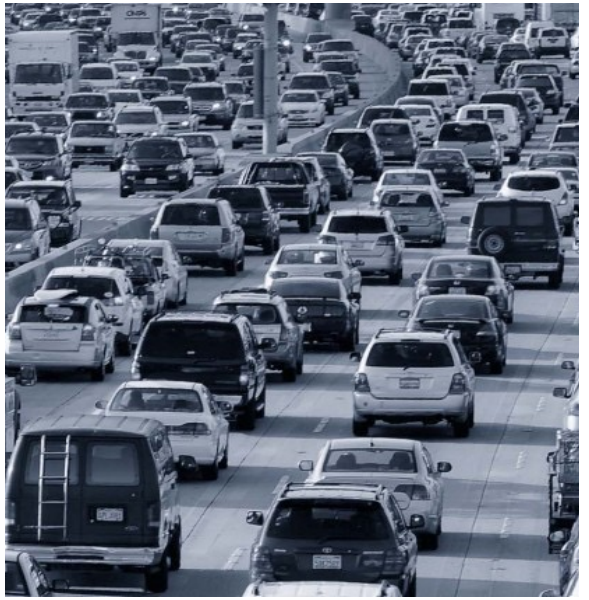
– David Shrank, TTI researcher

# Level of Service




LOS = f(volume/ capacity)



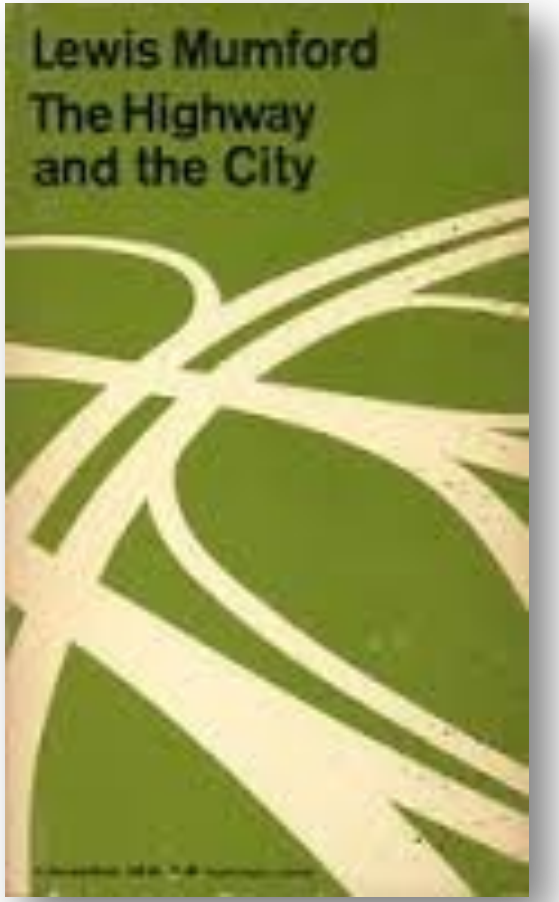
# Accessibility as the goal

"Transportation – I blush to utter a truism now so frequently ignored – is a means and not an end."

– Lewis Mumford in *The New Yorker*, 1955

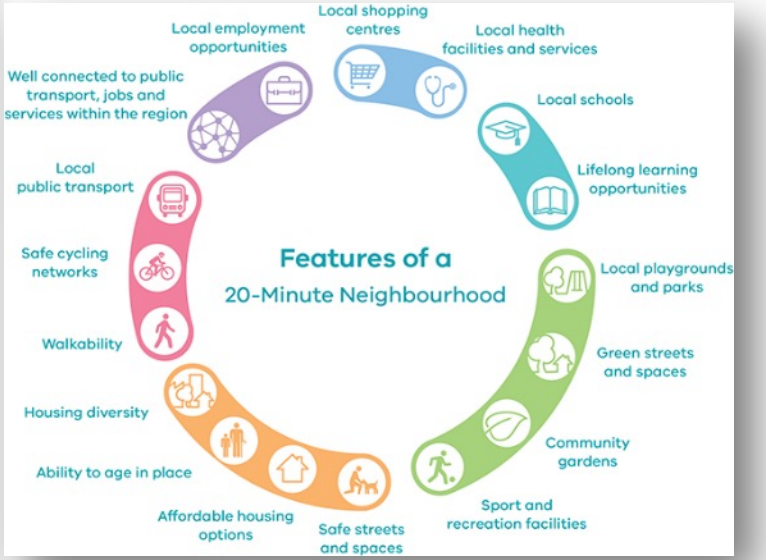
"What's transportation for?... The purpose of transportation is to bring people or goods to places where they are needed..."

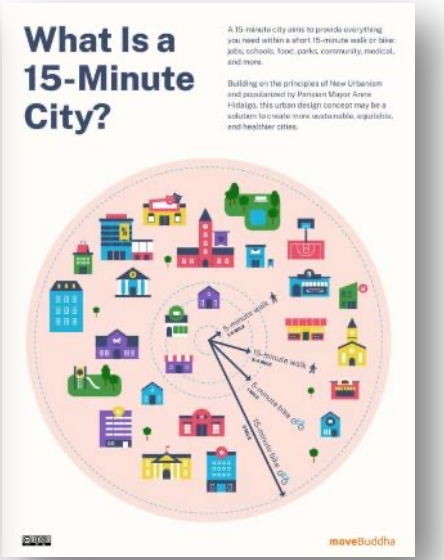
– Lewis Mumford, *The Highway and the City*, 1958



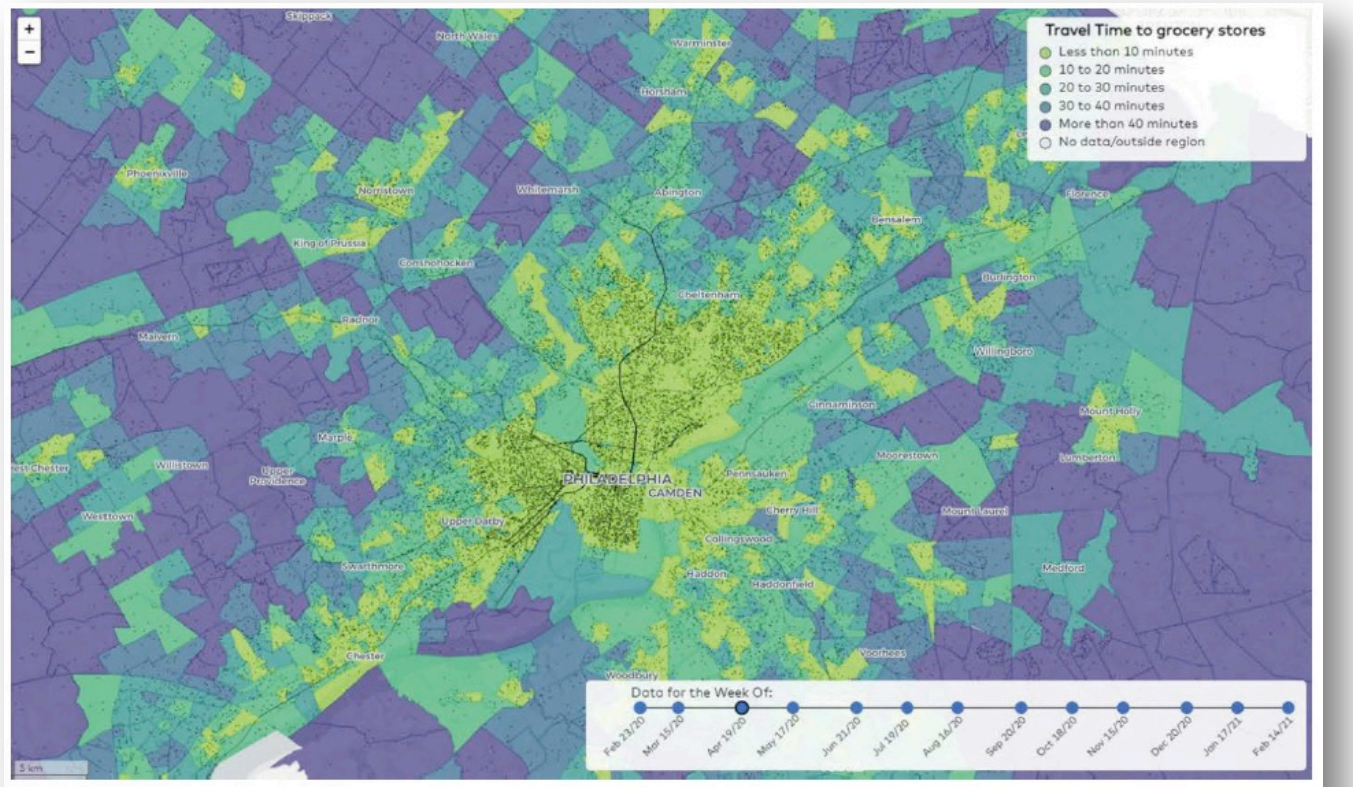
# 15-minute city, et al.



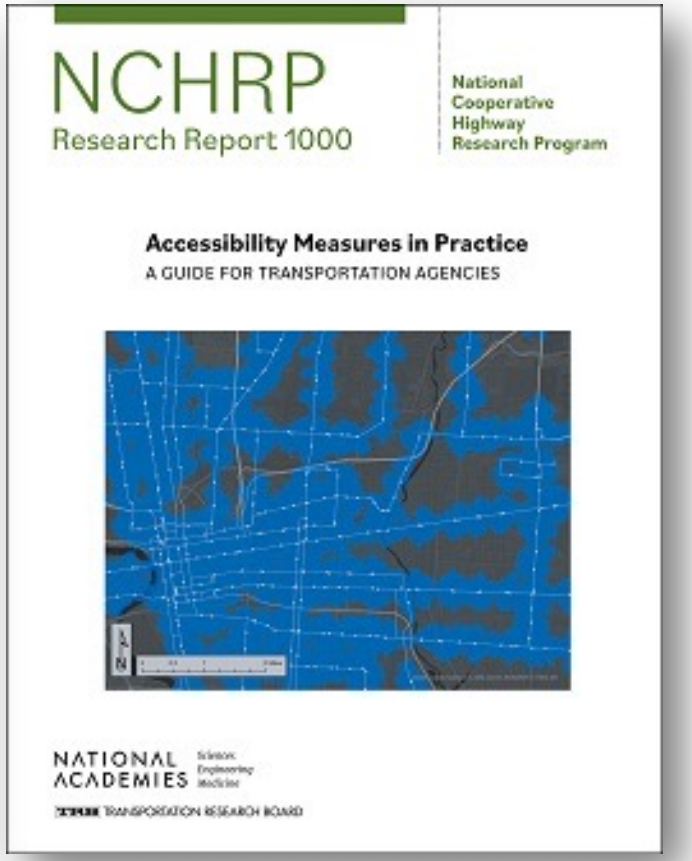



# Accessibility measures




Note: Overlaid dots illustrate essential worker locations.

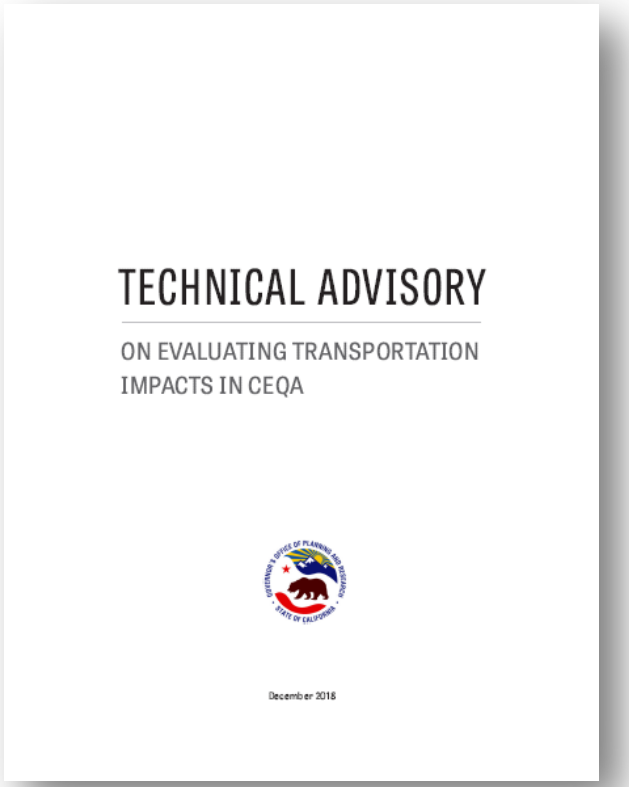
*Figure 15. Travel time to the third-closest grocery store by public transit in the Philadelphia, Pennsylvania, metropolitan region (12).*

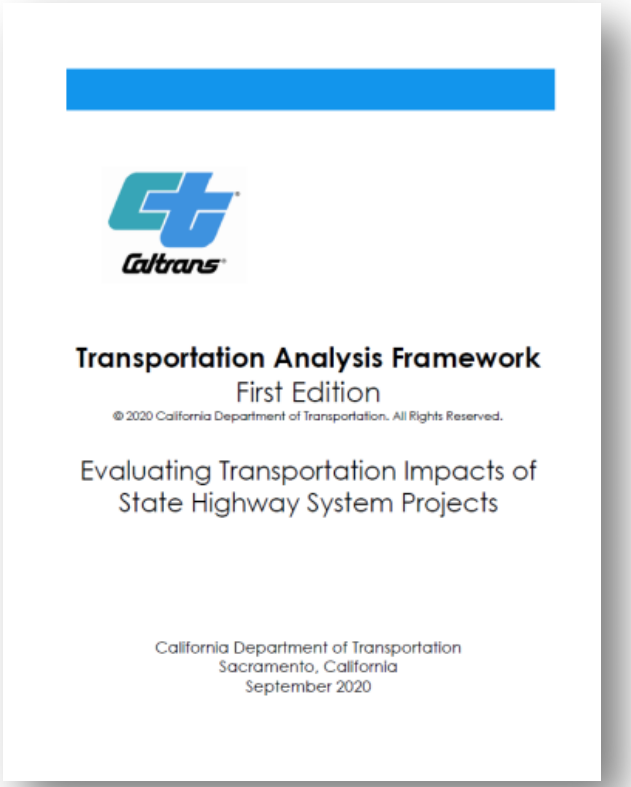



https://www.trb.org/Publications/Blurbs/182849.aspx

# VMT in place of LOS

Updated guidelines for the California Environmental Quality Act (CEQA) that focus evaluation of transportation impacts on VMT rather than LOS



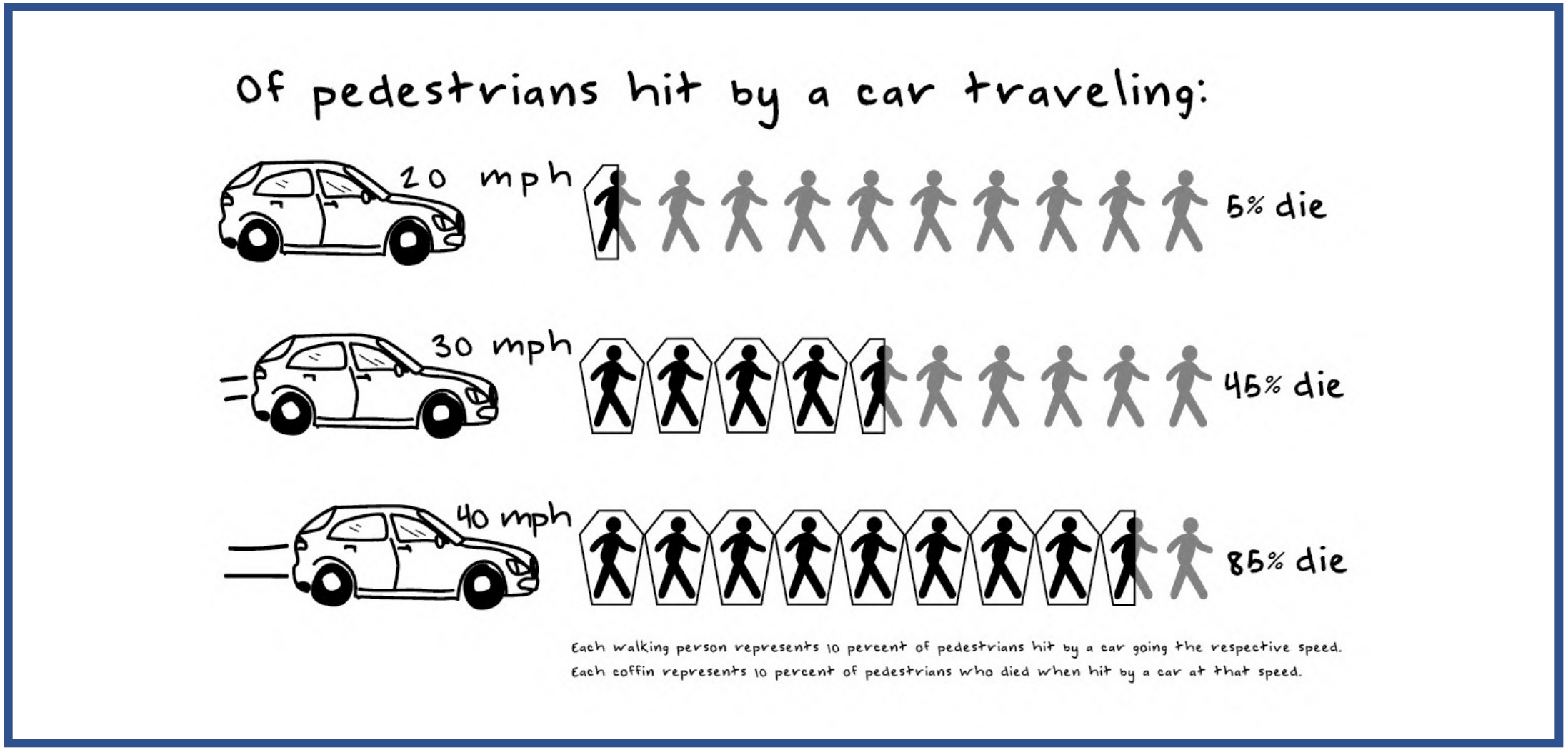
# Speed

The thrill of speed.

Speed as efficiency.

Minimize travel time.

# What speed means for pedestrians



# Speed limits

The 85th Percentile Rule:  Set the speed limit at the speed at which 85% of the drivers are going that speed or less.

How fast drivers are driving → How fast drivers are allowed to drive

How fast we *want* drivers to drive → How fast drivers are allowed to drive

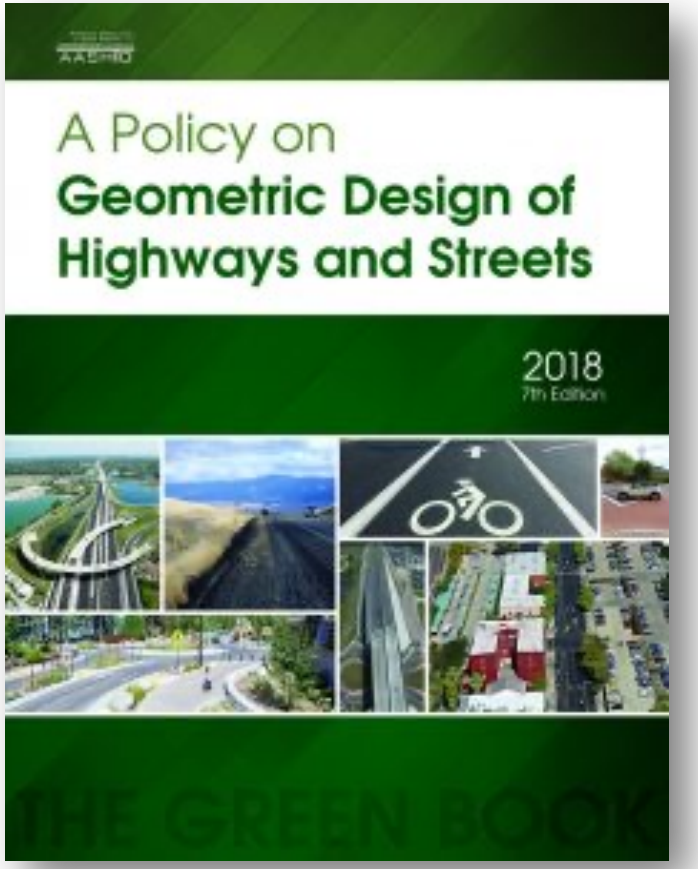
# Design speed

"…every effort should be made to use as high a design speed as practical to attain a desired degree of safety."

Straight roads
Wide lanes
Clear zones

→ Lower risk of crashing

→ Faster speeds



# Traffic calming

## Vertical deflection

Speed bump

Raised crosswalk

## Horizontal deflection

Traffic circle


Chicanes

## Horizontal narrowing

Bulb-outs

Neck-down

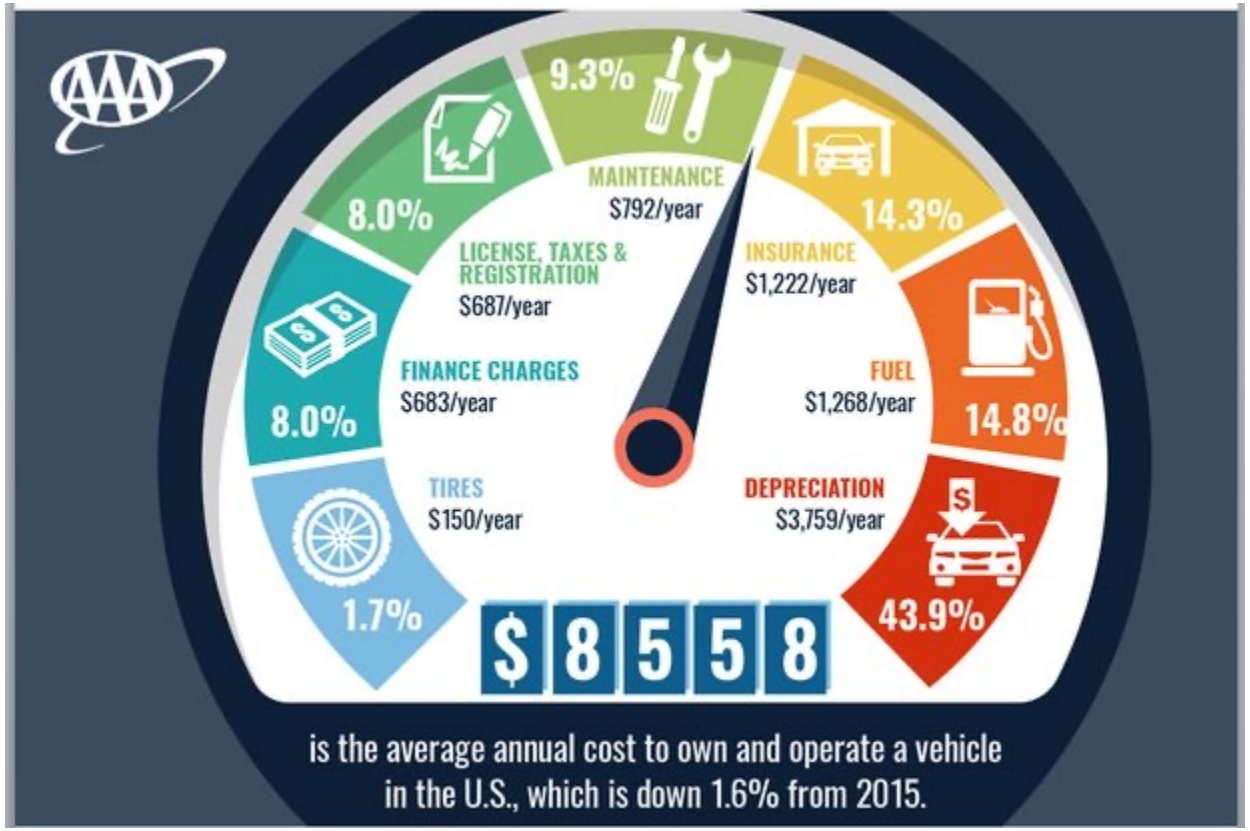
# Slow is good

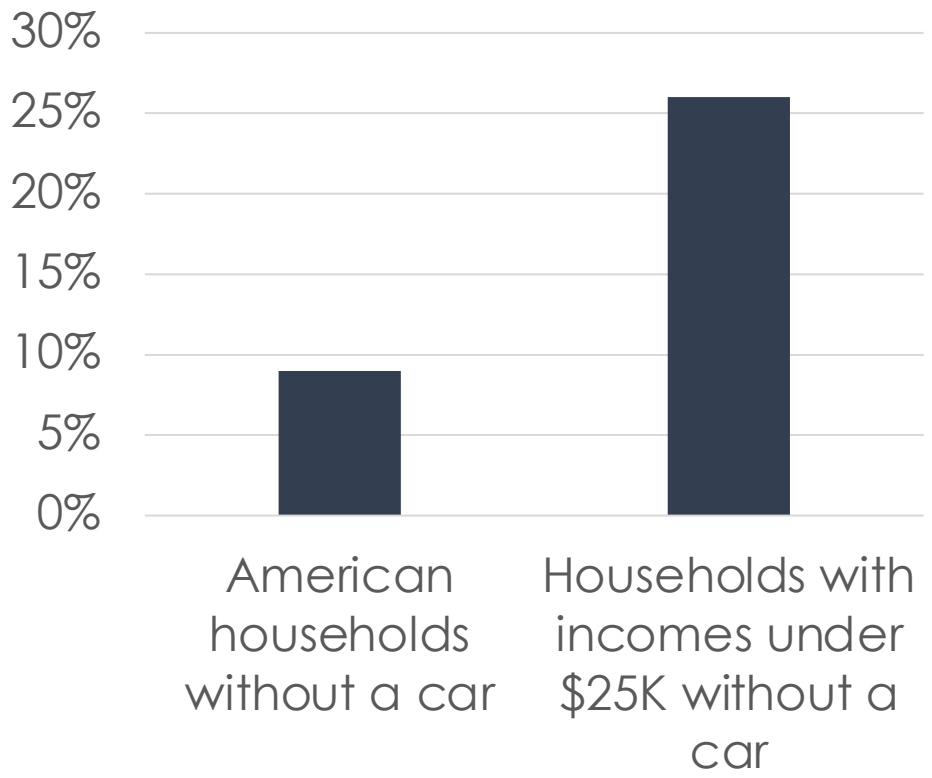

# Freedom

The freedom of the open road.

Car = ability to go where and when we want

# When the car ≠ freedom



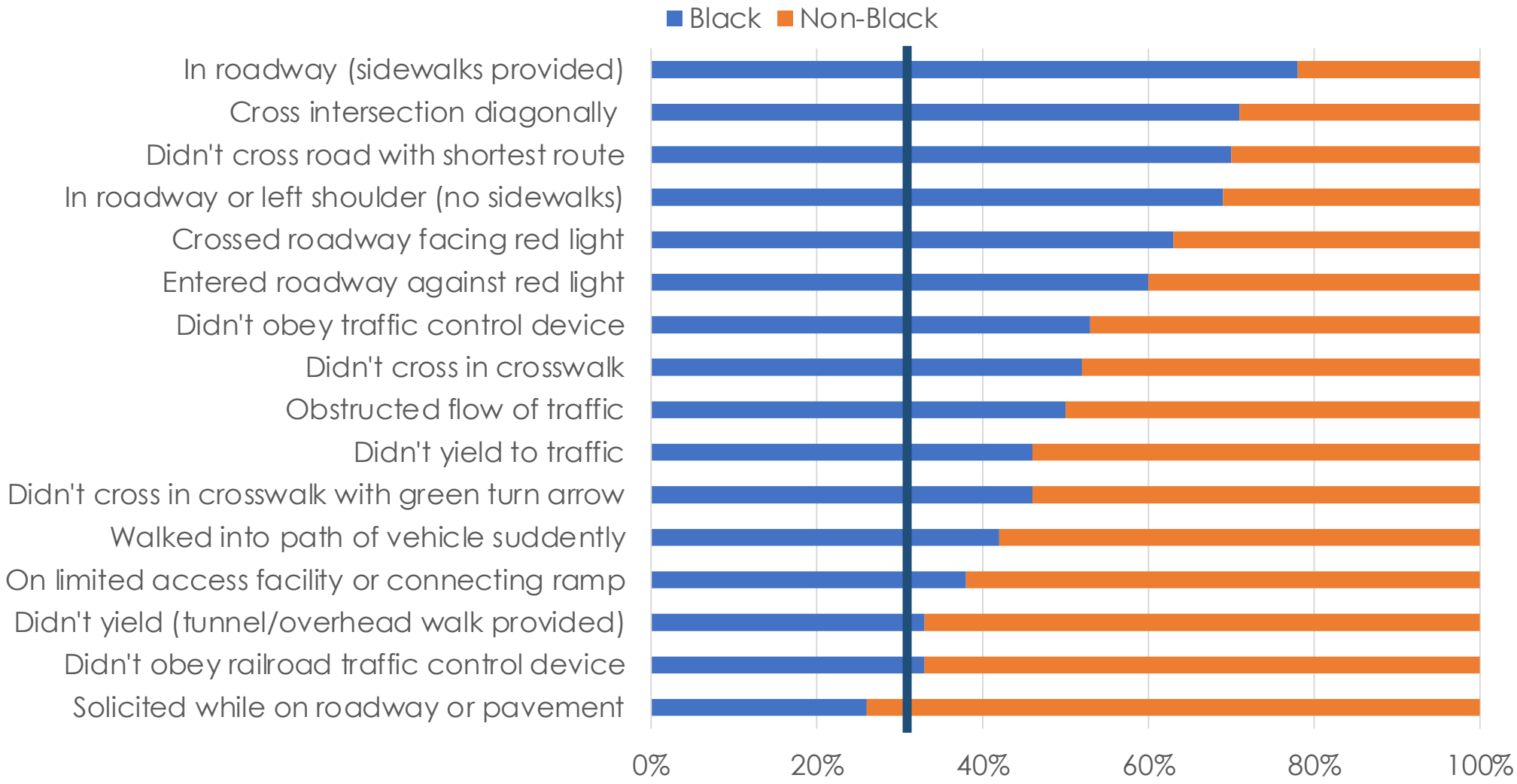




43 weeks of work to pay for the average new car!

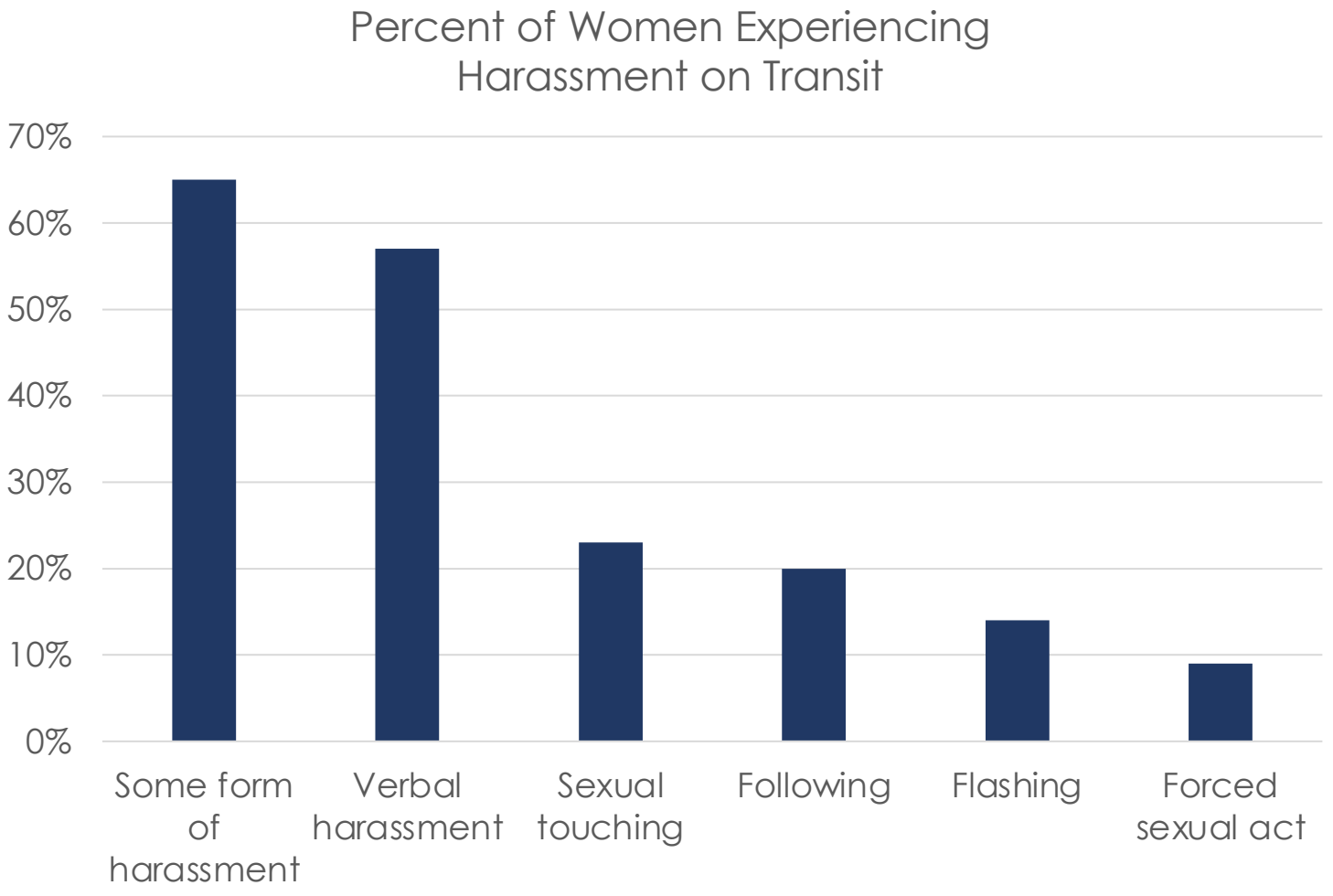
https://news.aaa-calif.com/news/driving-costs-hit-six-year-low-aaa-finds

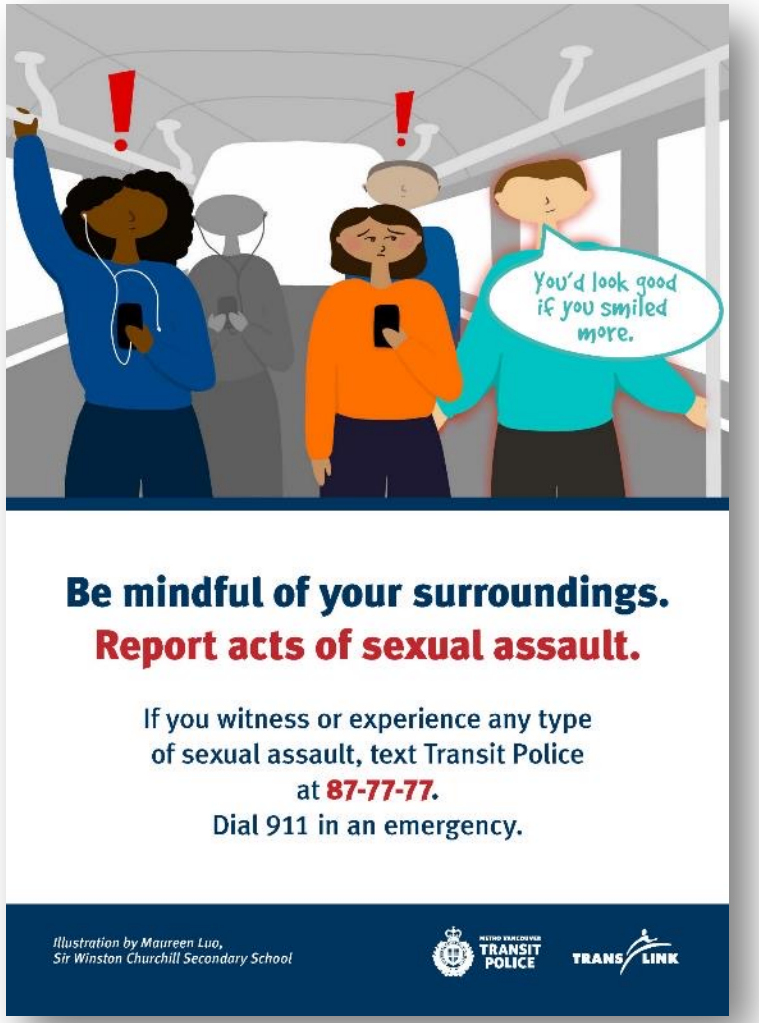
# Walking or biking while black or brown

Citations in Jacksonville, Florida, where Black residents are 30% of the population



# Riding transit while female

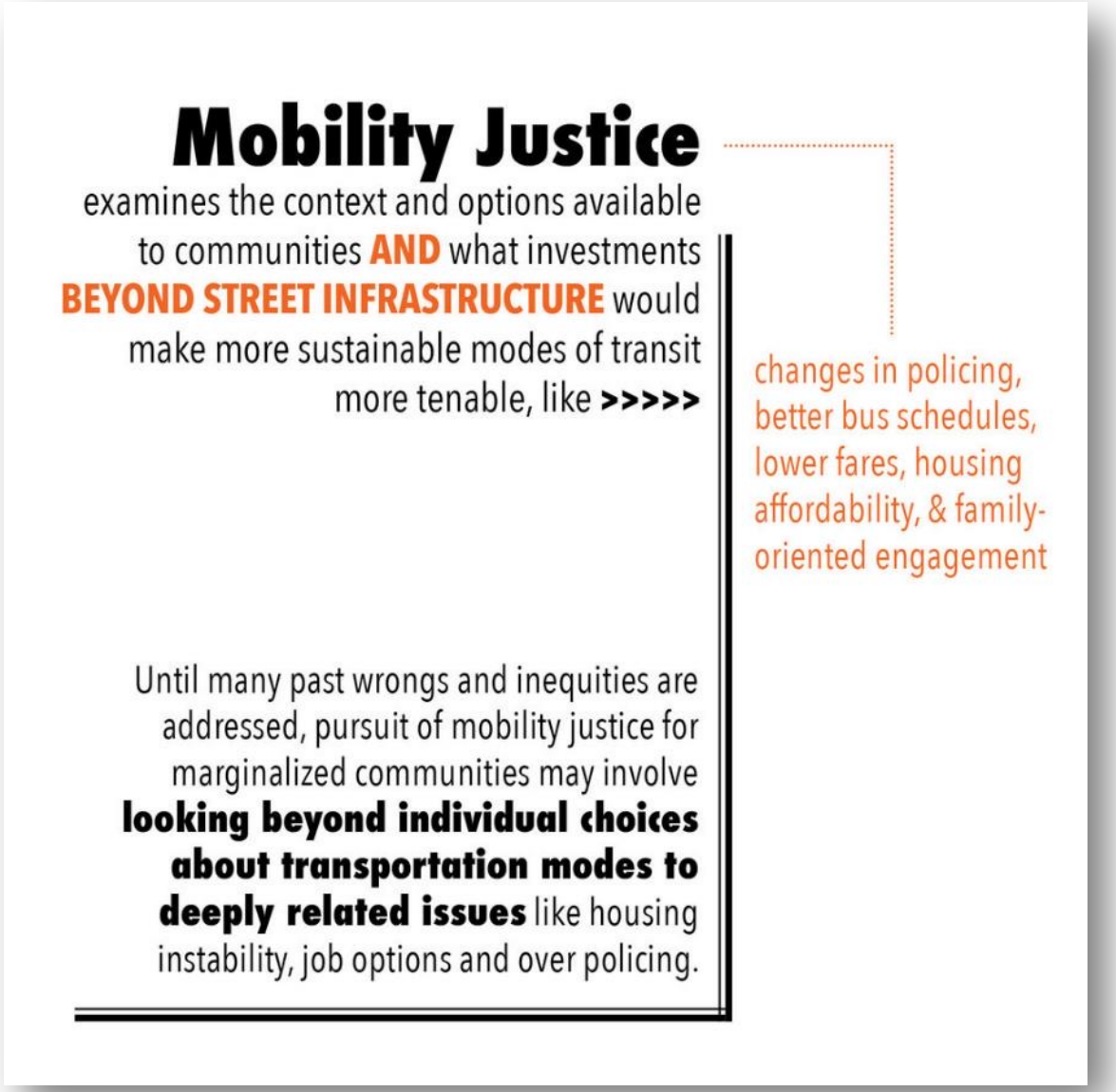


**Transportation equity**

**Transportation justice**

**Mobility justice**




Source: Untokening Collective

# Technology

It will solve all our problems.

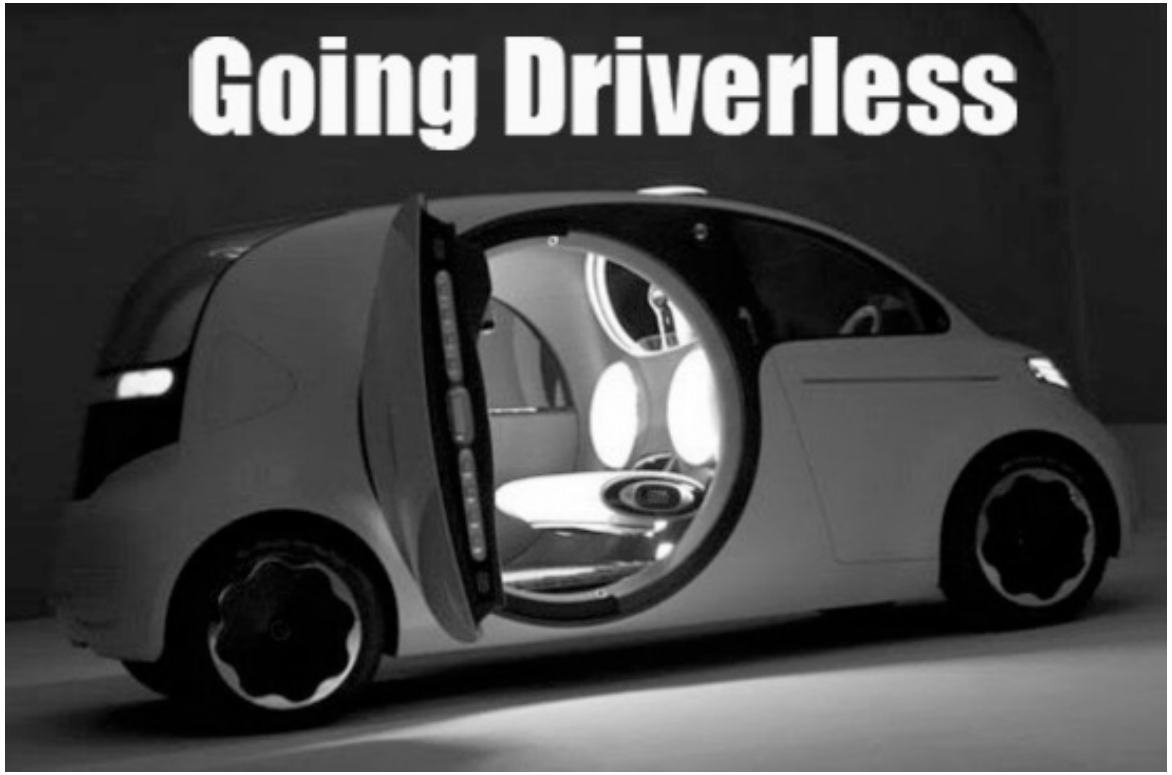
We can have our cake and eat it, too.

# Autonomous vehicles?

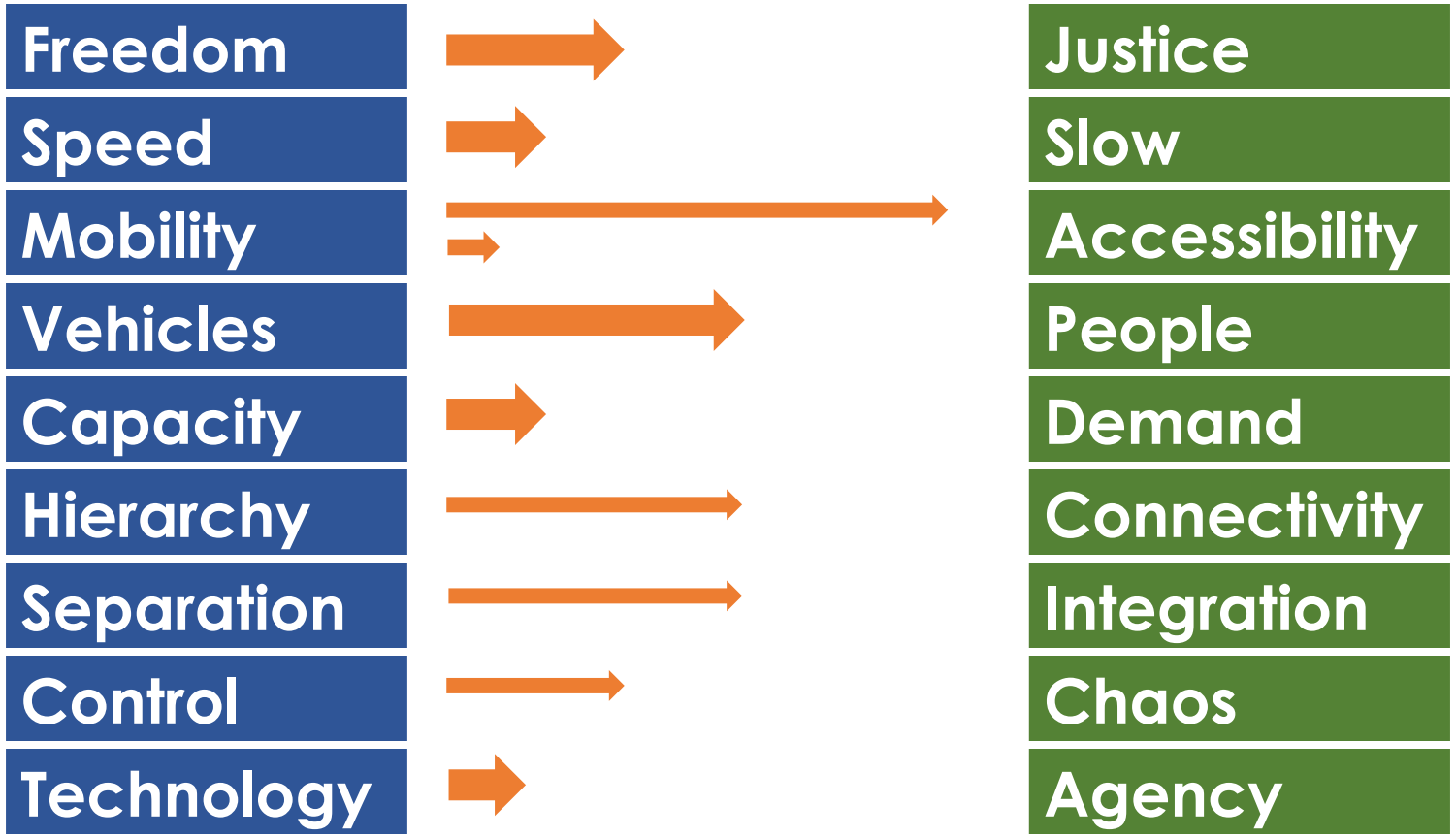
Safety?


More driving?

# Future Mobility?




# Shifting Ideas in the Profession



# Paradigm shift in US transport planning?

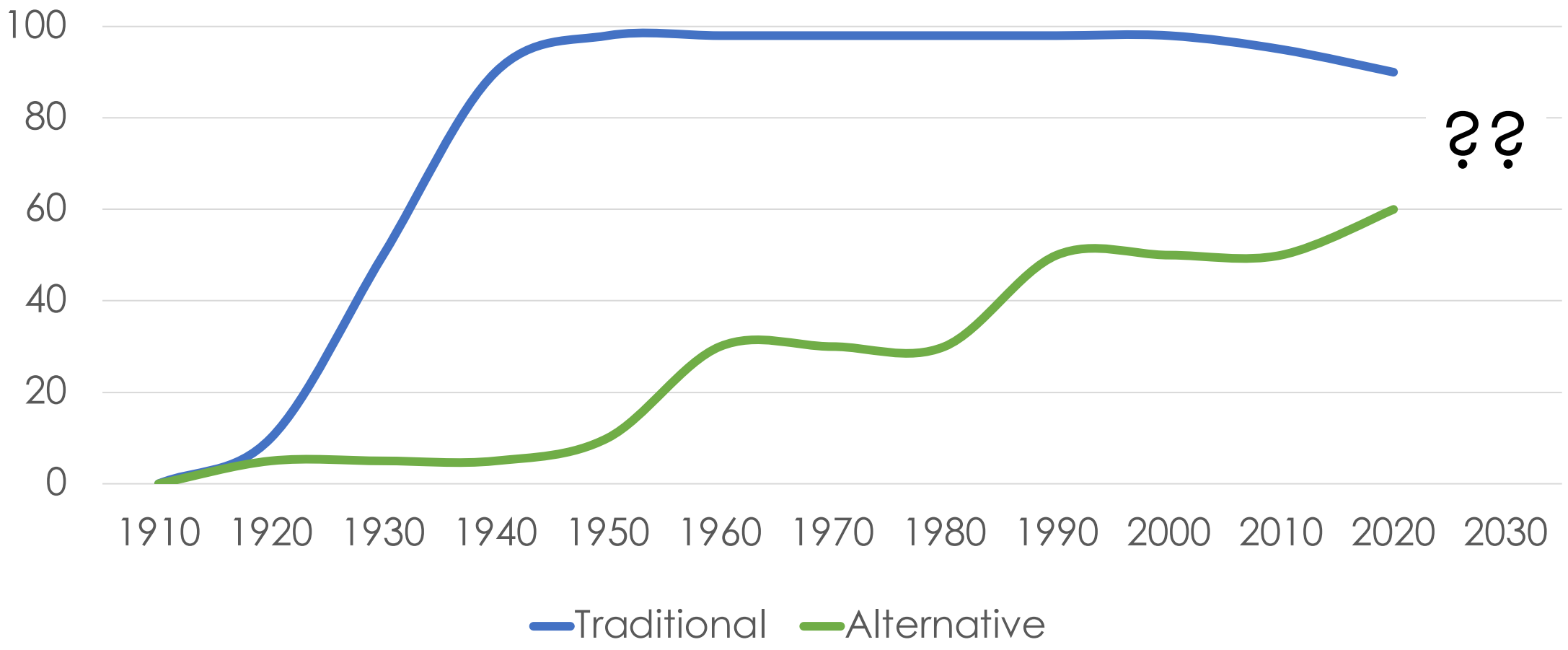
*The Old Way:*

Make it easier to drive

*The New Way:*

Make is easier to NOT drive

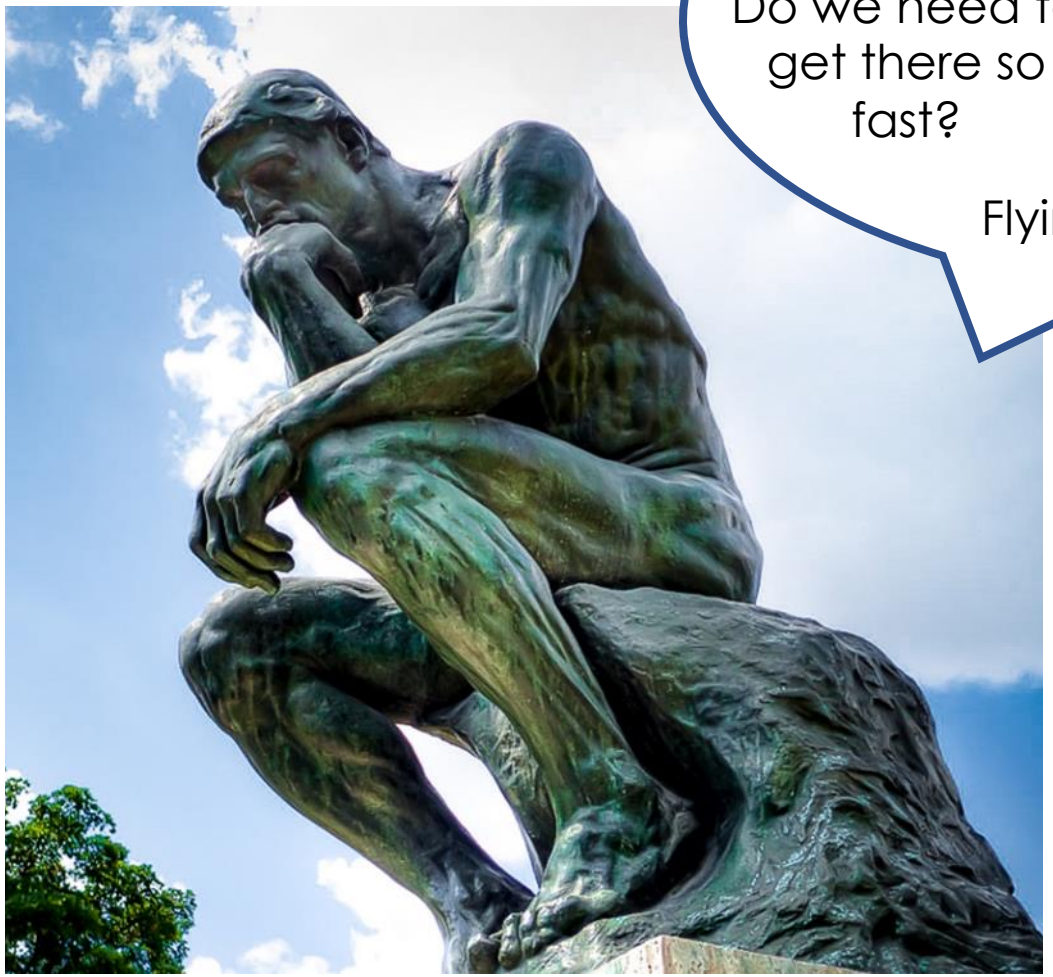
# Acceptance levels *unscientific version*



# The “throw everything at it” mentality

Marin and Sonoma’s SMART Train


Highway 101 Marin-Sonoma Narrows

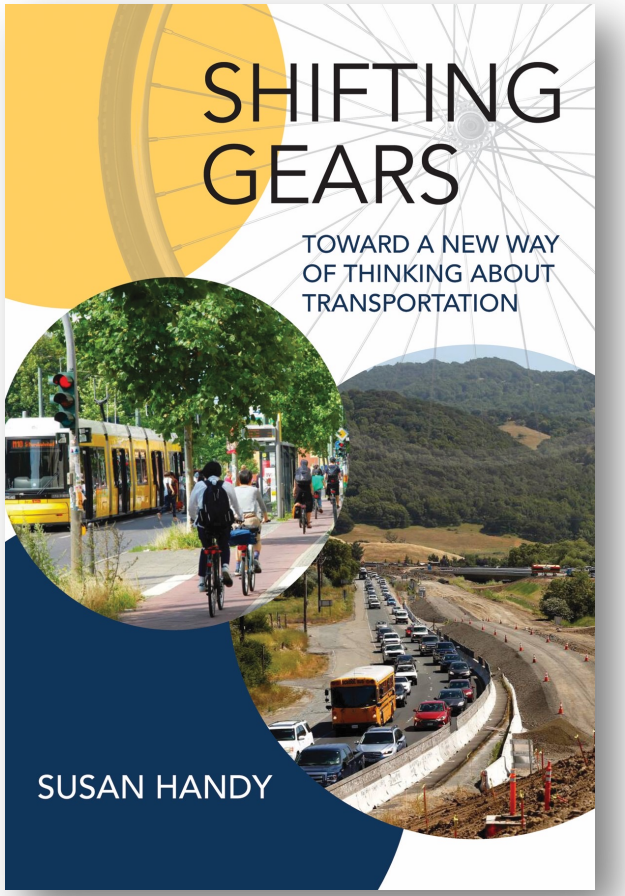


Can we free people from their cars?

Do we need to get there so fast?

Aren't there better ways to use our street space?

Flying cars? Really?




# Let me know what you think!

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A USDOT University Transportation Center