A NEW TOOL TO CALCULATE INDUCED TRAVEL

May 23, 2019

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OUTLINE

- Historical approach to congestion management

- The induced travel effect

- Measuring induced travel

- NCST's induced travel calculator

  - https://ncst.ucdavis.edu/research/tools/

- Commentary from guest respondents

- Questions

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HISTORICAL APPROACH TO CONGESTION MANAGEMENT

- Increase automobile capacity
  - Build new roadways
  - Add lanes to existing roadways
- Still commonly prescribed
  - SB 319 (Feb. 2019, Moorlach), initial version:
    - Would have added lanes along the entirety of I-5 and CA-99 to reduce congestion and GHG emissions

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HISTORICAL APPROACH TO CONGESTION MANAGEMENT

Problem → Treatment → Intended Effect

| ↑ Traffic | ↑ Auto Capacity | ↓ Traffic |

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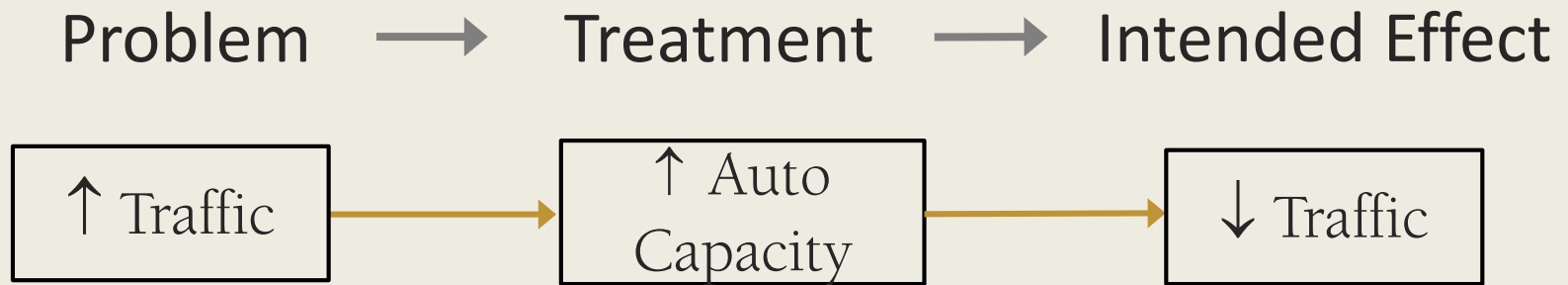
INDUCED TRAVEL EFFECT

- Adding roadway capacity in congested areas *reduces the time cost of driving*

- When the price of driving goes down, *vehicle miles traveled (VMT) go up*

- With increasing VMT, *congestion can return to pre-capacity expansion levels relatively quickly*

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INDUCED TRAVEL EFFECT
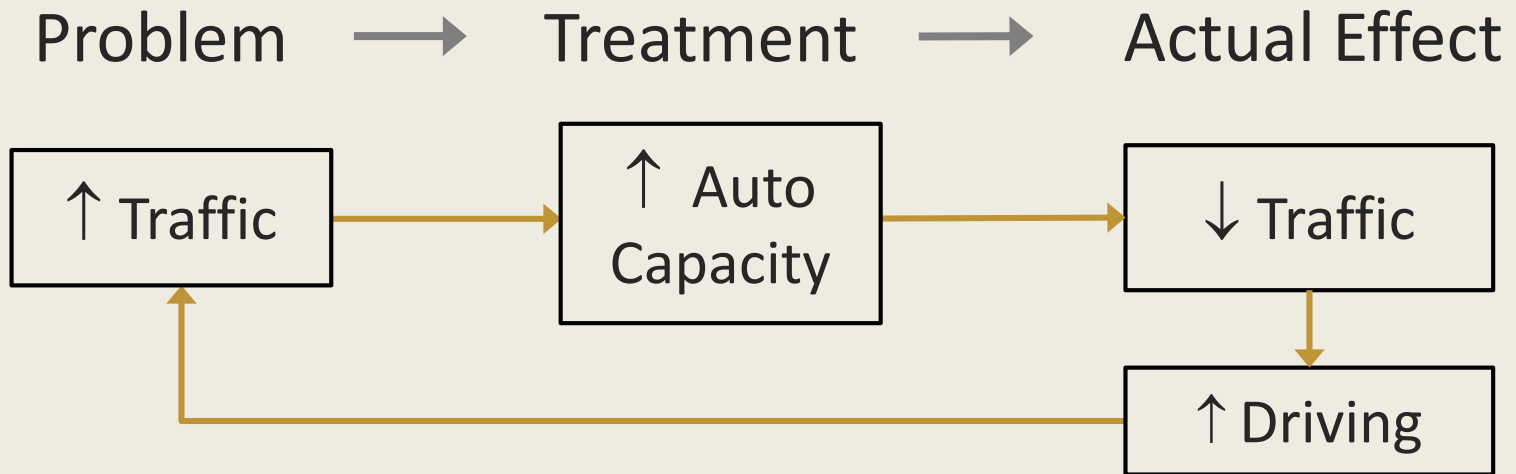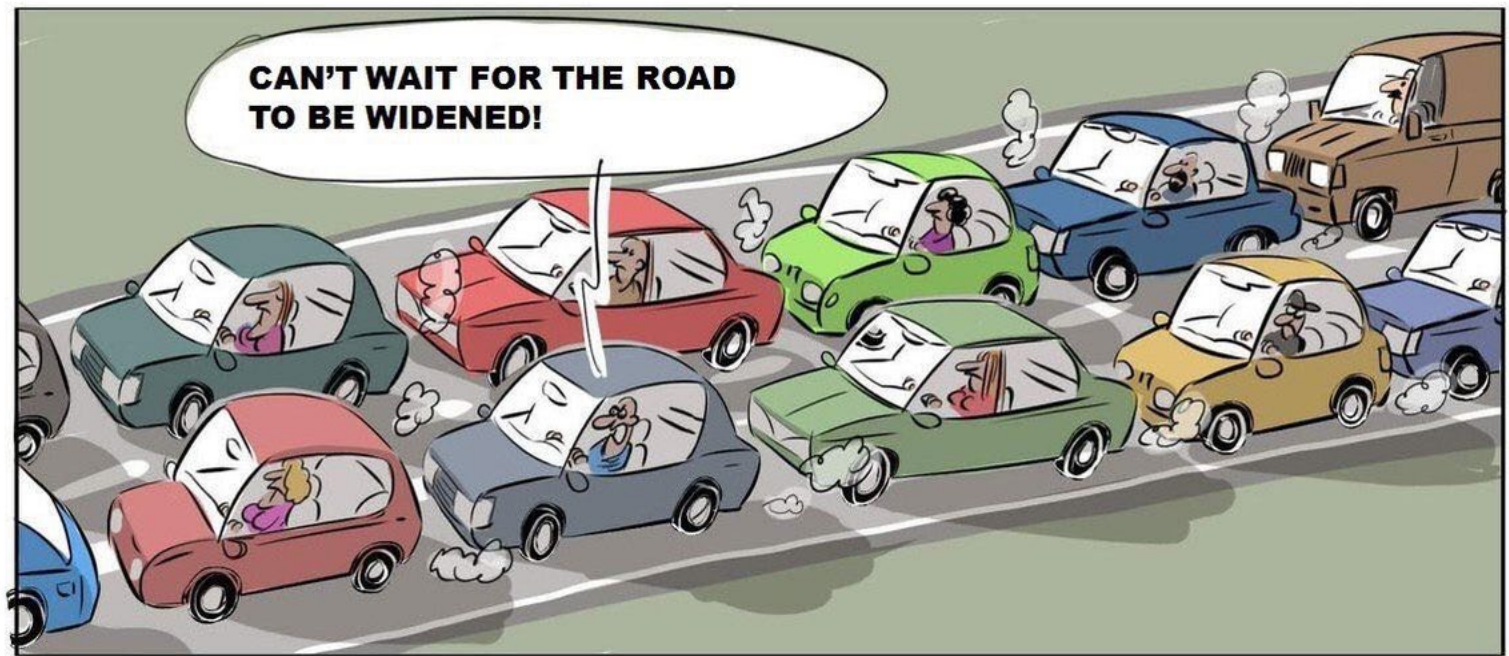
MEASURING INDUCED TRAVEL

■ Magnitude of the effect commonly measured as an elasticity:

$$Elasticity = \frac{\%\ Change\ in\ VMT}{\%\ Change\ in\ Lane\ Miles}$$

■ Range of long-term elasticity for major roads in congested areas:

- 0.6 – 1.0

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MEASURING INDUCED TRAVEL - IMPORTANCE

- Reducing VMT is key to meeting California's GHG emissions reduction goals

- Increasing use of VMT as a measure of transportation system performance, environmental impacts, and public health impacts

  - SB 743 (2013)

  - See http://opr.ca.gov/ceqa/updates/sb-743/

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NCST'S INDUCED TRAVEL CALCULATOR - BASICS

- **Purpose:** provides a simple estimate of induced travel – additional VMT per year – from . . .

- **Projects:** adding general-purpose or high-occupancy-vehicle (HOV) lane miles to major roadways in the California Highway System (FHWA Class 1, 2, or 3) in . . .

- **Geography:** California's urbanized counties - counties within a metropolitan statistical area (MSA)

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NCST'S INDUCED TRAVEL CALCULATOR - EQUATION

- Calculator solves this equation:

$$VMT\ Induced\ by\ Project$$
$$= \%\Delta\ Lane\ Miles\ \times\ Existing\ VMT\ \times\ Elasticity$$

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NCST'S INDUCED TRAVEL CALCULATOR - DATA

- **User inputs:**
  - Geography
  - Facility type
  - Lane miles proposed to be added
- **Supplied inputs:**
  - Existing lane miles (2016 Caltrans data)
  - Existing VMT (2016 Caltrans data)
  - Elasticity
    - 1.0 for Class 1 facilities (interstates)
    - 0.75 for Class 2 and 3 facilities

NCST'S INDUCED TRAVEL CALCULATOR - DEMONSTRATION

- URL: https://ncst.ucdavis.edu/research/tools/

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ℹ️ Overview

This calculator allows users to estimate the VMT induced annually as a result of adding general-purpose or high-occupancy-vehicle (HOV) lane miles to roadways managed by the California Department of Transportation (Caltrans) in one of California's urbanized counties (counties within a metropolitan statistical area (MSA)). The calculator applies only to Caltrans-managed facilities with Federal Highway Administration (FHWA) functional classifications of 1, 2 or 3 (see Caltrans, 2019). That corresponds to interstate highways (class 1), other freeways and expressways (class 2), and other principal arterials (class 3).

❓ How to Use

To obtain an induced VMT estimate for a roadway capacity expansion project, enter the project length (in lane miles added) and geography (MSA for additions to interstates; county for additions to other Caltrans-managed class 2 or 3 facilities).

More about this calculator

🧮 Calculator

1. Select facility type

◯ Interstate highway (class 1 facility)
◯ Class 2 or 3 facility

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🔢 Calculator

1. Select facility type

🔵 Interstate highway (class 1 facility)

Select MSA
Bakersfield
Chico
El Centro
Fresno
Hanford-Corcoran
✓ Los Angeles-Long Beach-Anaheim
Madera
Merced
Modesto
Napa
Oxnard-Thousand Oaks-Ventura
Redding
Riverside-San Bernardino-Ontario
Sacramento-Roseville-Arden-Arcade
Salinas
San Diego-Carlsbad
San Francisco-Oakland-Hayward
San Jose-Sunnyvale-Santa Clara
San Luis Obispo-Paso Robles-Arroyo Grande
Santa Cruz-Watsonville
Santa Maria-Santa Barbara

▼

🔢 Calculator

1. Select facility type

🔘 Interstate highway (class 1 facility)

⚪ Class 2 or 3 facility

2. Select MSA

Los Angeles-Long Beach-Anaheim ▲▼

3. Input total lane miles added

90   miles

Calculate Induced Travel

Calculate Induced Travel

Results

774.8 million additional VMT/year
(Vehicle Miles Travelled)

Los Angeles-Long Beach-Anaheim MSA currently has 3515 lane miles of Interstate highway on which 30261 million vehicle miles are travelled per year.

A project adding 90 lane miles would induce an additional 774.8 million vehicle miles travelled per year.

Los Angeles-Long Beach-Anaheim MSA consists of 2 counties (Los Angeles and Orange).

This calculation is using an elasticity of 1.0 .

Read more about this calculator

⊞ Calculator

1. Select facility type

○ Interstate highway (class 1 facility)
● Class 2 or 3 facility

2. Select county

Butte ▲▼

3. Input total lane miles added

| | miles |

Calculate Induced Travel

RESOURCES

- NCST's Induced VMT Calculator:
https://ncst.ucdavis.edu/research/tools/
- OPR site with resources on induced travel, VMT, and automobile level of service:
http://opr.ca.gov/ceqa/updates/sb-743/
- Info on FHWA functional classifications and California's highway system:
http://www.dot.ca.gov/hq/tsip/hseb/func_clas.html
- Downs (1962): https://trid.trb.org/view/694596
- Cervero & Hansen (2002):
https://www.ingentaconnect.com/content/lse/jtep/2002/00000036/00000003/art00005
- Handy & Boarnet (2014a):
https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf
- Handy & Boarnet (2014b):
https://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkgd.pdf
- Duranton & Turner (2011):
https://www.aeaweb.org/articles?id=10.1257/aer.101.6.2616
- Handy (2015): http://www.dot.ca.gov/research/researchreports/reports/2015/10-12-2015-NCST_Brief_InducedTravel_CS6_v3.pdf
- Hymel (2019): https://www.sciencedirect.com/science/article/pii/S0967070X18301720

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QUESTIONS???

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