

Buying Traffic Decongestion by Paying Drivers to Become Passengers

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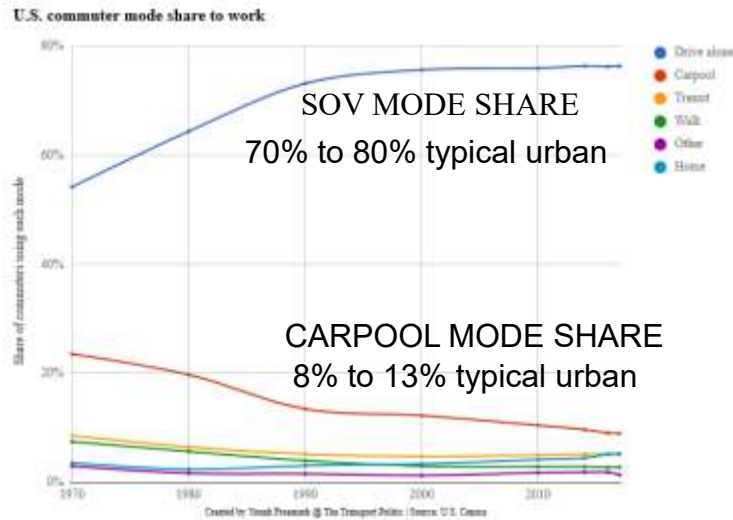
Research project of Mineta Transportation Institute, transweb.sjsu.edu

Funded by the United States Department of Transportation



https://commons.wikimedia.org/wiki/File:Miami_traffic_jam,_I-95_North_rush_hour.jpg

U.S. Carpool Commuting Mode Share Low & Dropping



Proposed Solution for Reducing Congestion

Dynamically achieve a target level of reduced vehicle traffic by motivating enough SOV commuters to become passengers

- Determine the amount of daily cash to pay drivers to switch to being passengers
- Pay enough, per person and in total, to achieve the lower target
- Establish as a permanent system

STEPS in FULL SOLUTION DESIGN

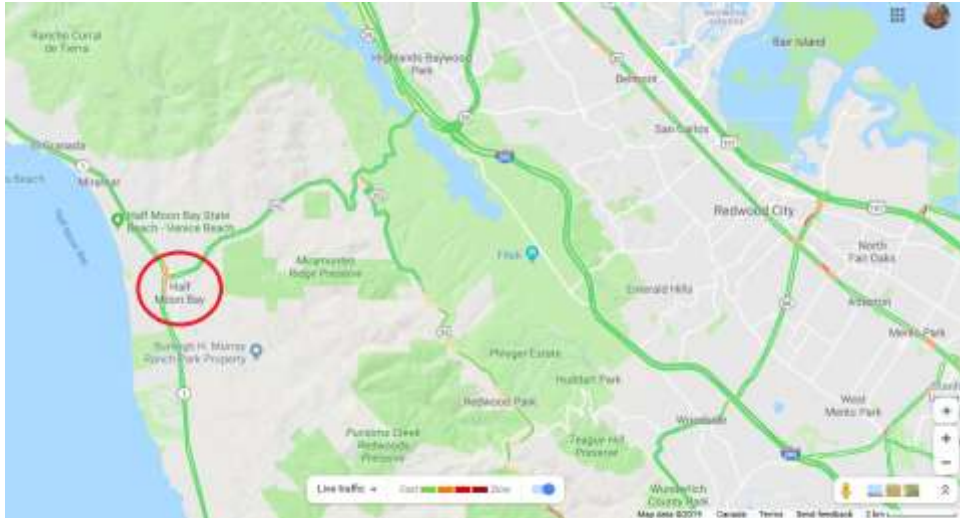
- Define corridor
- Gather base data
- Count traffic
- Set desired traffic reduction
- Determine incentive cost
- Determine incentive structure
- Calculate gross cost
- Calculate year 1 total cost
- Estimate later years cost
- Forecast lifetime cost & B/C present value

Case study site in California





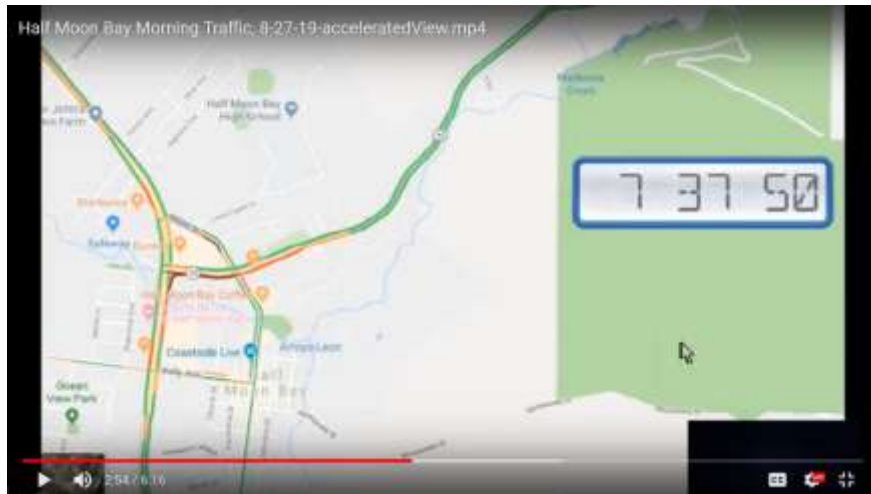
Case study site: Half Moon Bay, CA



Case study: A Simple Bottleneck



Half Moon Bay Road to Silicon Valley



Case Study Bottleneck





Key Steps in the Full Design

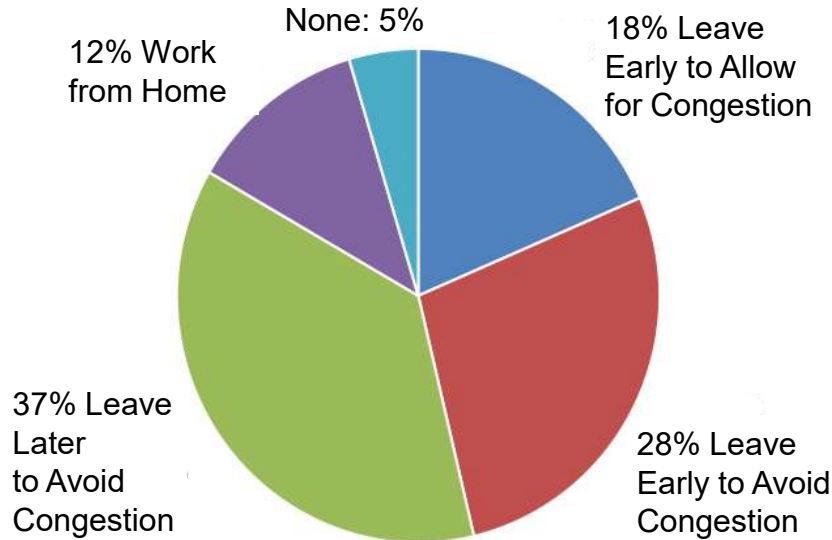
- ❑ Surveyed Half Moon Bay citizens on attitudes, travel behavior, and stated preferences for change
- ❑ Estimated price sensitivity in commuters becoming passengers
- ❑ Did spreadsheet-based simulation of traffic dynamics
- ❑ Calculated cost and benefit estimates for permanent implementation



Main Data Source: Resident Survey

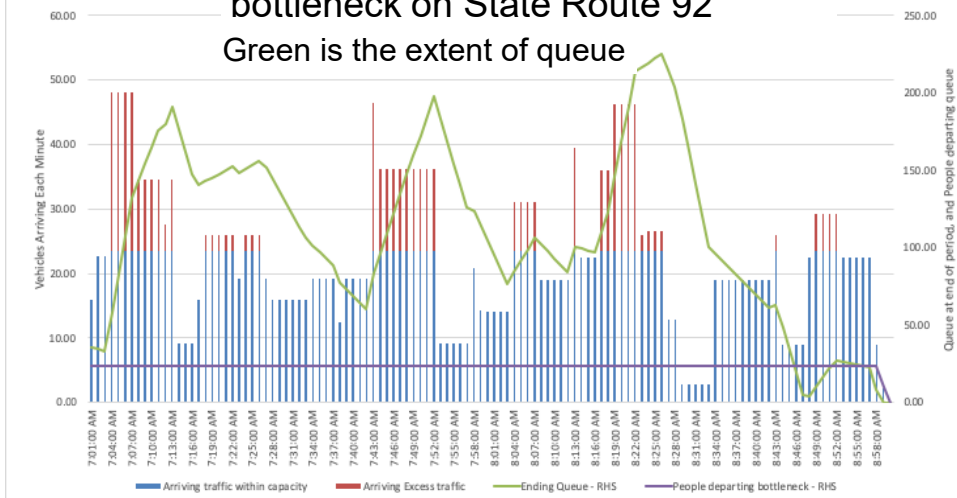
- Geographic filtering of all-county voters list
- 588 emails sent out that pointed to an online questionnaire
- 120 responses made. Closely matched census demographics
- Sought travel behavior on “Typical Tuesdays”
- Personal strategies to avoid congestion?
- Willing to travel as passenger?
- What incentive payment needed?

Response to Congestion

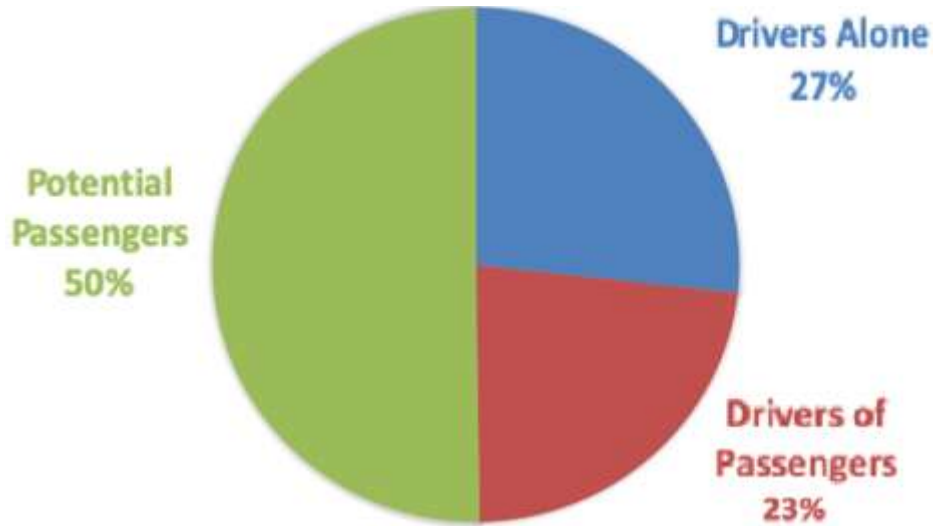


Estimated Tuesday Morning Traffic Half Moon Bay, Summer 2019

Red shows traffic delayed at the
bottleneck on State Route 92
Green is the extent of queue

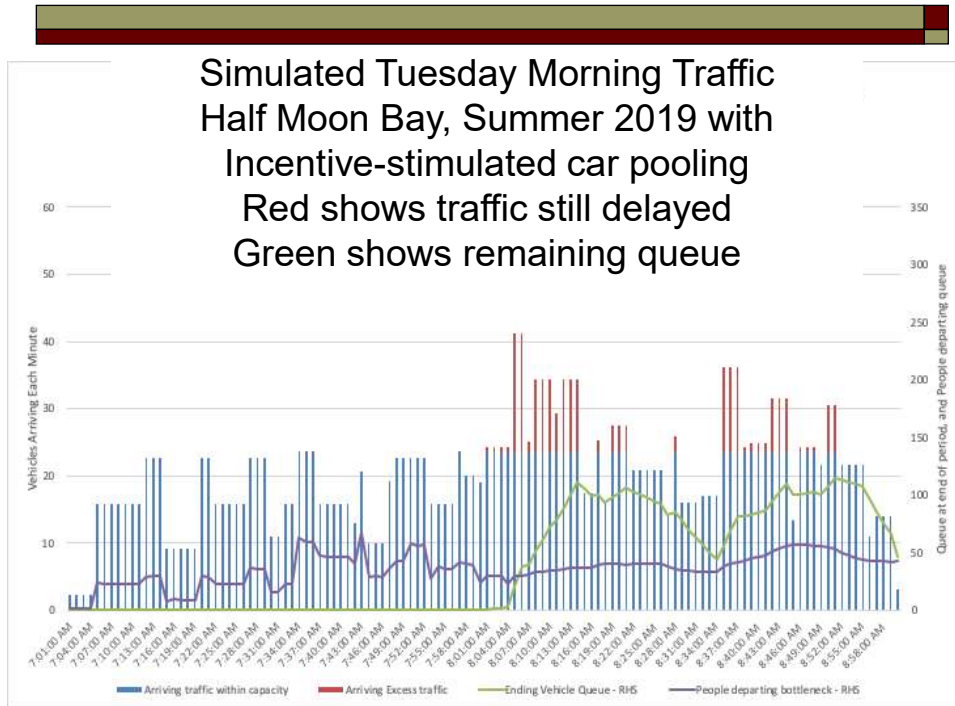


Survey Response: Willingness to Share the Ride



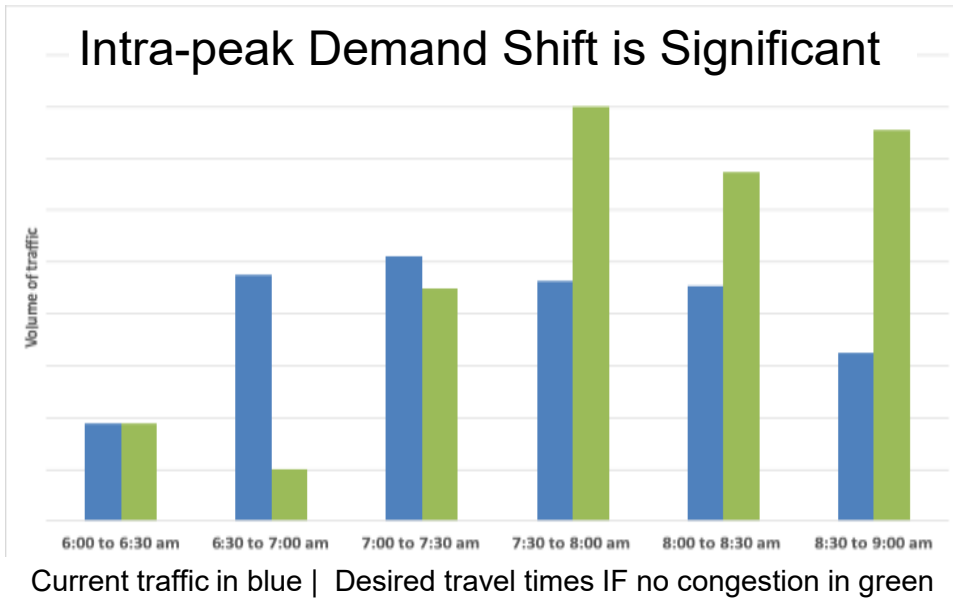
Reward Sought for Being a Passenger





Discovery: Reactive later departures would rebuild peak congestion

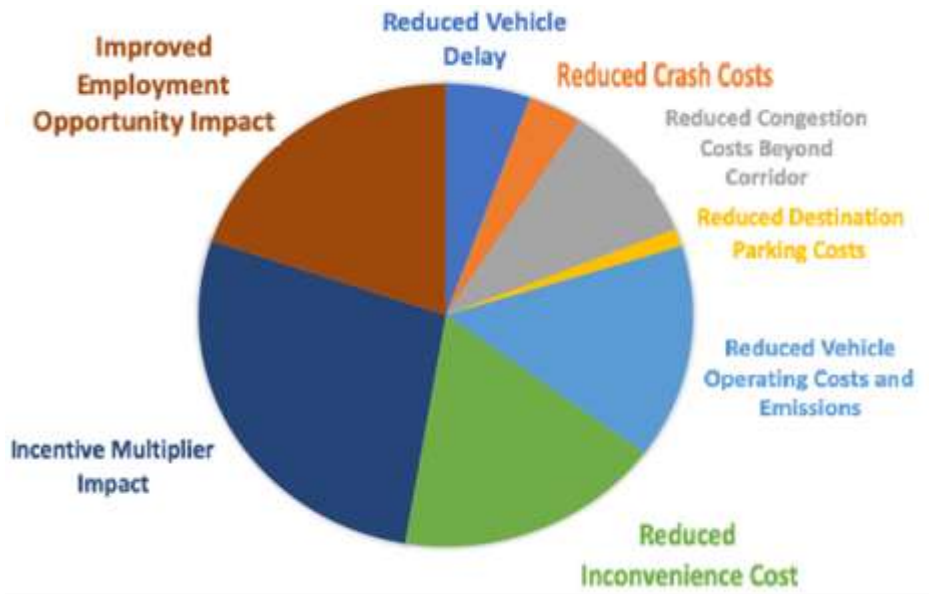
- 3,700 commuters estimated to currently pass through the bottleneck between 5 am and 9 am.
- But with congestion dissipated:
 - 2,600 (71%) would shift to a later departure for a total of 1,735 hours more time at home
 - 620 (17%) would shift to an earlier departure for a total of 490 hours of additional time at destination.



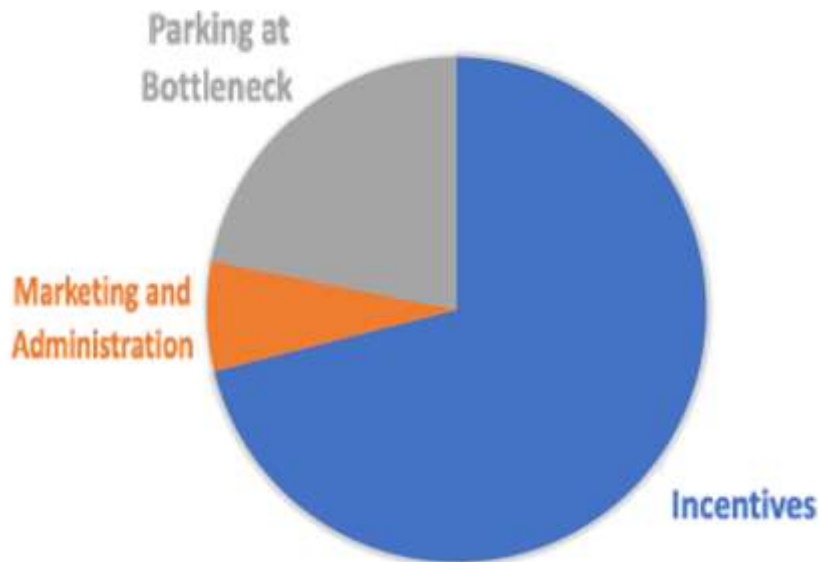
The Good News

- ❑ Analytical, empirical evidence in case study finds that a daily average \$15 price per passenger motivates enough SOV commuters to become passengers that congestion is removed.
- ❑ Removing congestion would allow people (88% in case study) to move departures to preferred times, so a going-early or going-late bonus is required to avoid re-peaking.
- ❑ 20-year present value benefit @ 3% discount rate is \$640 million vs \$140 million in costs; 4.5 benefit:cost.
- ❑ Cost of this system may compete well with widening the highway or building/buying new transit infrastructure.

\$640 Million, 20 Year Benefits, NPV



\$140 Million, 20 Year Costs, NPV





Bottom Line

- ❑ Pending more peer review and your comment, research team is eager to work further on congestion-clearing-payments methodology.
- ❑ Our documented, detailed, eight-step method is ready for funding support of further testing in an innovative community. Your suggestions, please?!
- ❑ Envisioned as an iteratively-tuned, ITS-enabled system of congestion relief – a game-changer!
- ❑ Thanks! PaulMinett@gmail.com or J@JohnNiles.com