

Presentation Series – UCD-ITS-PS-13-01

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# The Effects of Demand Management on Commercial Vehicle Travel

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# The Effects of Demand Management Measures on Commercial Vehicle Travel

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# Acknowledgements

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- Brandon Haydu, ULTRANS
- Nicholas J. Linesch, ULTRANS

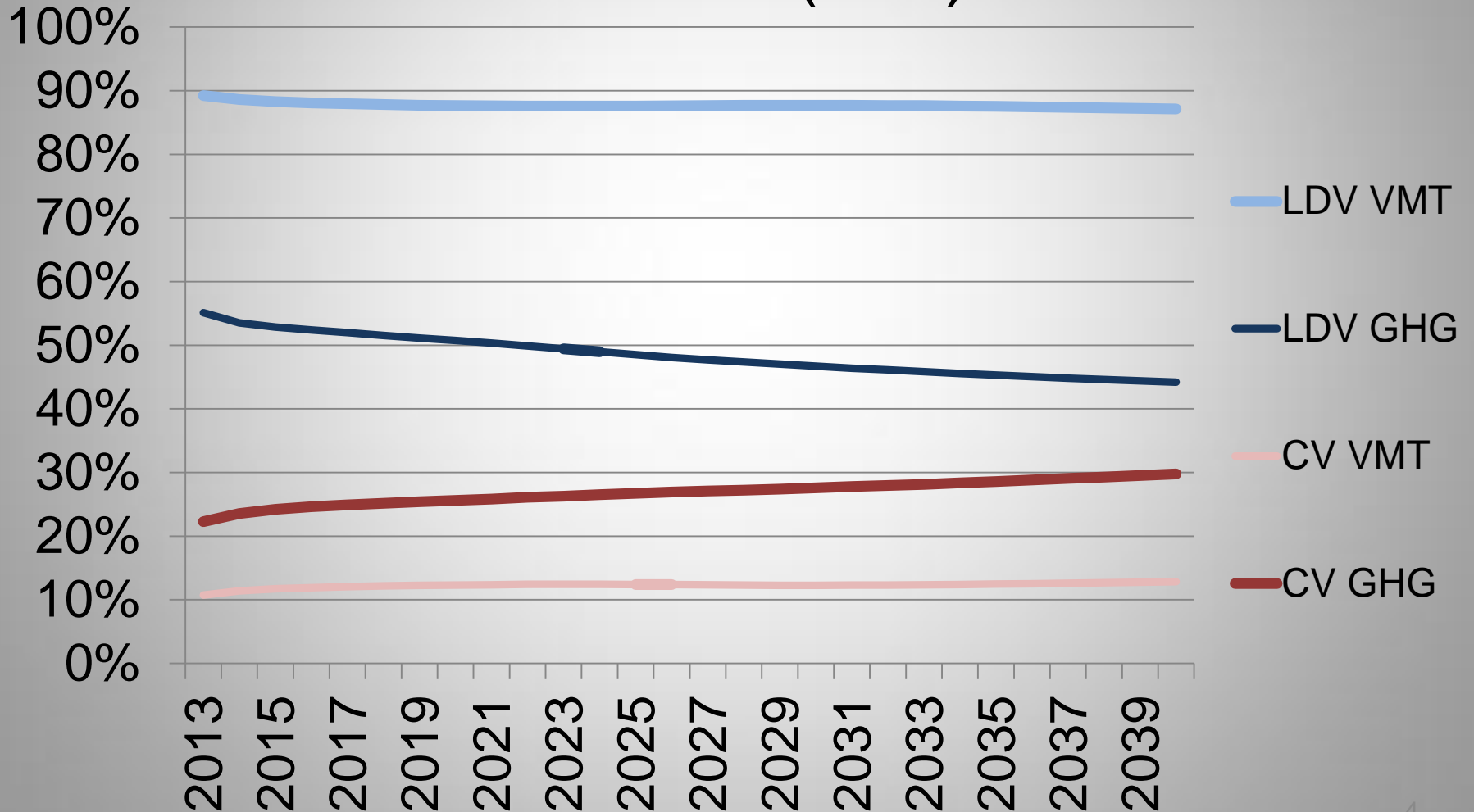
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# Policy Question

How might transit oriented development (TOD) and vehicle pricing policies (VMT fees) change local commercial vehicle miles traveled (VMT) and greenhouse gas emissions (GHGs)?

# Share of Total VMT & GHGs in U.S. for Light & Commercial Vehicles from 2013 to 2040 (EIA)



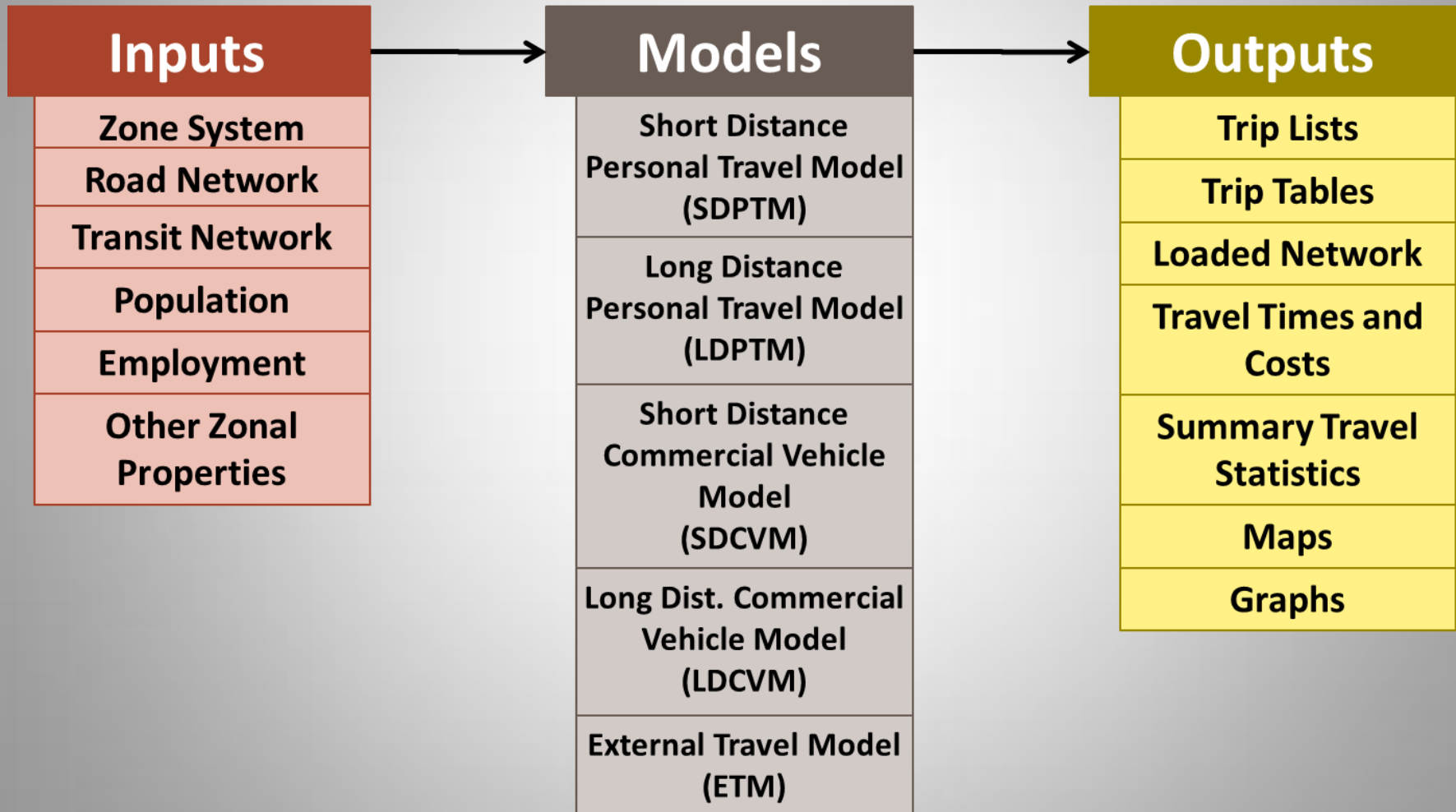
# What Do Other Studies Say?

- Transit Oriented Development (TOD)
  - Urban areas with high population densities less commercial vehicle travel
- Distance-Based Pricing (VMT Fee)
  - Potential for significant reduction in passenger and commercial vehicle travel
  - Since 2005, pilots and field tests of fees and technology throughout U.S.
  - GAO recommended pilot of commercial vehicle distance based fee in 2012

# Methodology

- TOD and VMT Fee simulated with California Travel Demand Model
  - Advanced activity-based microsimulation
  - First applied at large geographic scale
  - Explicit treatment of personal & local commercial vehicle travel

# California Travel Demand Model





# Data for Model Development

## Surveys

- Travel Surveys
- Census-PUMS
- American Community Framework
- Freight Analysis Framework
- Commodity Flows

## Observed

- Sensors
- Loop-Detectors
- WIM data
- On the Map
- Google Earth
- General Plans
- Zoning

# What is different about this study?

- New type of local commercial vehicle travel model: tour-based.
  - Better represents underlying mechanisms driving change in commercial travel due to public policies, investments, and plans that alter travel distances, times, and costs experienced by drivers.

# 2035 Base Case Scenario

- MPO's population and employment forecasts for 2035
- Adds roadway and transit projects from regional transportation plans
- As of August 2011
- Not latest SCS plans

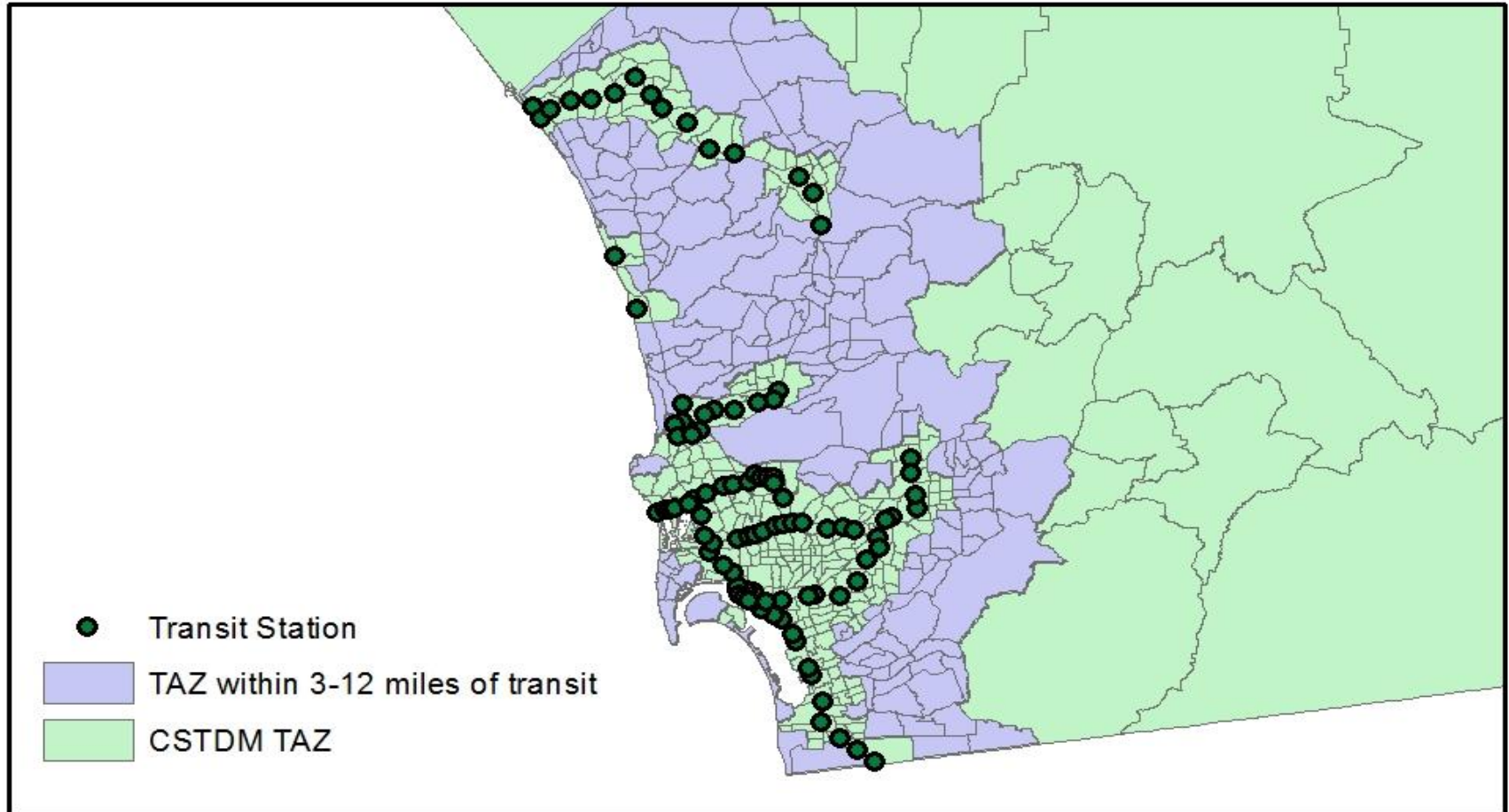
# VMT Fee: Double per Mile Vehicle Operating Costs

2035	Base	VMT Fee
Passenger & Light Commercial	\$ 0.14	\$ 0.28
Medium Truck	\$ 0.49	\$ 0.98
Heavy Truck	\$ 0.58	\$ 1.16

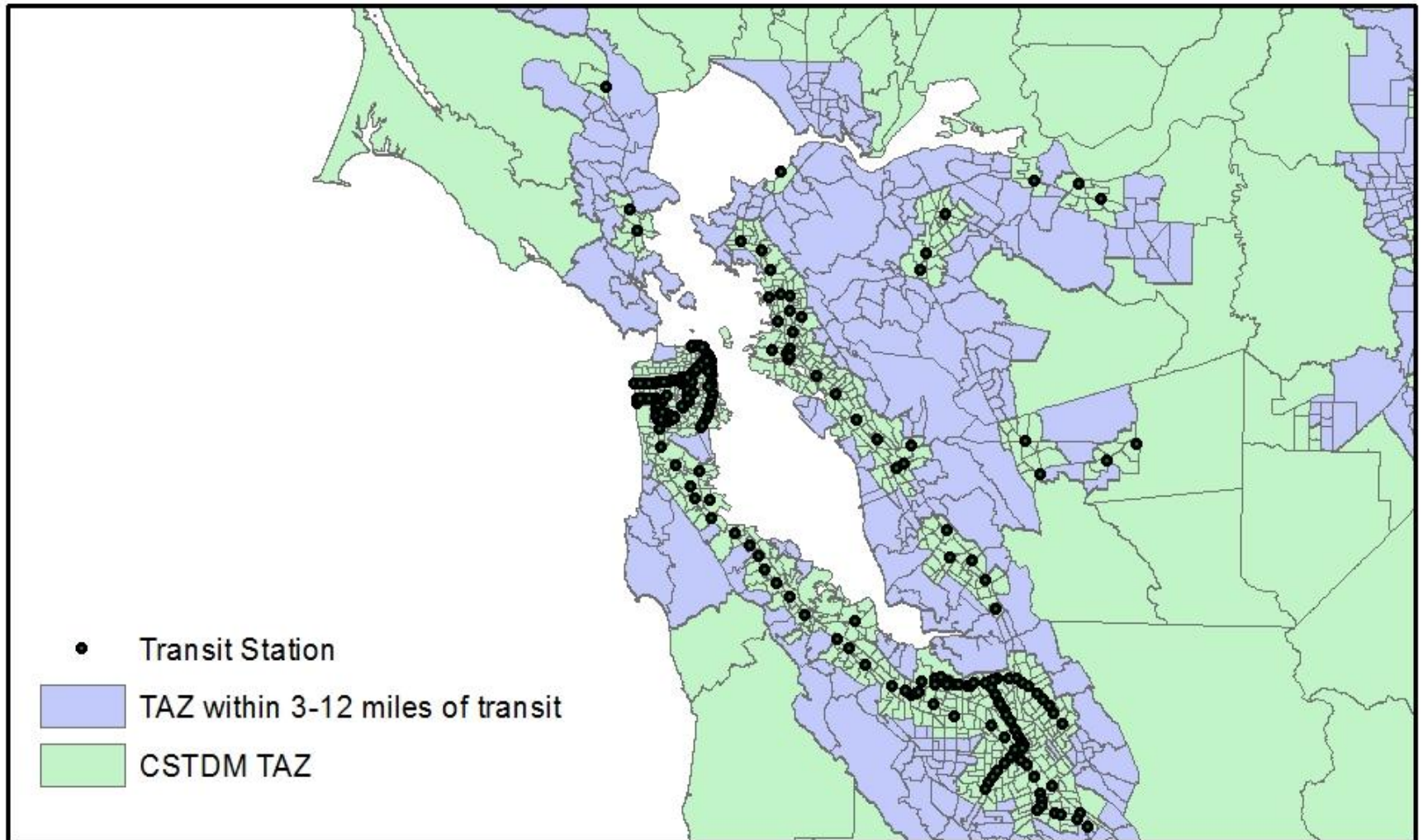
# Transit Oriented Development: Population & Density

2035	Population Moved Closer to Transit	Weighted Population Density
Base	--	32.2
TOD	4.0 Million	35.2
Percentage Change	8.2%	9.5%

# TOD: San Diego Region



# TOD: San Francisco Bay Area









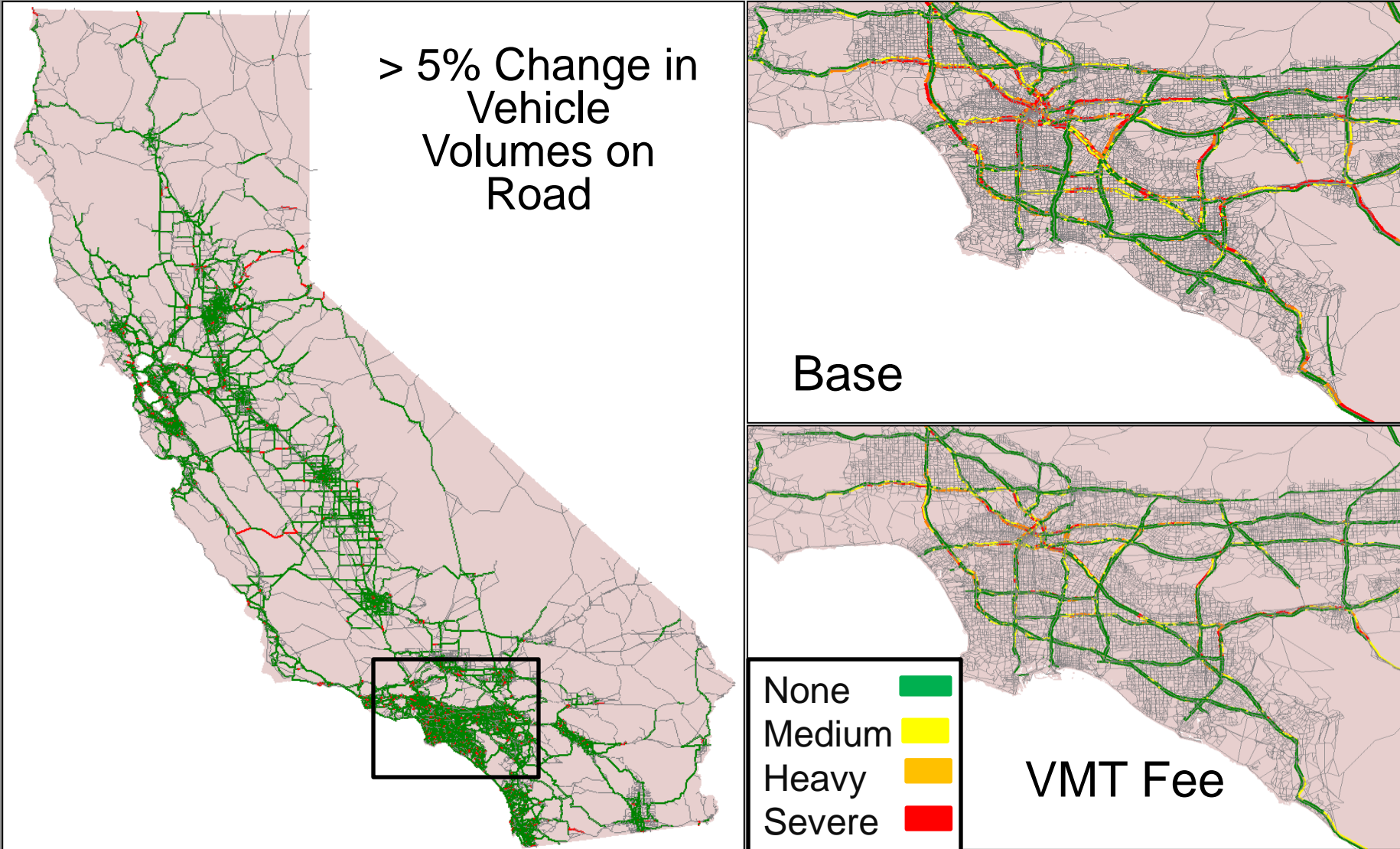
# Dramatic Reduction in Congestion for VMT Fee: AM Peak

> 5% Change in  
Vehicle  
Volumes on  
Road

Base

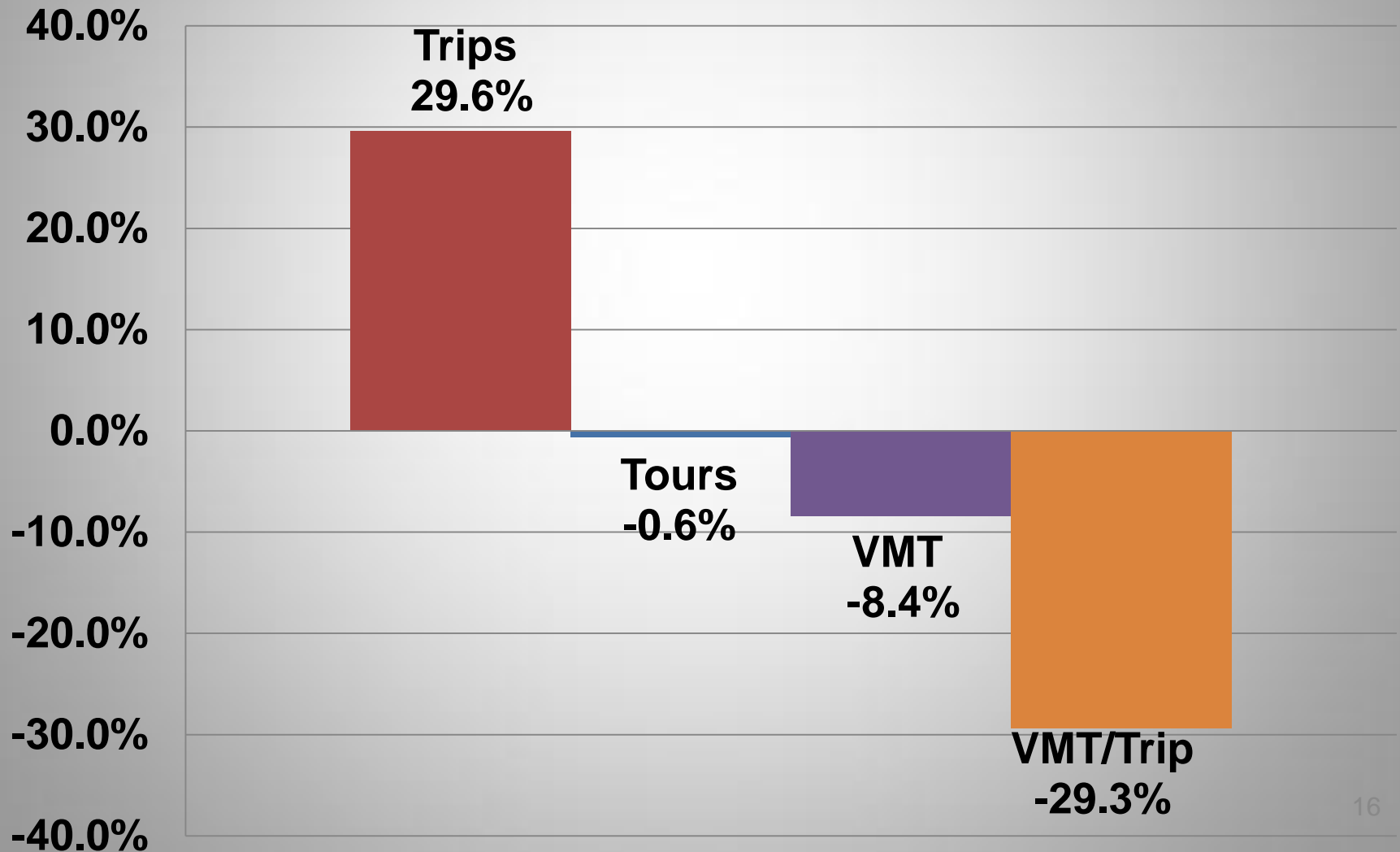
None	
Medium	
Heavy	
Severe	

VMT Fee

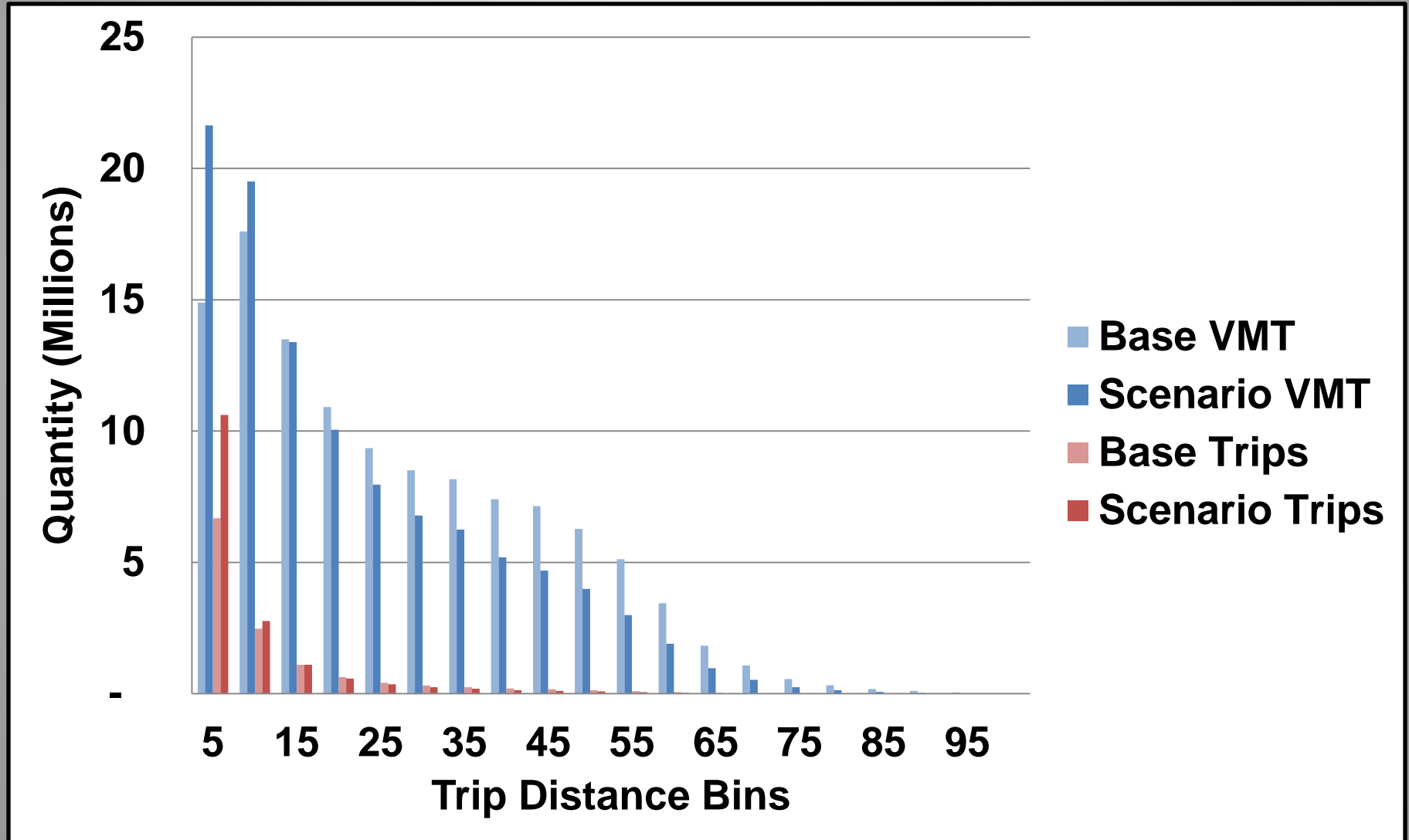




# Percentage Change in Local Commercial Vehicle Travel: VMT Fee Compared to Base







# 5 Mile Bins for Local Commercial Vehicle Travel: VMT Fee Compared to Base



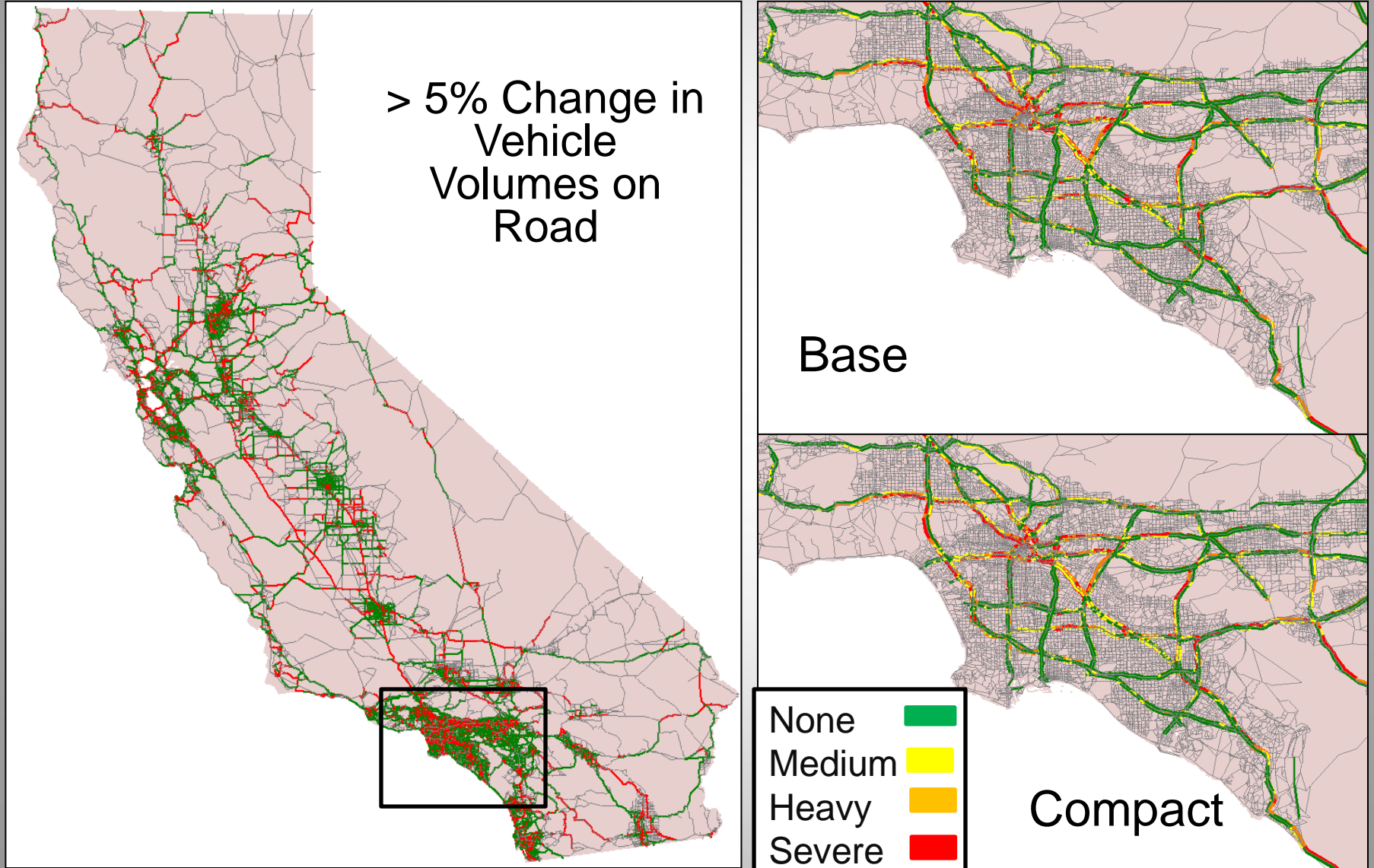
# Modest Reduction in Congestion for TOD: AM Peak

> 5% Change in  
Vehicle  
Volumes on  
Road

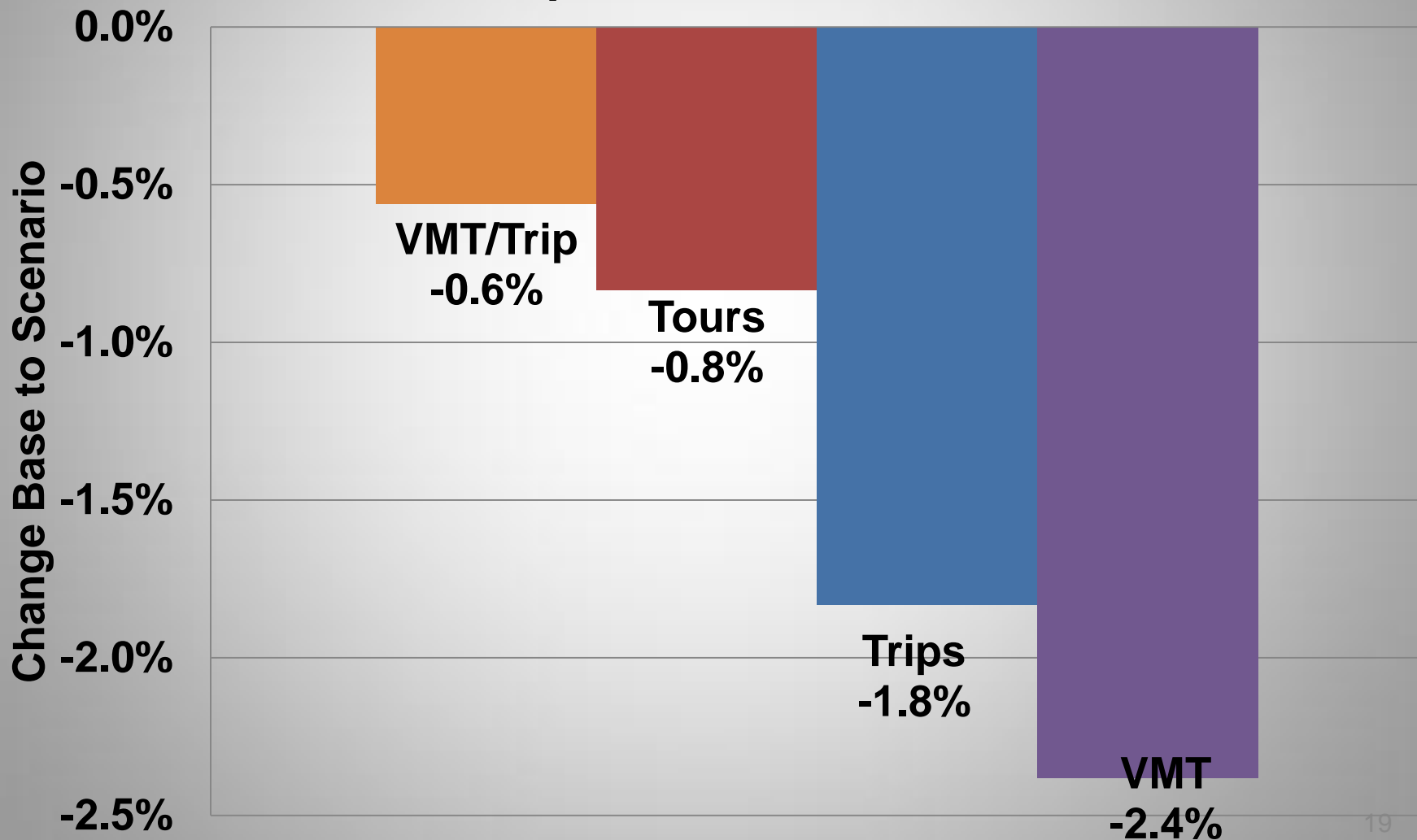
Base

None	
Medium	
Heavy	
Severe	

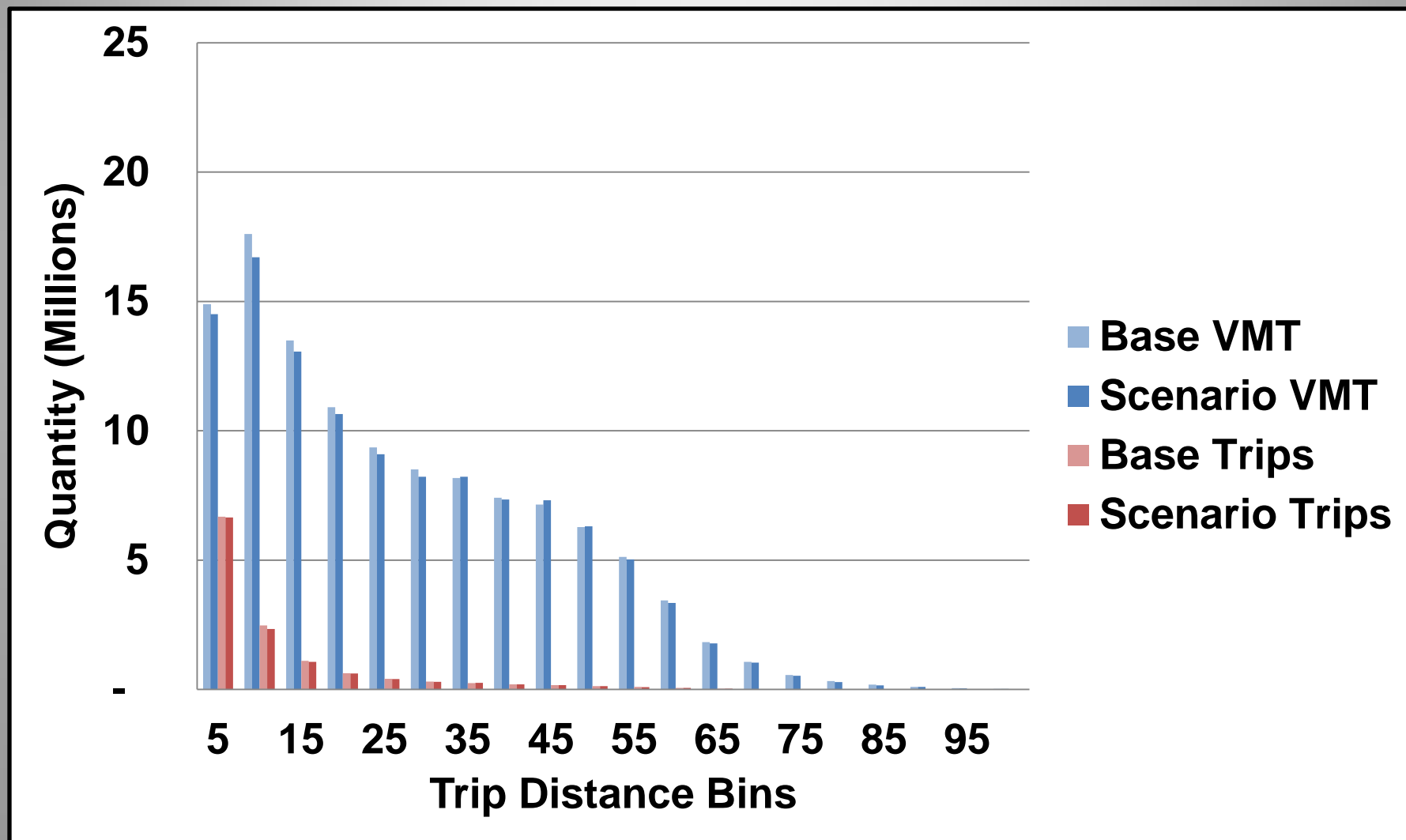
Compact



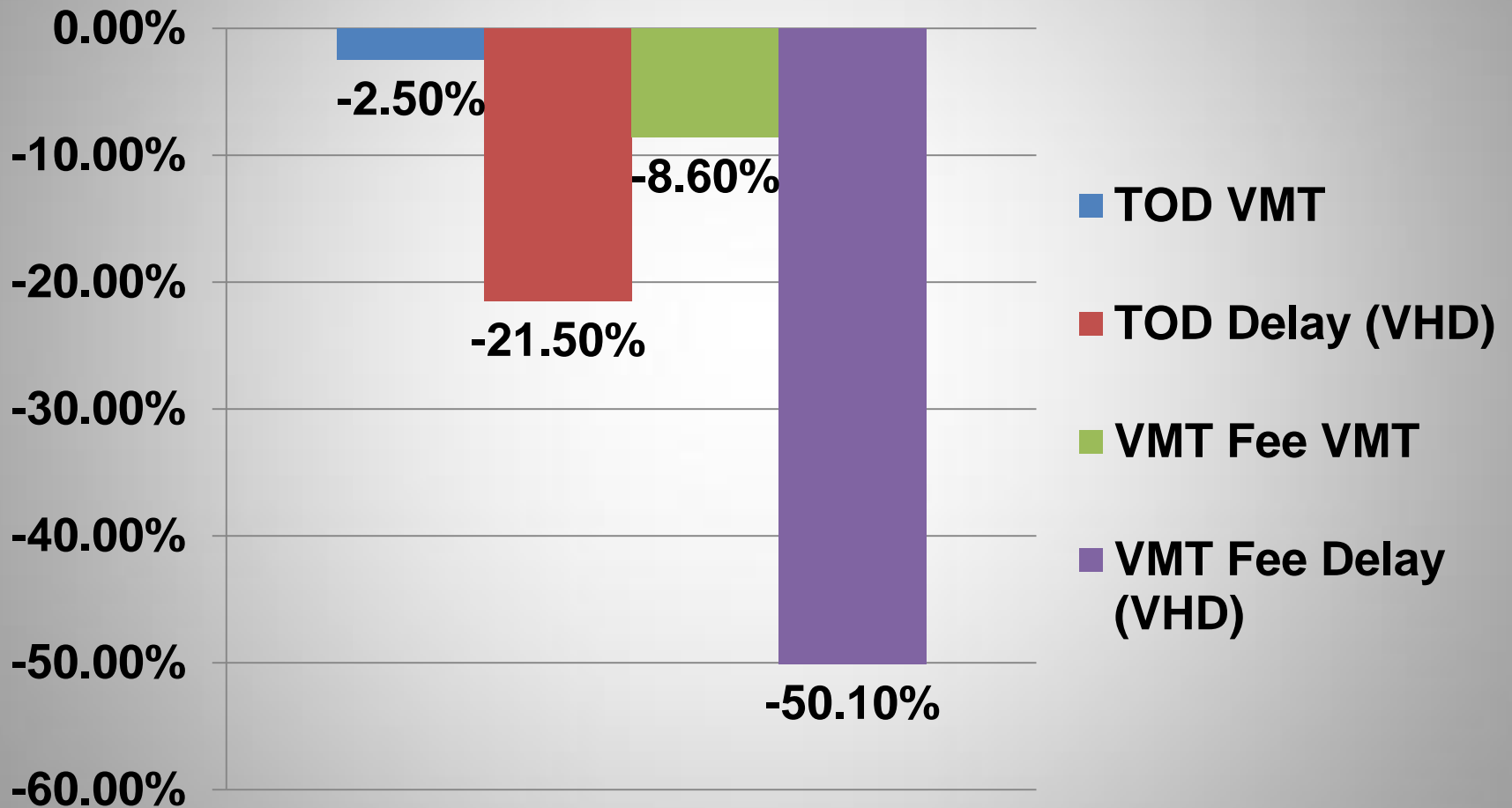
# Percentage Change in Local Commercial Vehicle Travel: TOD Compared to Base



# 5 Mile Bins for Local Commercial Vehicle Travel: TODs Compared to Base



# Comparison of VMT & Delay Changes for TOD & VMT Scenario



# Conclusions

- TOD scenario provides modest reduction in commercial vehicle travel due to closer proximity of origins & destinations
- VMT fee scenario has significant reductions in local commercial travel distance due to dramatic congestion reduction & financial incentives to minimize distance traveled
  - Increase local commercial vehicle productivity
  - Enough to offset added VMT costs?

**Thank you!**

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