

# Vehicle Movement on California's Public Roads

**Inputs and Methods for the 2013 Transportation  
Energy Demand Forecast**  
Hearing Room A

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# Using Vehicle Movement to Estimate Fuel Consumption

- 2011 is the base year used to forecast fuel use
- 2011 volumes of fuels are calculated for sectors, modes and vehicle classes
- Fuel consumption is the product of vehicle populations, miles traveled per vehicle, and fuel economy



# Different Measures of Fuel Use

## *Different Vehicle Movement Data*

- Quantity of fuel purchased and delivered in California
- Number of California-registered vehicles
- Number of miles driven on California public roads
- Number of miles of rail movement



# Annual Vehicle Miles Traveled

- Annual vehicle miles traveled (VMT) from Highway Performance Monitoring System (HPMS, Caltrans)
- Truck and total traffic counts (Caltrans)
- Annual VMT estimates from Emissions Factors model (EMFAC, Air Resources Board)
- Smog check data (Consumer Affairs)
- Vehicle Inventory and Use Survey
- Energy Commission estimate

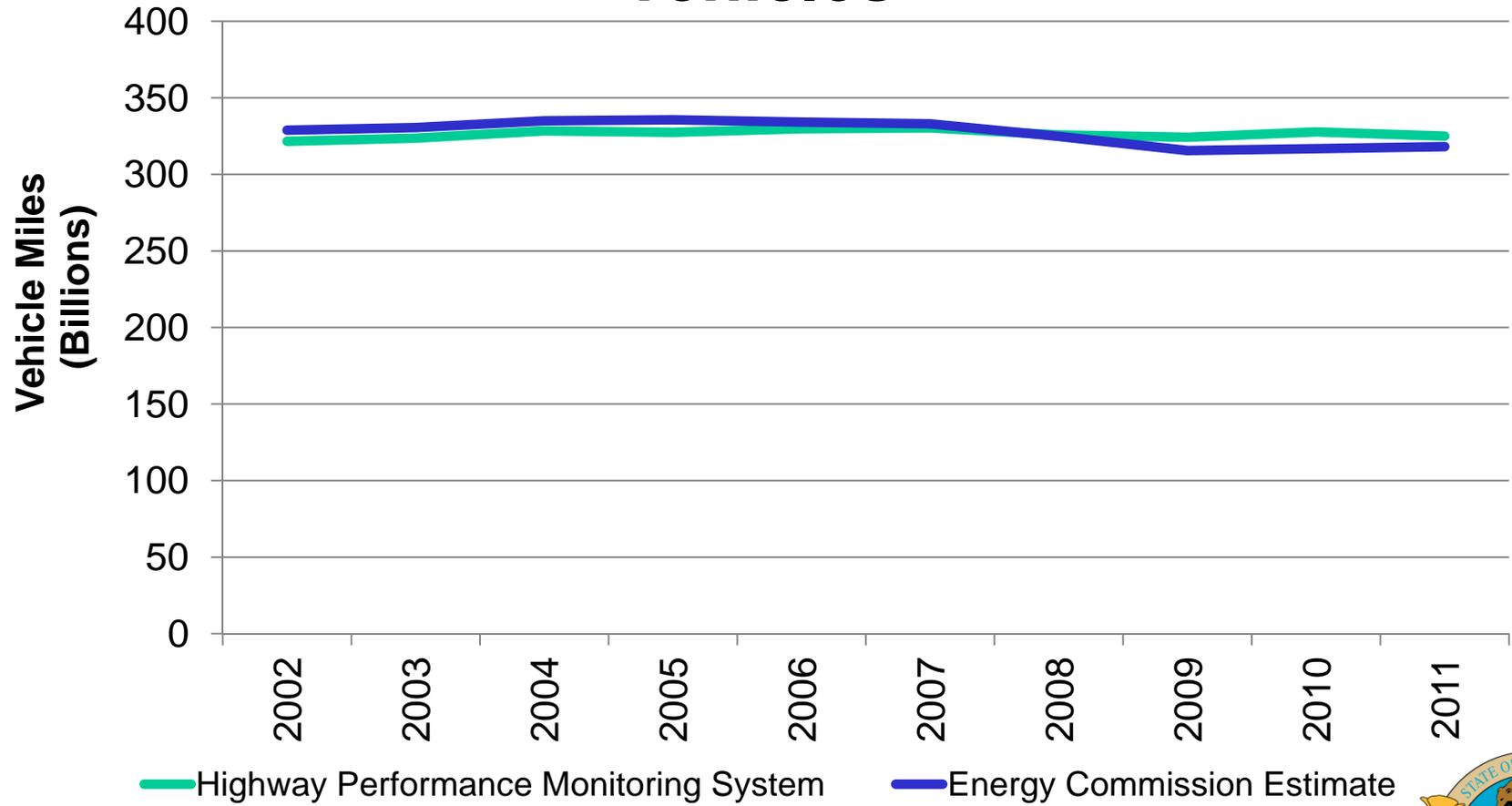


# Challenges in Comparing Estimates of Fuel Use

- Organizations use different vehicle classes, estimates of Annual VMT, and vehicle counts
- Fuels are used in multiple sectors and modes but not all sectors and all modes
- Gasoline fuels light-duty and heavy-duty vehicles
- Diesel fuels rail, trucks, buses, and light-duty vehicles



# Annual Miles Driven in California Vehicles



— Highway Performance Monitoring System

— Energy Commission Estimate

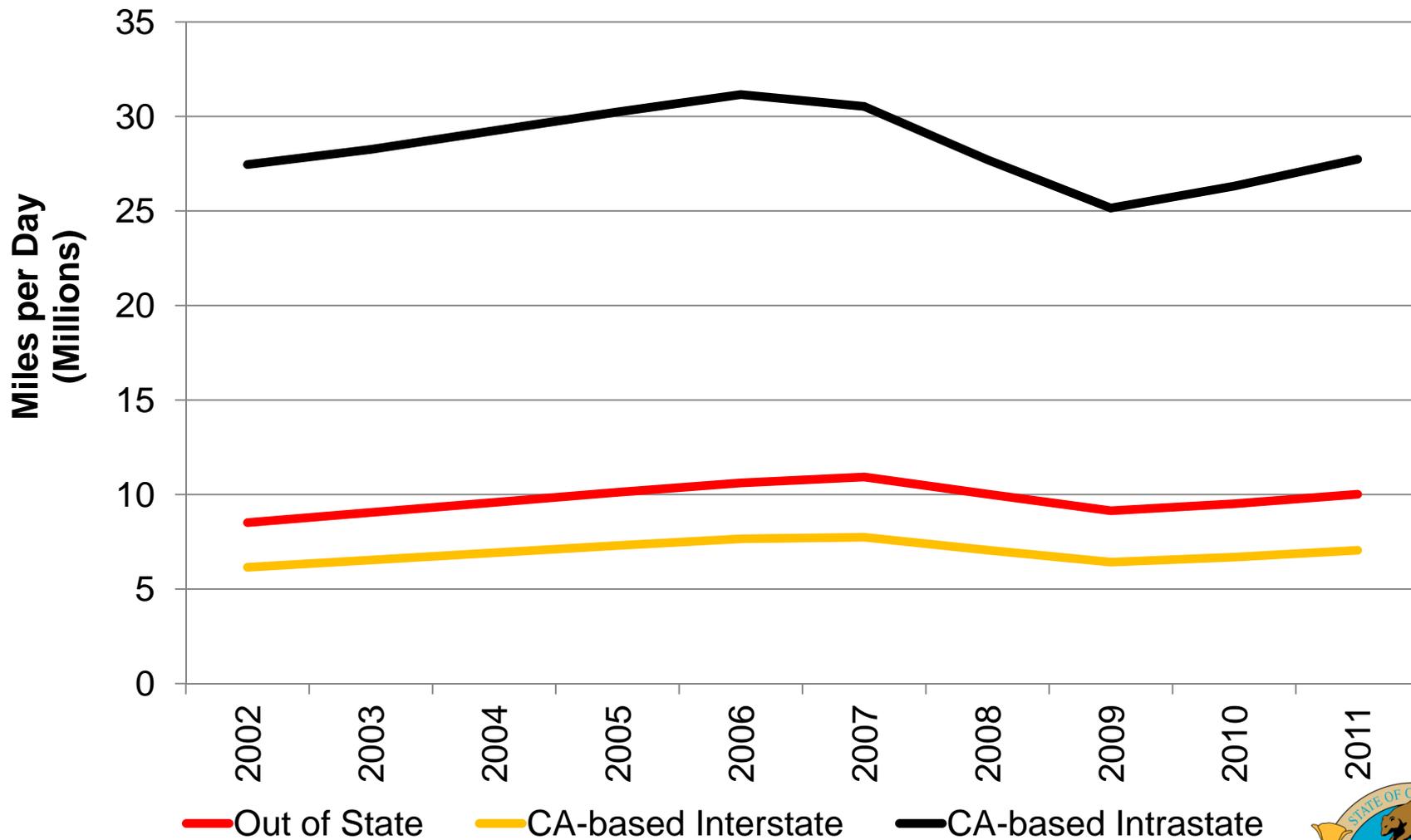


# Estimating 2011 Annual VMT

- Annual VMT from Energy Commission analysis of vehicle population, fuel economy, and fuel use
- Annual VMT of out-of-state trucks on California roads, from analysis of International Fuel Tax Agreement data at the Air Resources Board



# MD-HD Truck Daily VMT in California



Source: Air Resources Board [<http://www.arb.ca.gov/emfac/>]



# Data Sources for Daily Movement of Individual Vehicles

- National Household Travel Survey (NHTS 2008-09)
- California Household Travel Survey (CHTS 2000, 2012)
- Vehicle Inventory and Use Survey (VIUS 2002)
- Census Journey to Work (ACS 2006-10)



# Data from Household Travel Surveys

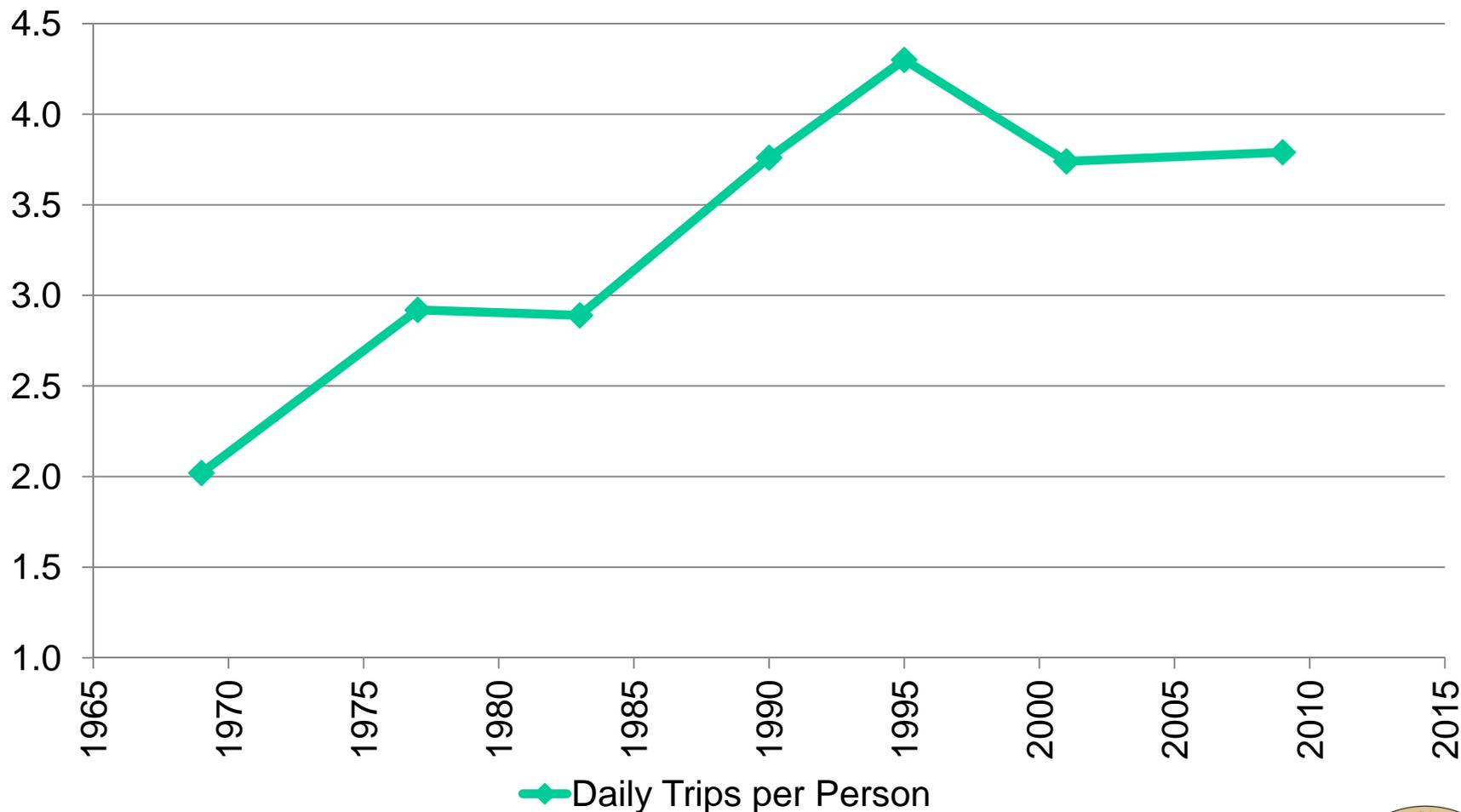
- Social and economic characteristics and travel behavior of individuals and households
- Trip rates, trip distance, vehicle occupancy are used to calculate Daily VMT
- CHTS 2012-13 includes responses from ~42,000 households with ~109,000 people



**Daily VMT**  
equals  
**Trips per Person**  
times  
**Miles per Trip**  
divided by  
**Vehicle Occupancy**



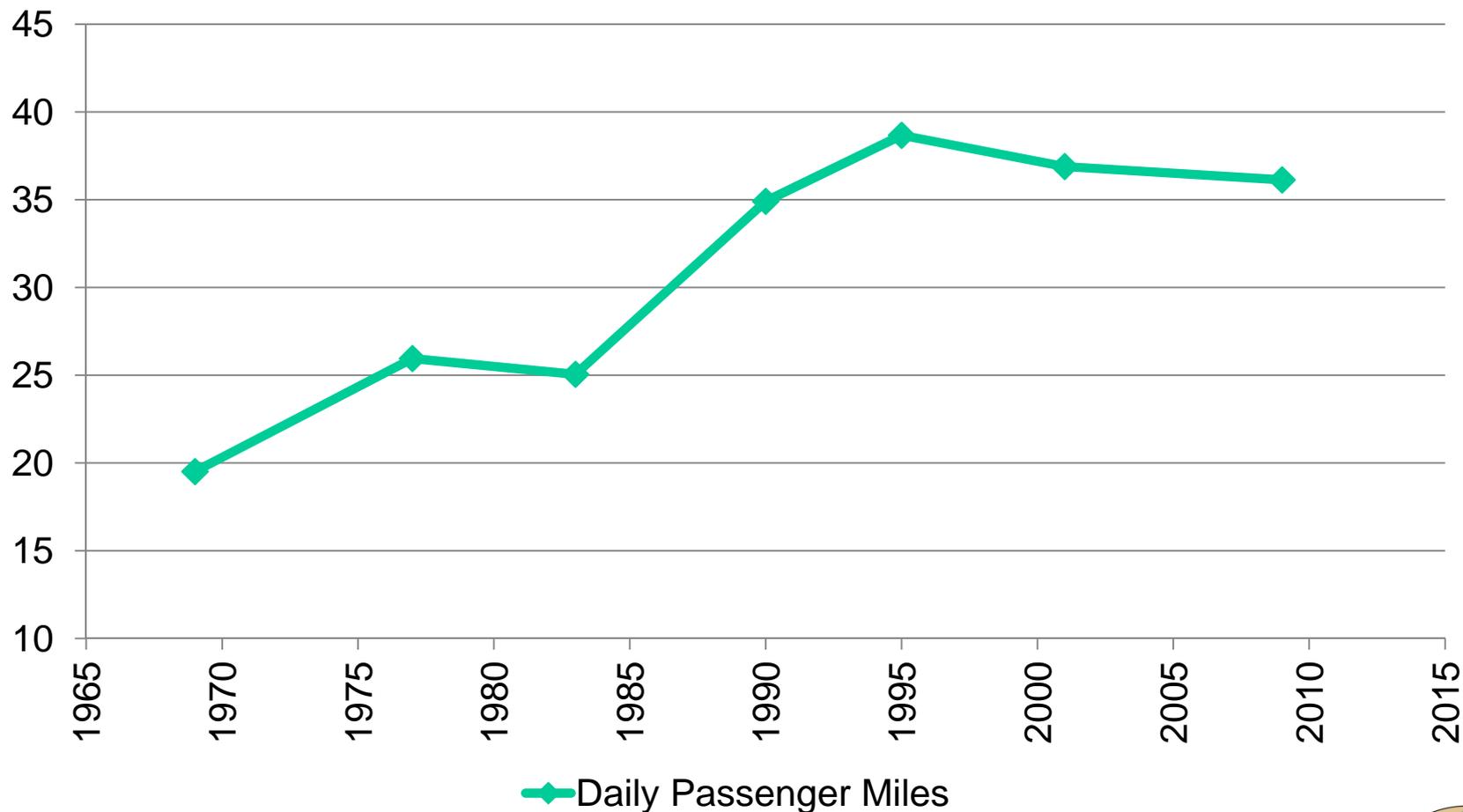
# Daily Trips per Person



Source: 2009 NHTS and Energy Commission analysis of CHTS



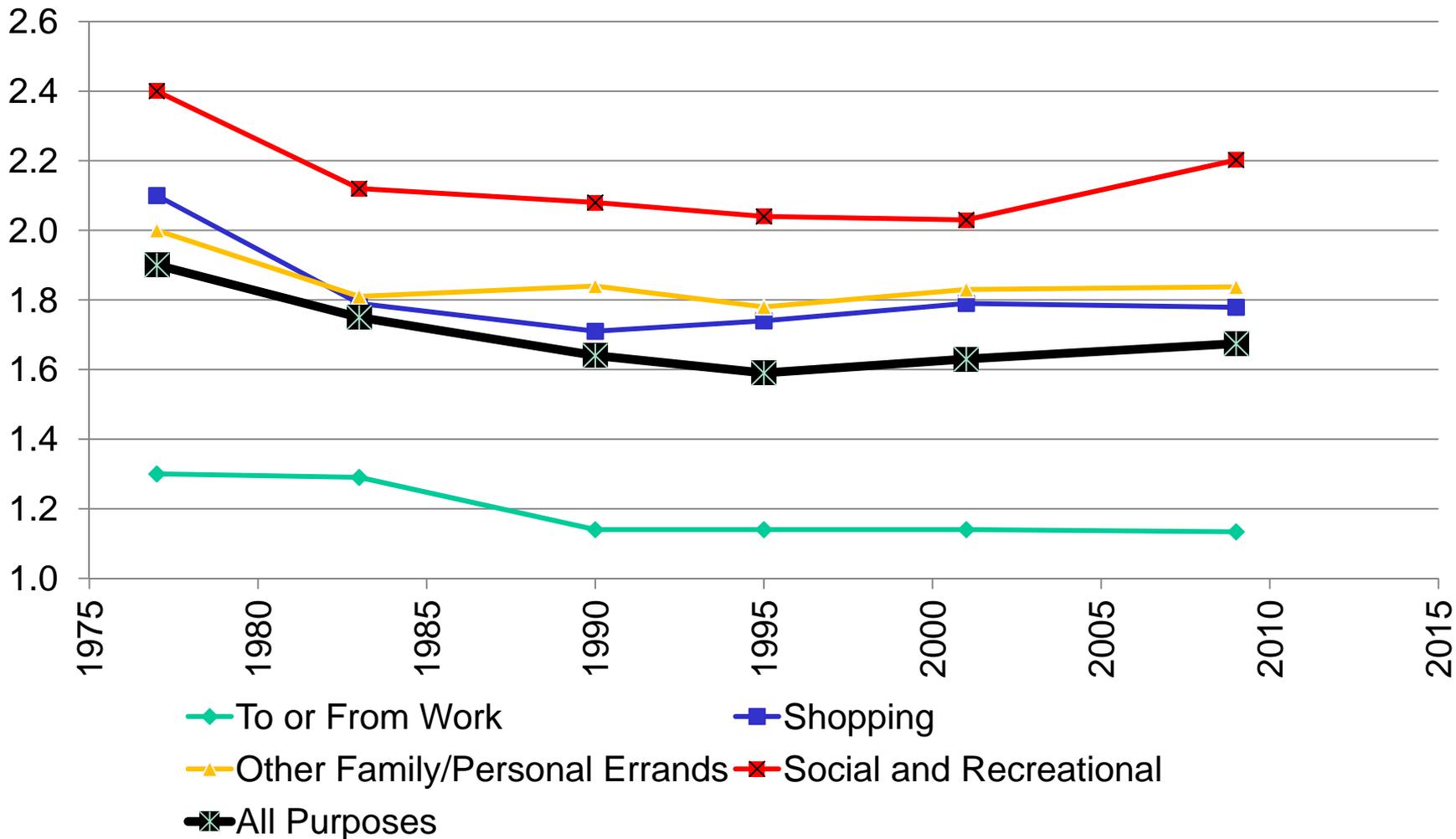
# Daily Miles per Person



Source: 2009 NHTS and Energy Commission analysis of CHTS



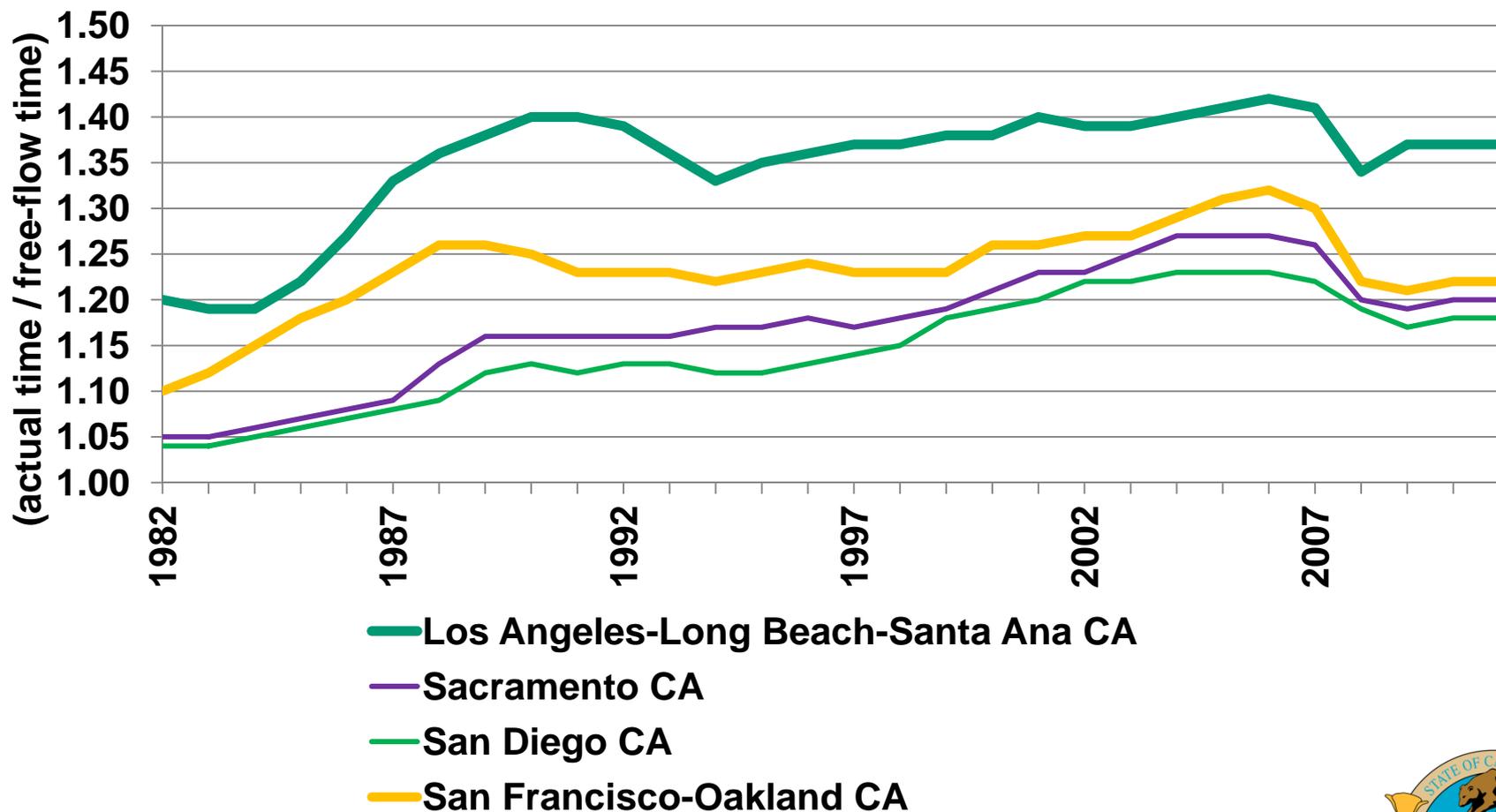
# Average Vehicle Occupancy



Source: 2009 National Household Travel Survey



# Traffic Congestion: Travel Time Index



Source: Texas Transportation Institute, 2012 Urban Mobility Report [<http://mobility.tamu.edu/ums/report/>]



# Use of Census Journey to Work

- Analyze count of **trips from residence to workplace** in the Census Journey to Work (JTW)
- Correlate CHTS **travel days with a work trip** to the JTW counts
- Apply this relationship to **all travel days** in CHTS to estimate **all trips**



# Reconcile Annual VMT with Daily VMT

- Analyze personal travel, goods movement, and truck services to identify Daily VMT
- Include additional Annual VMT from light-duty commercial model, and transit, demand response, school, charter, and interstate bus
- Compare Annual VMT with annual total of Daily VMT
- Adjust the least reliable component(s) of the Daily VMT estimate

