CAMBRIDGE SYSTEMATICS

Think Forward

Caltrans Statewide Models

presented to

SCAG Model Task Force

presented by

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Presentation Overview

- Statewide Modeling Overview
- California Statewide Travel Demand Model
- California Statewide Freight Forecasting Model
- Model Applications

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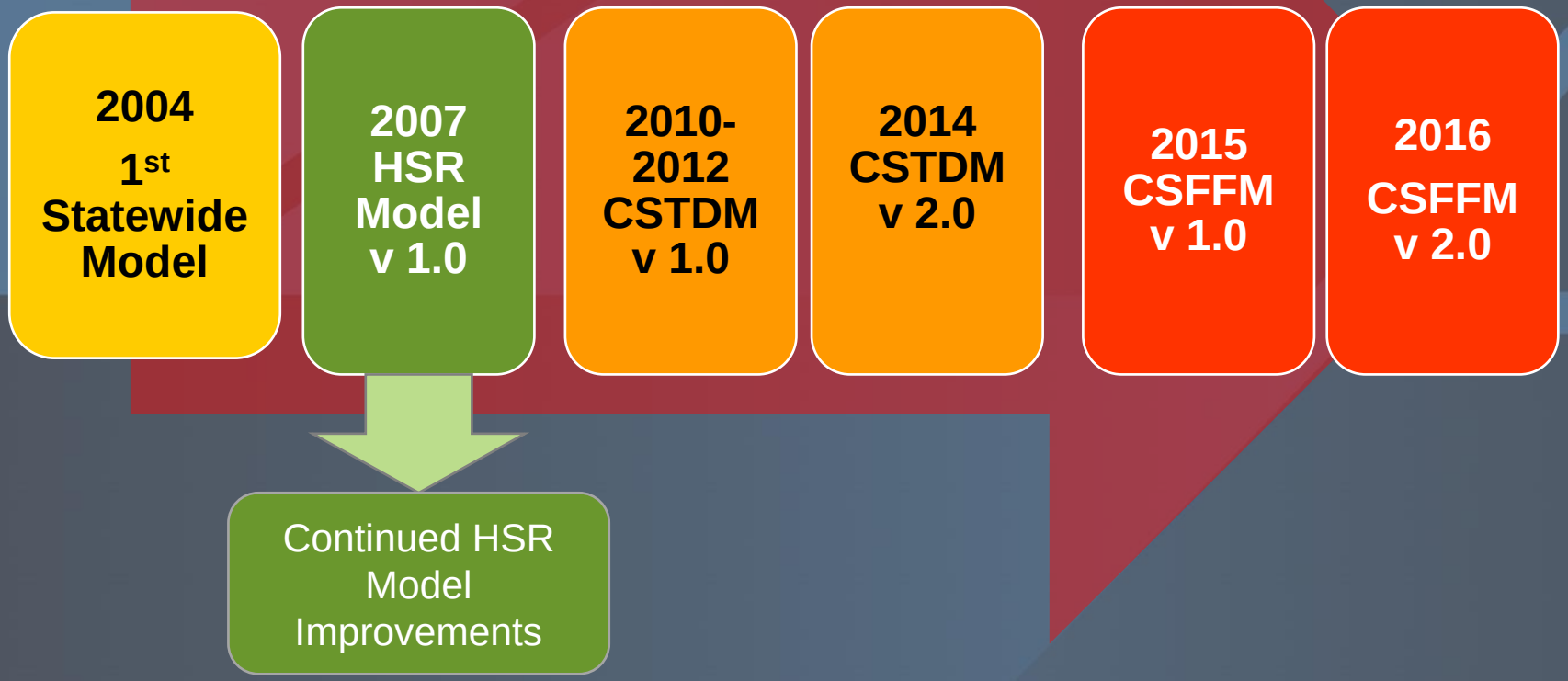
Right model for right job

Statewide Model	Regional Models	County Models	Local/City Models
CTP 2040	RTP/ SCS	County-wide Transport. Plan	General Plan
Inter-regional Travel	Regional Policy (i.e., managed lanes)	FTA New Starts	Local Traffic Impact Study

Statewide Modeling History



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- California Statewide Travel Demand Model
- California Statewide Freight Forecasting Model
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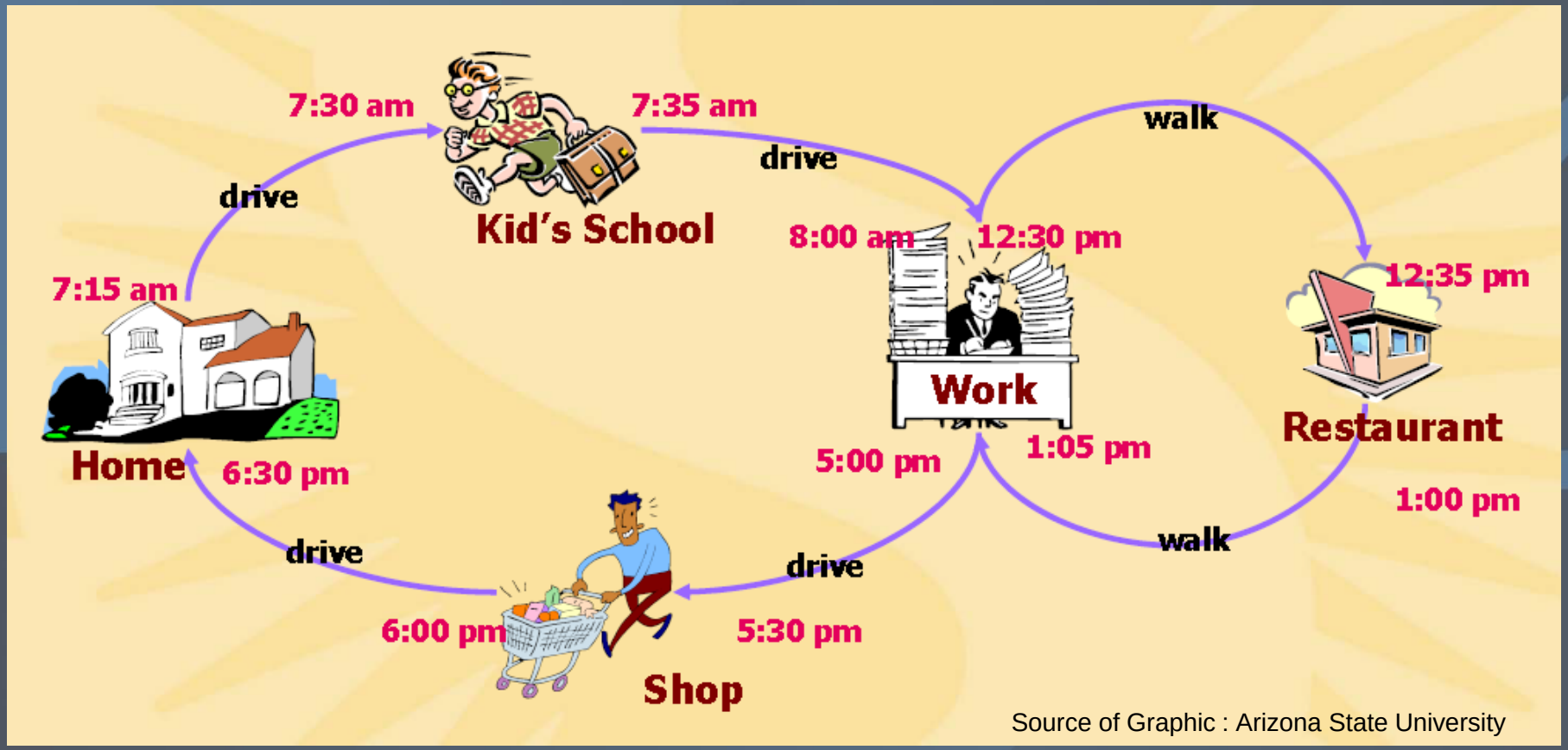
CSTDM Models and Modes

	Models				
Travel Modes	**Short Distance Personal**	**Long Distance Personal**	**Short Distance Truck**	**Long Distance Truck**	**External Travel**
Auto Single Occupant	√	√			√
Auto 2 persons	√	√			√
Auto 3+ persons	√	√			√
Transit (bus & urban rail)	√				
Bicycle	√				
Walk	√				
Air		√			
Intercity Rail		√			
Trucks (3 classes)			√	√	√

Tour-Based Models



Source of Graphic : Arizona State University

Trip based models treat each trip independently – no dependencies

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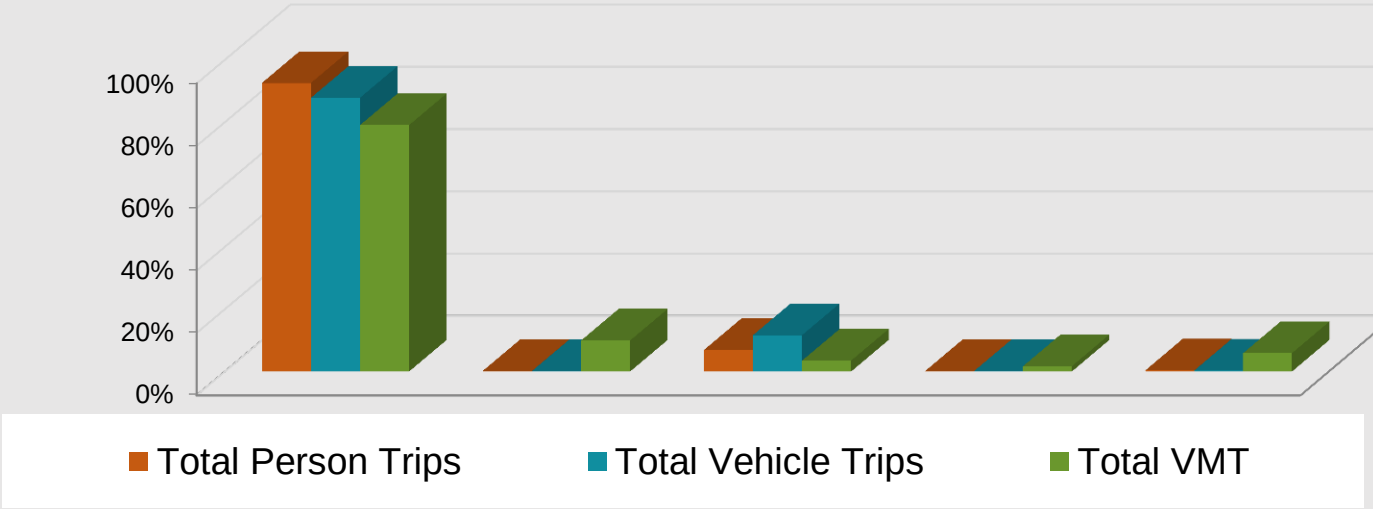
CHTS Data – Sampling Rates

County	Households	Weekday		Full		Percent Weekday
		Samples	Rate	Samples	Rate	
Alpine	497	9	1 in 55	21	1 in 24	43%
Del Norte	9,907	90	1 in 110	187	1 in 53	48%
Monterey	125,946	318	1 in 396	1,012	1 in 124	31%
Tulare	130,352	281	1 in 464	793	1 in 164	35%
San Mateo	257,837	581	1 in 444	1,129	1 in 228	51%
Stanislaus	165,180	192	1 in 860	541	1 in 305	35%
Los Angeles	3,239,571	3,301	1 in 981	8,102	1 in 400	41%
Sacramento	513,945	350	1 in 1,468	818	1 in 628	43%
San Diego	1,086,865	698	1 in 1,557	1,668	1 in 652	42%
Statewide	**12,575,860**	**17,445**	**1 in 721**	**41,958**	**1 in 300**	**42%**

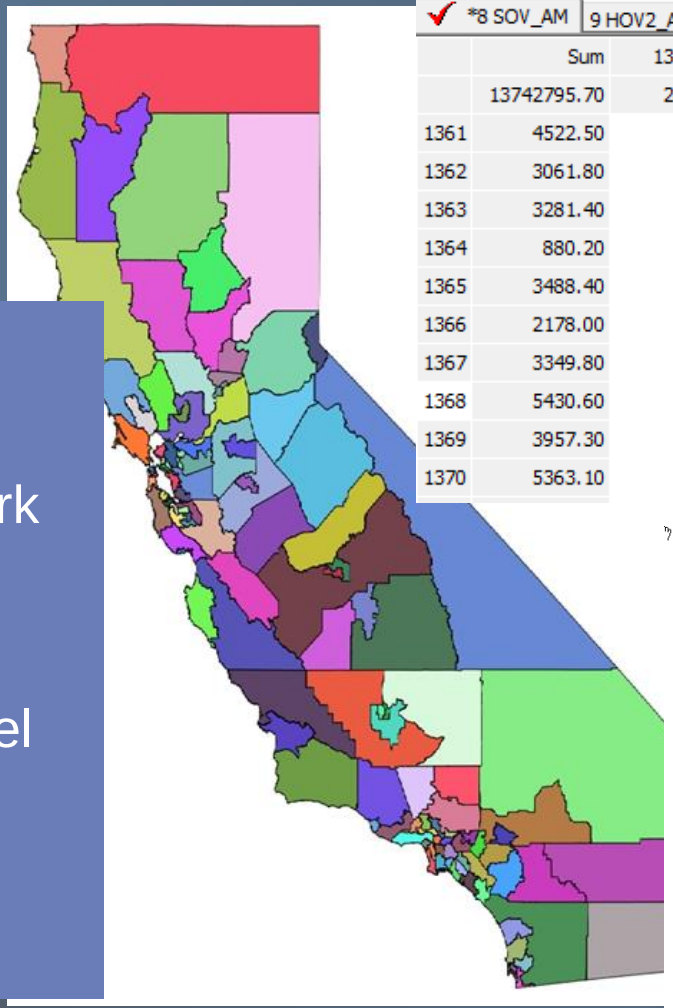
Statewide Travel components

	Personal		Truck		External	Total
	Short Dist	Long Dist	Short Dist	Long Dist		
Total Person Trips	93%	0.20%	7%	0.06%	0.34%	100%
Total Vehicle Trips	88%	0.15%	12%	0.11%	0.30%	100%
Total VMT (Auto/Truck)	79%	10%	3%	2%	6%	100%

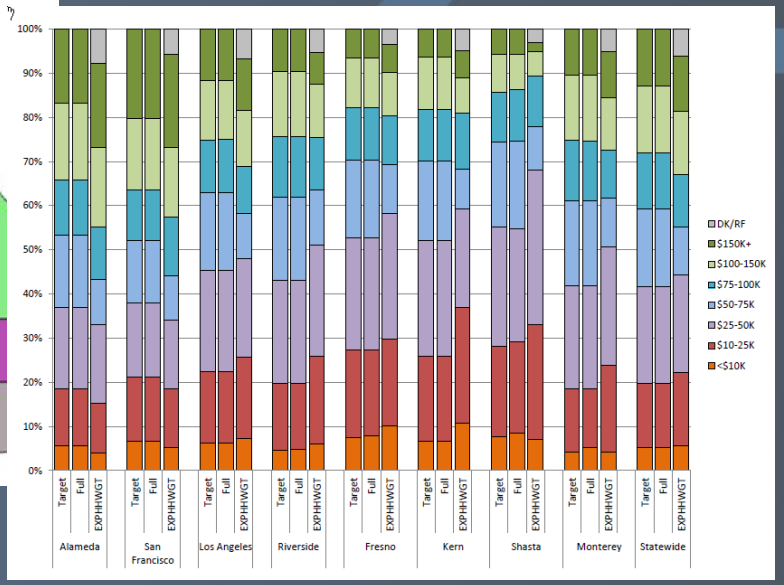


CSTDM System Outputs

- Trip lists
- Trip tables
- Loaded network
- Travel times and costs
- Summary travel statistics
- Maps
- Graphs



	Sum	1384	1385	1386	1387	1388	1389
	13742795.70	2886.30	3828.60	1909.80	1715.40	2838.60	2988.00
1361	4522.50	1.80	12.60	5.40	3.60	4.50	5.40
1362	3061.80	2.70	5.40	1.80	1.80	0.90	0.90
1363	3281.40	4.50	2.70	0.00	0.00	1.80	0.90
1364	880.20	0.00	0.00	0.00	0.00	0.00	0.90
1365	3488.40	1.80	1.80	2.70	1.80	0.00	1.80
1366	2178.00	9.90	7.20	4.50	3.60	3.60	11.70
1367	3349.80	36.90	28.80	17.10	5.40	32.40	47.70
1368	5430.60	49.50	35.10	27.90	12.60	26.10	82.80
1369	3957.30	16.20	15.30	8.10	4.50	9.90	19.80
1370	5363.10	13.50	11.70	12.60	5.40	10.80	13.50



- California Statewide Freight Forecasting Model
- Model Applications

CSFFM

- Commodity-based model
  - 15 commodity groups (2 digit SCTG codes)
- Same network as CSTDM in California
  - Freight network includes all of North America
- 97 Freight Analysis Zones
- 38 Import/export gateways
  - i.e., ports
- 26 transport logistics nodes (Transshipment nodes)
  - i.e., airports & rail nodes

CSFFM

- Serves as a stand-alone model for freight
  - Includes interstate and international goods movement
- Version 1.0 developed by UC Irvine
- Version 2.0 developed primarily by Fehr & Peers
  - To be completed within next two months
- Version 3.0 – After CA-VIUS has been completed
  - Will ultimately replace the CSTDM long distance truck model

What is CA-VIUS?

- Largest Survey of Trucks and Goods ever conducted in California
  - Includes a GPS O-D survey subset (5% of respondents)
- Replaces critical data from National VIUS for modeling and freight planning
  - Air quality/energy analysis
- Includes surveys of out-of-state trucks in CA
- Will be supplemented by other data sources
  - FAF4, GIS-based “big data”, CFS

CA-VIUS

Survey unit is trucks with GVW>8,500 pounds

All trucks (versus “freight trucks”) to be surveyed, consistent with National VIUS

Both CA-based and non-CA based trucks (“IRP Trucks”) to be included

ARB Weight Class	Examples
Light-Heavy-Duty	 
Medium-Heavy-Duty	 
	 
Heavy-Heavy-Duty	 

Advanced Truck Count Program

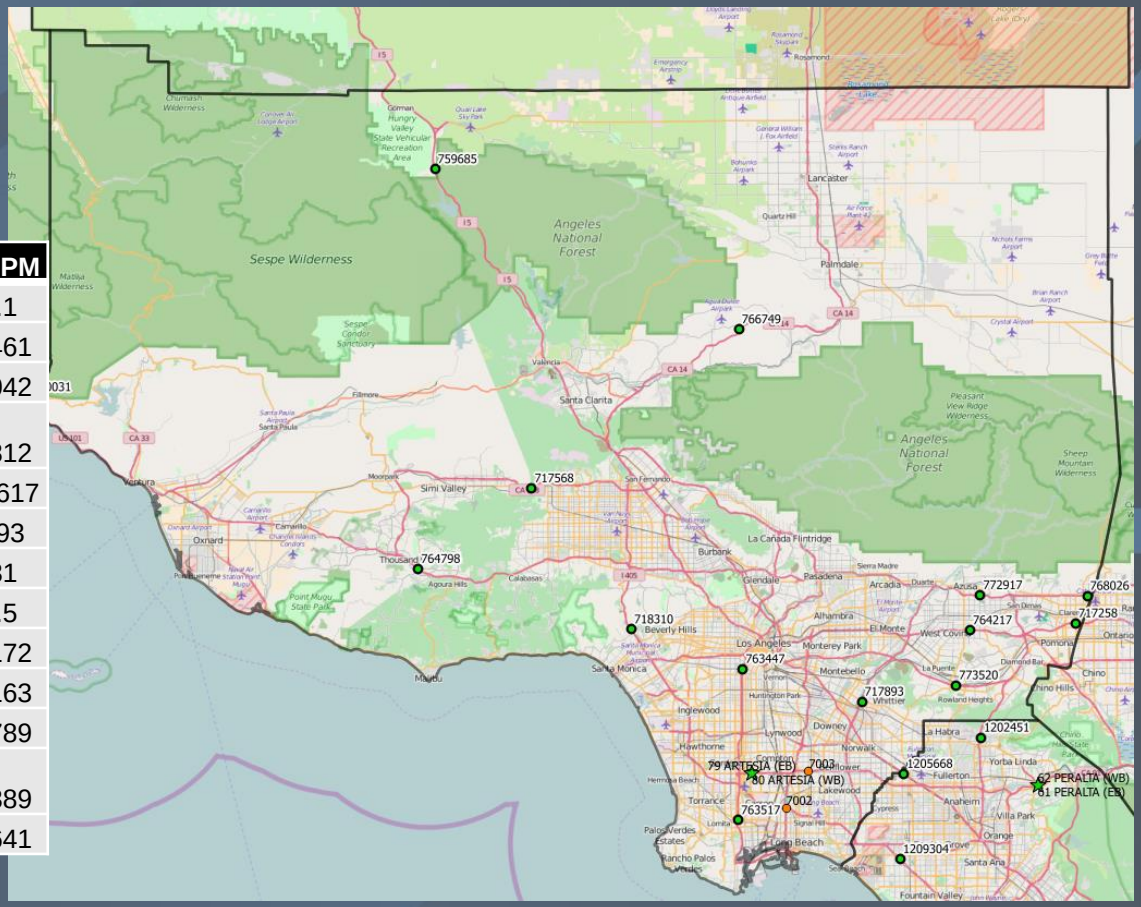
Caltrans District 7

Deployed ILD Sites (2)

Site ID	PEMS ID	Name	Route
7002	774444	SO OF 405	710
7003	717399	CHERRY	91

Proposed ILD Sites (13)

PEMS ID	Name	Route	CA PM	Abs PM
717258	INDIAN HILL	10	47.6	46.1
717568	ROCKY PEAK 2	118	32.53	33.461
717893	S OF WASHINGTON	605	11.99	14.042
718310	SUNSET WB / CHURCH	405	33.04	56.812
759685	SMOKEY BEAR RD	5	78.1	194.617
763447	EXPOSITION2	110	20	19.93
763517	SEPULVEDA 1	110	5.38	5.31
764217	HOLLENBECK	10	37	35.5
764798	WESTLAKE 2	101	0.65	40.172
766749	ESCONDIDO CYN RD	14	43	18.163
768026	E/O MILLS AV	210	51.5	51.789
772917	E/B 210-W/O BARRANCA	210	41.1	41.389
773520	E/O AZUSA 2	60	18.5	18.641



Proposed WIM Sites (2)

Site ID	Name	Route
79	Artesia (EB)	91
80	Artesia (WB)	91

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Model Applications

Model Applications

- CSTDM
  - California Transportation
  - California State Rail Plan
    - Ridership Forecast Support + Economic Analyses
  - Interregional Transportation Strategic Plan
  - SB 743 Case Studies
  - Documentation of II, IX, XI, XX travel for all MPOs
- CSFFM
  - State Rail Plan Economic Analyses

California Transportation Plan

CTP 2040 Mode Split Change for Scenario 2

	Final CTP Assumption	Evaluation Method: Source	Policy or Objective	Final CTP VMT Reduction (estimated)
Transit Service Improvements	Transit services & Speeds increased 50%, free fares, timed xfers	CSTDM	Policy	-6%
High Speed Rail	HSR fares reduced by 50%	CSTDM	Policy	
Bus Rapid Transit	Convert some Local Bus Routes to BRT	Off Model: TCRP 118, CSTDM Data	Policy	-0.07%
Expand Bike	Doubled bicycle shares	Off Model: CSTDM Data	Objective	-0.41%
Expand Walk	Double walk shares	Off Model: CSTDM Data	Objective	-0.43%
Carpool Occupancy	Change 2+ occupancy to 3+	CSTDM	Policy	-0.80%
HOV Lanes	Fill missing gaps (mixed flow → HOV)	Off-Model	Policy	TBD

Statewide Vision of Integrated Rail Network

2013 Rail Plan Vision

High Speed Rail Phasing

Services Planning Process

Value Added to 2017 Rail Plan

Refine Planned Services

Robust Benefits Analysis

Actionable & Aspirational

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CSTDM XX Growth: 2010 - 2040

Fastest Growth							
MPO	**VMT**	**MPO**	**VMT**	**MPO**	**Trips**	**MPO**	**Trips**
SCAG	4,310	BCAG	221%	SJCOG	46,878	BCAG	240%
KCOG	1,893	MCTC	78%	MCAG	41,189	MCTC	78%
SACOG	1,772	SACOG	74%	SACOG/ TRPA	37,813	SACOG/ TRPA	77%
FCOG	1,541	SCAG	71%	StanCOG	33,322	AMBAG	67%
State Total	**17,450**	**State Avg**	**56%**	**State Total**	**369,840**	**State Avg**	**58%**
Slowest Growth							
MPO	**VMT**	**MPO**	**VMT**	**MPO**	**Trips**	**MPO**	**Trips**
AMBAG	325	FCOG	45%	SRTA	7,202	FCOG	48%
BCAG	299	SJCOG	44%	BCAG	6,428	SJCOG	47%
SLOCOG	224	KCOG	39%	SLOCOG	3,435	KCOG	38%
SBCAG	162	SBCAG	26%	SBCAG	2,249	SBCAG	28%