California

STATEWIDE TRANSIT STRATEGIC PLAN

BASELINES REPORT

2016-2017

Authors

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Statewide Transit Strategic Plan

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INTRODUCTION

Introduction to the Statewide Transit Strategic Plan

Introduction to the Statewide Transit Strategic Plan

The UCLA Institute of Transportation Studies is working with the Caltrans Division of Rail and Mass Transportation to create the 2017 California Statewide Transit Strategic Plan, recognized as one of seven statewide modal plans under the umbrella of the California Transportation Plan 2040. Researchers at the UCLA Institute of Transportation Studies previously worked with the Division to prepare the 2012 Statewide Transit Strategic Plan.[1]

This report is a follow-up to the 2011 report, *Baselines: Current and Future Transit Trends*[2] prepared by researchers at UC Berkeley under contract with Caltrans. The 2017 Baselines Report is a broad-based, descriptive profile of transit's goals, funding, operations, use, and trends in California intended to establish a common set of facts for the Statewide Transit Strategic Plan Project Advisory Committee, a group of transportation professionals from State, local, and regional transit agencies and organizations. This report will inform phases 2 and 3 of the Statewide Transit Strategic Plan project.

Phase 1: This Baselines Report: A broad, descriptive profile of transit in California.

Phase 2: Stakeholder Engagement: Insights from interviews and workshops with the Project Advisory Committee and other stakeholders.

Phase 3: Strategic Transit Plan: Recommendations to meet the state's goals and objectives for transit.

What is Statewide Strategic Transit Planning?

With the 2017 Statewide Transit Strategic Plan Project, the UCLA Institute of Transportation Studies team asks the core question: How can California achieve its transit-related goals?

In a departure from the 2012 Statewide Transit Strategic Plan, which made recommendations to the then Caltrans Division of Mass Transportation, the 2017 Plan will take a pan-governmental perspective that makes recommendations not only for local transit agencies and Caltrans but also other state departments and the Legislature.

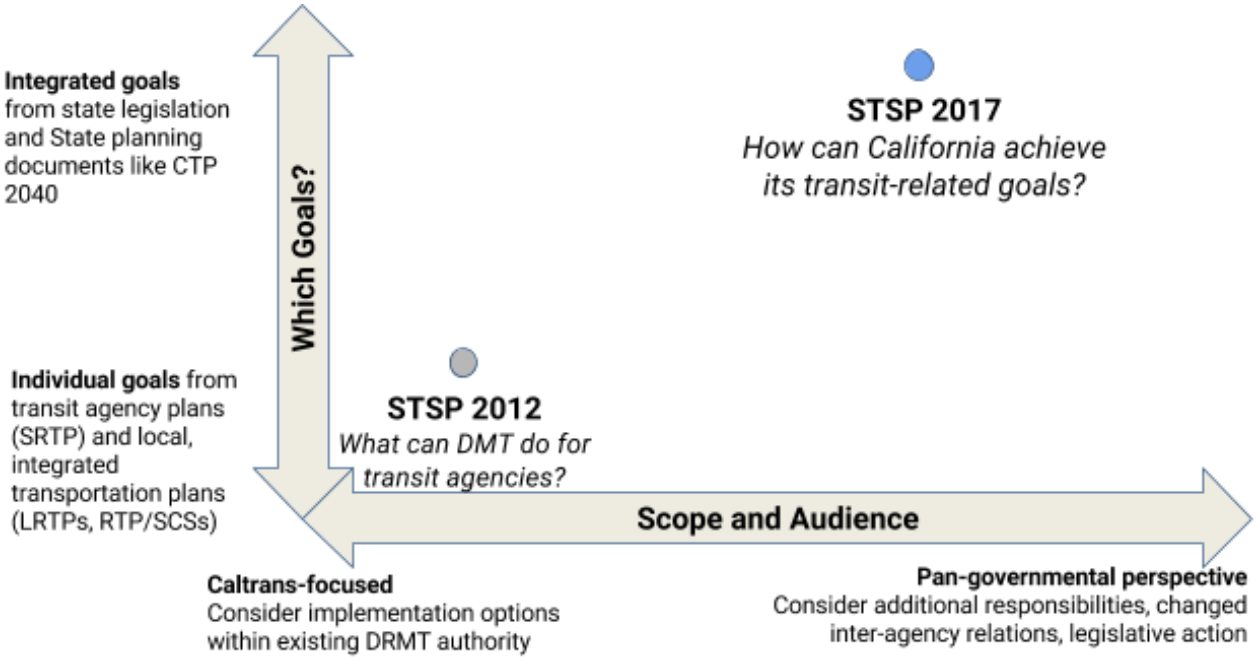
The Statewide Transit Strategic Plan will inherit state-level transit-relevant goals, policies, strategies, modeling assumptions, implementation measures from recent legislation, the

[1] Matute, Juan M., Brian D. Taylor, Allison C. Yoh, Shira Bergstein, Julia Campbell, Melanie Curry, and Carter Rubin. (2012). *Statewide Transit Strategic Plan: Recommendations for Caltrans*. UCLA Institute of Transportation Studies. Available at www.dot.ca.gov/hq/MassTrans/STSP/STSPrecommendations.pdf

[2] Available at http://www.dot.ca.gov/hq/MassTrans/STSP/Baselines_rpt_11-08-11.doc

Governor's Office, the California Transportation Plan 2040, and the Caltrans Strategic Management Plan.

Figure 1: 2017 Statewide Transit Strategic Plan Project Approach



Making pan-governmental recommendations in support of achieving the state's transit-related goals requires research into the common issues facing local transit agencies and statewide mobility. Understanding the combined effect of 1) trends internal to transit and transportation planning, 2) the state's changing housing, mobility, and employment landscapes, 3) the state's bold climate change goals and their implications for transportation, 4) volatile transit funding programs, 5) unprecedented uncertainty about the federal role in transit; and 6) further advances in information and transportation technology is essential to strategic transit planning.

Since the 2011 STSP Baselines Report, the level of transit service provided in the state has recovered to pre-recession levels. However, per-capita transit ridership is trending downward and agencies provided fewer passenger trips in 2015 than in the prior year. A trend of increasing trip lengths fuels the continued growth in annual transit passenger miles traveled.

Strategic transit planning provides an opportunity to reflect on statewide funding programs and formulas without the immediacy that attends a budget or bill negotiation. While the State's Local Transportation Fund program has provided relatively stable and predictable funding for transit, other state programs have been more volatile. The prospect of decreasing federal support for public transit introduces a new variable into the effort to adequately fund transit and meet related statewide goals.

Statewide strategic planning provides an opportunity to consider state support for the adoption of transit technology and data standards. While information and communications technology has advanced more rapidly than transportation technology, these advances bring novel tools and applications to public transit. In the past ten years, passenger access to network and schedule information systems has made service more legible for those with access to computers or mobile devices. Real-time arrival information has made out-of-vehicle waits less burdensome. However, California's diverse transit agencies have not adopted technology and data standards that enable these advancements at the same rate. And a rapid pace of technological change will bring additional challenges and opportunities, particularly with enhanced automation and connectivity on the horizon for both passenger and transit vehicles.

Many of the trends affecting transit are caused by factors that are external to transit and transportation planning. One dominant trend is increasing housing prices in the state's urban centers, especially the large coastal regions that have the greatest share of transit trips. Another is market-driven changes to the mobility landscape, including the emergence of Transportation Network Companies, which can replace, integrate or compete with traditional public transit.

What Statewide Transit Strategic Planning is Not

Statewide strategic planning requires aggregate analysis in support of aggregate outcomes. Statewide strategic transit planning does not evaluate individual agency details unless examples are scalable or transferable. Statewide strategic planning excludes zero-sum political strategies or other actions which may help individual agencies obtain a larger share of fixed formula or discretionary funding. Topics like individual agency service and capital planning also fall outside the scope of strategic planning for statewide transit.

Guide and Outline for this Baseline Conditions Report

This baselines report is a snapshot of the current state of California public transit. As such, it focuses on factors and trends internal to transit and transportation planning. Additional research into internal and external factors and trends will inform the development of recommendations for the Statewide Transit Strategic Plan (Phase 3).

Each chapter in this report is designed to stand alone. The report can be read sequentially, from front to back or serve as an encyclopedic reference for readers interested in a specific chapter or section. An overview of each chapter follows.

Chapter 1: A Portrait of California Public Transit Agencies

Public transit is a decidedly local public service: the vast majority of public transit trips are local and service is provided by transit operators administered locally or regionally. However, the vast array of transit routes, services, and operators combine to form a critical element of the state transportation system. These local systems are influenced and largely funded by the state and federal governments. Because California has been a leader for decades in promoting high-quality local public transit in the service of state goals and priorities, and because California continues to have bold goals for how transit will reshape the state's mobility and built environment, statewide strategic transit planning is of paramount importance.

Chapter 2: State and Federal Policies Impacting Strategic Transit Planning

While transit is decidedly a local enterprise, local planning and managerial decisions are shaped by state and federal policies, plans, and funding programs. These policies and plans, collectively, form the basis for a statewide strategy for transit. At least two dozen state laws and propositions from the past five decades have had major implications for transit. The California Transportation Plan 2040 and the Caltrans Strategic Management: Plan 2015-2020 each prescribe goals, objectives, and implementation measures that impact transit in California. The Statewide Transit Strategic Plan will inherit these objectives and measures.

Chapter 3: Local Planning for the Future of California Public Transit

The goals in local and regional transportation plans are informative for understanding where alignment with state goals is present and where further coordination may still be needed. The goals and objectives in a total of 85 such plans were compared with those presented in the California Transportation Plan 2040 and other planning documents.

The state's goals for transportation are generally more prevalent in the plans of the largest agencies[3] operating bus and rail or rail only than in smaller and bus-only agencies; they are similarly more prevalent in the plans of northern California agencies. Table 1 below presents a summary of all findings. Note that only 44% of all plans and 54% of the Short Range Transit Plans (SRTPs) have adopted a goal to increase transit ridership.

Table 1: State Goal Prevalence by Local Plan Type

	Total (all studied plans)	**RTP/ SCS**	**LRTP**	**SRTP**	**Coordinated Plan**
Number of Plans	85	18	8	46	13
Safety	72%	94%	75%	78%	15%
Service efficiency (costs)	65%	61%	75%	67%	54%
Service effectiveness (ridership, given costs)	58%	50%	38%	72%	31%
Environmental sustainability	55%	94%	63%	52%	8%
Improving transportation choices	51%	94%	63%	33%	46%
Interagency coordination	49%	72%	13%	43%	77%
State of good repair	48%	61%	50%	50%	23%
Social service for disabled	48%	50%	13%	39%	85%

[3] Those with over 500 transit vehicles

Social service for low-income	46%	78%	13%	28%	85%
Increasing transit ridership	44%	28%	63%	54%	15%
Affordable mobility	41%	56%	25%	28%	77%
Land use integration	36%	78%	63%	24%	23%
Congestion reduction	32%	61%	63%	20%	0%
Social equity	28%	78%	13%	15%	15%
Environmental justice	20%	44%	13%	15%	8%

Chapter 4: Use of the California Transit System

In 2015, 42.2 million hours of public transit service were provisioned in California, 1.4 billion passenger trips were taken, and 8.5 billion passenger miles were traveled. While these numbers are big, so is California. These 1.4 billion public transit trips account for only 4.1% of all of the person trips made in the state,[4] and the 42.2 million hours of transit service are lower than several other states' on a per capita basis.

Over the 10-year period from 2005 to 2015, per capita provision of transit service has remained steady, as increases in vehicle revenue hours have (barely) matched statewide population growth. During this period, the number of passenger trips taken each year has remained steady, meaning that per capita trip-taking has fallen, as has the number of trips taken per service hour provisioned.

California has set a target of doubling transit's statewide mode share by 2020 with additional future increases to meet the state's greenhouse gas reduction targets. Meeting these targets will require a clear understanding of the factors influencing transit patronage trends, which this chapter aims to provide.

Chapter 5: Revenues for Transit

California's transit agencies obtain revenue from a diverse set of sources. In addition to directly-generated revenue from fares and, to a much lesser extent, advertising, transit agencies

[4] Caltrans. (2012). California Household Travel Survey (CHTS).

receive revenue from stable federal programs, variable state programs, and growing local sources.

Locally-generated revenues, primarily in the form of local option sales taxes, have been the dominant source of new revenues for transit in the past decade. While local sales taxes require a two-thirds majority to pass in California, 6 of 13 county sales tax measures for transportation passed in the November 2016 election.

In spite of rising local revenues, transit in California has a significant unmet funding need to keep the system in a state of good repair. Expanding the system and intensifying transit service will require new or expanded sources of funding.

Chapter 6: Cost-Effectiveness of Transit Service

Public transit in California is funded by the income and revenue sources outlined in Chapter 5. Stretching this income and these subsidies as far as possible requires cost-effective service. Overall, after adjusting for inflation, the cost of providing an hour of transit vehicle service in California is holding steady. However, the recent decline in ridership has led to a slight increase in cost per transit trip. Demand response paratransit service is a notable exception to the trend of steady costs. The inflation-adjusted cost of providing a demand response trip has doubled since 1991.

Chapter 7: Private Provision of Shared Transportation Services in California

In the past decade, California has seen new private entrants to the market for shared transportation services. These include new operators in the inter-city bus market, privately-operated employer-arranged shared commuter transportation, and Transportation Network Companies (TNCs). The most impactful have been the TNCs, which act as both an alternative and complement to traditional public transit.

The continued expansion of the private sector's role in providing shared transportation services will have a profound effect on traditional public transit. The next two phases of the Statewide Transit Strategic Plan project will consider these potential impacts and a statewide strategic response.

Chapter 8: The Future of Transit Performance Metrics

Data to describe transit networks, trips, and schedules, originally intended for passenger route planning and real-time arrivals notification, are an emerging source of data for analyzing current

service data for dozens of agencies. This chapter presents a proof-of-concept analysis on the use of General Transit Feed Specification (GTFS) and GTFS-Real Time data for automated analysis of interagency stop optimization and multi-agency corridor frequencies. These data sources can be used for robust analysis of performance metrics contained in the California Transportation Plan 2040.

Chapter 9: Conclusions

Although recommendations to the state and transit agencies are reserved for the December 2017 Statewide Transit Strategic Plan, based on the information and data contained in this Baselines Report, the research team can derive some conclusions. These conclusions are presented in four sections below: Ridership, Planning, Revenues and Cost-Effectiveness, and Emerging and Future Issues.

1

CHAPTER

A Portrait of California Public Transit Agencies

Chapter 1: A Portrait of California Public Transit Agencies

Public transit is a decidedly local affair. At least 269 local agencies[1] provide publicly-funded transportation services in the state, ranging from single demand response vehicles operating on rural tribal reservations to large urban operators whose service sees over one million boardings per day. Despite the large number of transit agencies in the state, the top 8% carry 90% of transit passengers in the state.

These agencies have close relationships with their respective Metropolitan Planning Organization (MPO) and/or Regional Transportation Planning Agency (RTPA), which coordinate planning and state and federal funding. This relationship is further described in Chapter 3.

Table 1-1 (below) lists the number of agencies in each MPO, as counted by the Federal Transit Administration's National Transit Database (NTD) and California's State Controller's Office (SCO), which tracks California agencies more closely. Transit agencies which receive federal funding report to the National Transit Database. Those which receive or may be eligible for state funding report to the State Controller's Office.

Table 1-1: Transit Agencies by Area

MPO Name	Abbrev.	NTD Reporters in UZAs[2]	SCO Reporters
Association of Monterey Bay Area Governments	AMBAG	2	7
Butte County Association of Governments	BCAG	1	3
Fresno Council of Governments	FCOG	1	6
Kern Council of Governments	KCOG	2	13

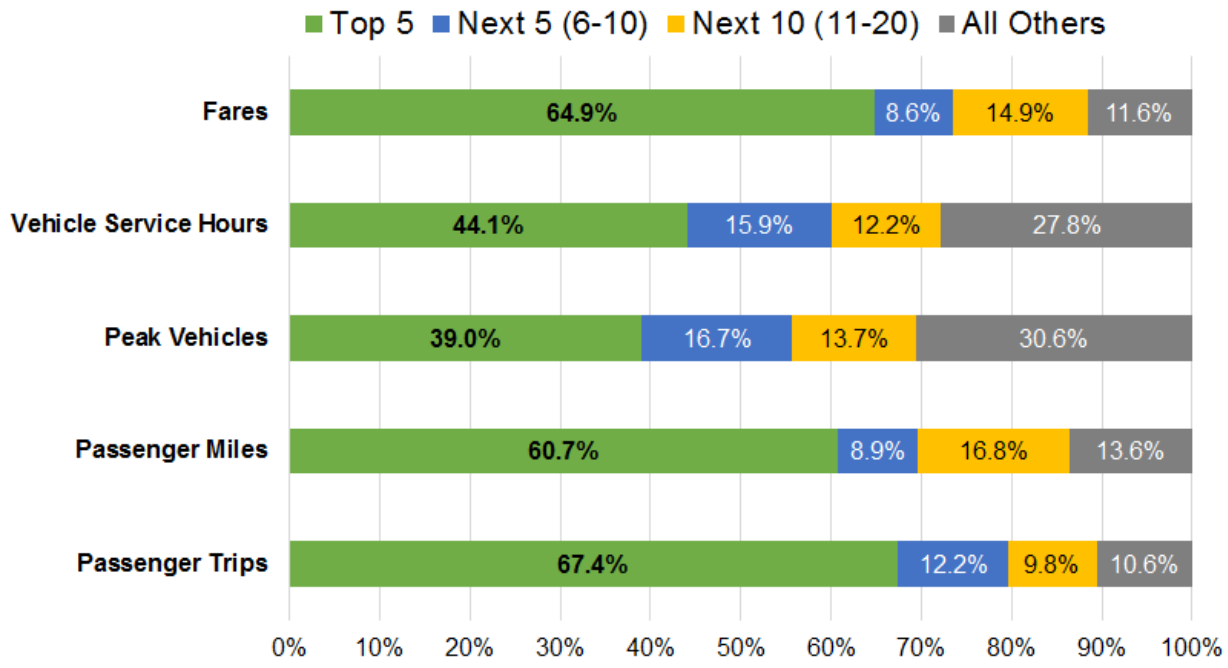
[1] In 2015, 165 California entities reported information to the NTD and 269 reported to the SCO. This Statewide Transit Strategic Plan Baselines Report excludes inter-regional rail service provided by Amtrak California, including local or regional trips made on such services. This service is operated by Caltrans and planned for as part of the State Rail Plan.

[2] UZA: US DOT's term for Urbanized Area, defined as a "Census-designated area with 50,000 residents or more" and synonymous with the Census Bureau's Urbanized Area term. Source: https://www.fhwa.dot.gov/planning/census_issues/urbanized_areas_and_mpo_tma/faq/page01.cfm#Urbanized_Area_UZA

Kings County Association of Governments	KCAG	2	3
Madera County Transportation Commission	MCTC	1	2
Merced County Association of Governments	MCAG	1	3
Metropolitan Transportation Commission	MTC	21	52
Sacramento Area Council of Governments	SACOG	12	18
San Diego Association of Governments	SANDAG	4	6
San Joaquin Council of Governments	SJCOG	5	6
San Luis Obispo Council of Governments	SLOCOG	3	9
Santa Barbara County Association of Governments	SBCAG	4	12
Shasta Regional Transportation Agency	SRTA	1	3
Southern California Association of Governments	SCAG	36	74
Stanislaus Council of Governments	StanCOG	4	4
Tulare County Association of Governments	TCAG	3	7
(Agencies in RTPAs but not in MPOS)		64	41
Total		**165**	**269**

While there are many transit agencies, a mere handful of top agencies operate most of the service and carry most of the passengers in the state. The top 5 agencies carry 67.4% of all trips and 60.74% of all passenger miles for 64.9% of all fares using 44.1% of vehicle service hours and 39.0% of all vehicles. As shown in Figure 1-1, the top 20 carry roughly nine-tenths of all trips in the state.

Figure 1-1: Key California Transit Metrics by Large Agency Grouping



The five largest agencies in the state provide rail and, with the exception of BART, bus service. They serve urban centers in Los Angeles, the San Francisco Bay Area, and San Diego. Table 1-2 (below) presents key service data and agency information on the top 20 transit operators in California.

Table 1-2: Top 20 Transit Operators in California, 2015[3],[4]

Agency Name	Type[5]	Modes Operated[6]	Unlinked Passenger Trips (1000s)	Passenger Miles Traveled (1000s)	Peak Service Vehicles	Vehicle Revenue Hours (1000s)	Fares (Millions)
Los Angeles Metro (LACMTA)	Ind.	HR, LR, MB, RB, VP	457,356	2,253,460	3,516	8,709	$368.3
San Francisco Muni	Muni	CC, DR, DT, LR, MB, SR, TB	220,119	464,626	1,524	3,459	$214.6
San Francisco BART	Ind.	HR	134,660	1,791,366	534	1,905	$459.9
San Diego MTS	Ind.	CB, DR, LR, MB	94,920	436,511	732	2,414	$97.6
AC Transit	Ind.	CB, DR, MB	56,021	222,448	667	2,114	$69.9
Orange County TA	Ind.	CB, DR, DT, MB, VP	50,023	235,698	1,528	2,581	$59.8
Santa Clara VTA	Ind.	DR, LR, MB	45,103	244,554	679	1,822	$42.3
Long Beach Transit	Muni	DT, MB	28,117	89,351	202	712	$17.3
Sacramento RT	Ind.	LR, MB	25,768	120,191	222	772	$29.5
Los Angeles DOT	Muni	CB, DR, DT, MB	23,895	58,622	369	796	$12.2
Peninsula Corridor JPB (Caltrain)	Ind.	CR	19,787	477,928	134	246	$83.3
Santa Monica's Big Blue Bus	Muni	DR, MB	18,774	76,121	163	510	$13.3
Foothill Transit	Ind.	MB	14,597	102,275	278	760	$18.8

[3]Ranked by Passenger Trips
[4]Ranked by Passenger Trips
[5] Ind. = Independent; Muni = Municipal. Please see the following “Agency Governance” section for a description of agency type significance.
[6]See Table 1-3

Omnitrans	Ind.	DR, MB	14,391	72,846	248	822	$15.1
SCRRA (Metrolink)	Ind.	CR	13,975	406,646	192	340	$83.1
San Mateo County TD (SamTrans)	Ind.	DR, DT, MB	13,796	63,247	363	702	$18.8
North County TD	Ind.	CR, DR, MB, YR	12,640	111,426	230	650	$19.4
Fresno Area Express	Muni	DR, MB	11,494	30,582	130	429	$8.8
Riverside Transit Agency	Ind.	CB, DR, DT, MB	9,652	69,093	260	734	$11.2
Anaheim Transportation Network	Ind. Non-profit	MB	8,915	17,661	63	235	$6.1

Source: National Transit Database 2015

Modes of Transit in California

In this report, mode-specific data is grouped based on potential mobility applications rather than the specific technology or vehicle type used. Table 1-3 below characterizes each of these modes and their counterpart in the Federal Transit Administration's National Transit Database, the source of most data for this Baselines Report.

Table 1-3: Transit Modes Operated in California

STSP Application-Based Mode	Technology-Based Mode(s) (NTD)	Mode Description
Local Bus	TB=Trolleybus MB=Motorbus	Local buses are the most common mode of transit service in California. Vehicles make frequent stops along fixed routes. Local buses in California are no more than 60 feet long and have limited passenger capacity. Trolleybuses (TB) are electric, powered by overhead wires, but serve similar applications.

Urban Rail	LR=Light Rail HR=Heavy Rail	Urban rail can move large numbers of people with trains of multiple rail cars and a single operator. Heavy rail is entirely grade separated while light rail can operate on streets in mixed traffic or cross intersections. Limited stops and the ability to avoid congestion means that urban rail averages faster speeds than local buses.
Bus Rapid Transit	RB=Rapid Bus	Bus Rapid Transit is a cost-effective option to mimic the stop spacing and congestion avoidance attributes of urban rail for routes that do not need vehicles over 60 feet to serve expected ridership. While many agencies have “rapid” bus service, the National Transit Database only includes routes with a dedicated right-of-way.
Commuter Rail	CR=Commuter Rail	Commuter rail offers high-capacity peak period transit service along fixed routes. Stops are spaced further apart than with urban rail, and the result is higher average speeds. Commuter rail services may offer additional amenities like stuffed seating or wifi.
Commuter Bus	CB=Commuter Bus	Typically linking suburbs with urban employment districts, commuter buses serve a few stops at the ends of a route without any stops for several miles in the middle. Commuter buses have a high peak-to-base ratio, meaning that at least 2 times as many vehicles operate during commute hours versus mid-day. High peak-to-base ratios can increase costs.
Ferry	FB=Ferry Boat	Ferries serve commuter markets with navigable waters and port facilities between employment and residential clusters. Publicly-subsidized ferryboat services only operate in the Bay Area.
Vanpool	VP=Vanpool	Vanpools are vehicles with fewer than 14 passengers used primarily for commuting trips. They offer long-distance services at a low cost, as the vehicles are typical commercial passenger vehicles and the operator is not an employee and typically volunteers their time. Additionally, vanpools can attract substantial federal subsidies.
Demand Response	DR= Demand Response	Demand Response is most typically flexible paratransit service that offers federally-mandated “origin to

	(agency-operated) DT= Demand Response Taxi	destination" services for those physically incapable of using fixed route transit.
Other Rail	CC= Cable Car SR= Streetcar MG= Monorail or Automated Guideway YR= Hybrid Rail	Rail that serves more niche applications than urban rail. In California, these are streetcars (San Francisco with growing interest from other cities), cable cars (San Francisco), automated guideway (Oakland Airport), and Hybrid Rail (North County San Diego Sprinter). Typically these vehicles have lower passenger capacity than urban rail or commuter rail.

In this Baselines Report, agencies are frequently grouped by MPO and segment to identify trends that correlate with geography or the size and scope of an agency. Table 1-4 (below) lists agencies according to their segmentation by modes of service and number of vehicles.

Table 1-4: Segmentation of Transit Agencies by Modes of Service and Number of Vehicles

Vehicles [7]	Rail Only	Bus & Rail	Bus Only	Specialized
500+	San Francisco BART	LA Metro, San Francisco Muni, San Diego MTS, Santa Clara VTA	Orange County Transportation Authority, Alameda-Contra Costa Transit District	Access Services, San Diego Association of Governments, California Vanpool Authority
101 - 499	Metrolink, Caltrain	Sacramento Regional Transit District, North County Transit District	LACMTA - Small Operators, San Mateo County TD, Los Angeles DOT, Foothill Transit, Omnitrans, Riverside TA, Victor Valley TA, Long Beach Transit, Santa Monica's Big Blue Bus, Golden Gate Bridge Highway and Transportation District, Central Contra Costa TA, Fresno Area Express, Monterey-Salinas Transit, Santa Cruz MTD, San Joaquin	Victor Valley Transit Authority, Paratransit, Inc

[7] Rail fleets are reported to the NTD by railcar, not by multi-car train consist

			RTD, Santa Clarita Transit, Golden Empire TD, Livermore / Amador Valley TA, Santa Barbara MTD	
< 100	Altamont Corridor Express		**See list below**	Ventura Intercity Service TA, Riverside Special Transportation, Easy Lift Transportation, City of Arcadia Transit, San Francisco Bay Area Water Emergency TA, Camarillo Area Transit, La Mirada Transit, Davis Community Transit

Bus Agencies Under 100 Vehicles

Anaheim Transportation Network / Resort Transportation
Antelope Valley Transit Authority
Butte County Association of Governments
Chula Vista Transit
City of Atascadero
City of Commerce Municipal Buslines
City of Corona
City of Delano
City of Elk Grove
City of Fairfield - Fairfield and Suisun Transit
City of Folsom
City of Gardena Transportation Department
City of Irvine
City of Lincoln
City of Lodi - Transit Division
City of Lompoc - Lompoc Transit
City of Madera
City of Manteca
City of Petaluma
City of Porterville
City of Redondo Beach - Beach Cities Transit
City of San Luis Obispo
City of Santa Rosa
City of Tracy
El Dorado County Transit Authority
Gold Coast Transit
Imperial County Transportation Commission
Kings County Area Public Transit Agency
Laguna Beach Municipal Transit
Marin County Transit District
Modesto Area Express
Montebello Bus Lines
Napa County Transportation and Planning Agency
Norwalk Transit System
Paso Robles Transit Services
Placer County Department of Public Works
Redding Area Bus Authority
Roseville Transit
San Luis Obispo Regional Transit Authority
Santa Maria Area Transit
Simi Valley Transit
Solano County Transit
Sonoma County Transit
Stanislaus County Public Works - Transit
The Eastern Contra Costa Transit Authority
Thousand Oaks Transit
Torrance Transit System

City of Tulare
City of Turlock
City of Union City Transit Division
City of Vacaville
City of Visalia - Visalia City Coach
Culver City Municipal Bus Lines
Transit Joint Powers Authority for Merced County
Unitrans - City of Davis/ASUCD
Ventura Intercity Service Transit Authority
Western Contra Costa Transit Authority
Yolo County Transportation District
Yuba-Sutter Transit Authority

Agency Governance

Of the attributes presented in Table 1-2, the structure of an agency's governance most affects their ability to engage decision-makers in strategic transit planning.

Municipal agencies are generally governed by a city council or county supervisorial board, whose members are typically elected local government officials, and whose purview extends beyond transit to concerns such as public health systems, land use zoning, and legal matters. While such boards may approve certain contracts regularly, they are unlikely to consider transit-related items in a separate session or public hearing more than once per year. Some large Municipal Agencies, such as San Francisco Muni, Long Beach Transit, and Los Angeles DOT, have an appointed oversight board. Others, such as Santa Monica's Big Blue Bus, do not and are instead governed by a city council.

Independent public agency/authority/district board meetings are more focused on transportation. Members are elected or appointed, and may have some specific interest in transportation. The board of a transit district may be a better venue to consider innovative changes that require sustained board engagement to make and monitor a decision which requires board approval. Conversely, more limited board oversight may give an agency some leeway to engage in pilot projects or make changes that seem politically unpopular on a surface level but lead to real, measurable benefits.

Other types of governance are used by transit operators which are run by tribes, private non-profit corporations, private for profit corporations, MPOs, Council of Governments (COGs) or other planning agencies, and universities.

Table 1-5: Summary of Transit Operator Organizational Types

Organization Type	Agencies in CA (2015)	By percent of Peak Vehicles Operated
Municipal: City, County or Local Government Unit or Department of Transportation	85	22.6%
Independent Public Agency/Authority/District	59	68.1%
Tribe[8]	10	0.1%
Private Non-Profit Corporation[9]	3	1.2%
MPO, COG or Other Planning Agency	3	4.1%
Private For Profit Corporation[10]	2	0.0%
Other	2	2.5%
University[11]	1	0.2%
Other Publicly-Owned or Privately Chartered Corporation	1	1.1%

Source: National Transit Database 2015 Agency Information

[8] Several tribes provide transit service in California: the Bishop Paiute Tribe, the Blue Lake Rancheria, the Chemehuevi Indian Tribe, the Karuk Tribe, the Morongo Band of Mission Indians, the North Fork Rancheria of Mono Indians of California, the Reservation Transportation Authority (a consortium of 14 tribes in Riverside and San Diego counties), the Susanville Indian Rancheria, the Tule River Tribe, and the Yurok Tribe

[9] Amador Stage Lines and Silverado Stage are both private, for-profit corporations which offer intercity bus service with some operations in Nevada.

[10] Two of the private-non-profit corporations are Paratransit, Inc., which provides demand response service in Sacramento, and Anaheim Resort Transportation, which serves the area around Disneyland park.

[11] Unitrans in Davis is governed by the Associated Students, University of California, Davis.

2

CHAPTER

State and Federal Policies Impacting Strategic Transit Planning

Chapter 2: State and Federal Policies Impacting Strategic Transit Planning

Introduction

Understanding the common legal and regulatory environment that all operators face is a necessary precondition for the exercise of statewide strategic transit planning.

Since the State of California began funding public transportation in 1971, the goals of the statewide transit planning program have been to improve air quality, reduce congestion, and provide some level of mobility for all Californians. In recent years, transit's role has evolved to also accommodate and promote the development of compact, climate-efficient communities that can better support the state's economic, equity, and environmental goals. Mode shift to transit is now a central pillar of the state's plan to reduce greenhouse gas (GHG) emissions, as evidenced by the state's commitment to distribute 15 percent of carbon market revenues to local transit agencies and an additional 20% for land-use supportive of transit and active transportation.

Planning for and operating transit is largely the domain of local and regional transit operators and agencies. However, a growing number of federal and state policies affect transit planning and operations in California. The federal program has focused on transit capital expenditures and funding operations in smaller places. The state program has focused, by contrast, on funding operations, including in less transit-rich countries, and on the potential environmental benefits of increased transit use.

This section presents these federal and state policies, regulations, plans, and funding programs, common to all operators and planning agencies in California, and which provide the basis for a statewide strategy for transit.

State Laws Impacting Transit

Table 2- 1: Historic and Recent State Bills Relevant to Strategic Transportation Planning

Bill	Bill Applicability to Strategic Transit Planning
SB 325 (1971)	Transportation Development Act, or the Mills-Alquist-Deddeh Act, extended the state sales tax to motor fuels and dedicated ¼ cent of all sales tax revenues to a newly established Local Transportation Fund (LTF) to support public transit (in counties over 500,000 population) and public transit and other transportation needs in smaller counties.
AB 69 (1972)	Set forth many of the modern requirements for the newly-formed Department of Transportation (Caltrans) and transportation planning in California. Established the state's role in stimulating the development of urban mass transportation and interregional high-speed transportation, as part of a balanced transportation system.
SB 620 (1979)	Amended the Transportation Development Act to create the State Transit Assistance Fund (STA), which was funded from a statewide sales tax on gasoline and diesel fuel until the fuel tax swap of 2010-2011. The STA is now funded by an excise tax on diesel fuel.
Proposition 111 (1990)	Phased-in an increase in the state's motor fuels taxes over five years, with additional funding for the Public Transportation Account, which funds STA.
Proposition 42 (2002)	The Traffic Congestion Improvement Act was a constitutional amendment that provided gasoline tax revenues for specified transportation funding programs, including public transportation, from 2003-04 to 2007-08, and that 20% of the state sales tax on gasoline would go to public transportation purposes beginning in in fiscal year 2008-09 and thereafter.
AB 857 (2002)	Added three planning priorities to the Environmental Goals and Policy Report planning processes: equitable infill development, environmental and agricultural resource protection, and efficient development patterns.
SB 375 (2008)	Gave ARB authority to set regional targets for per-capita reductions in GHG from light-duty vehicles and evaluate whether a Metropolitan

	Planning Organization's Regional Transportation Plans/Sustainable Communities Strategy would achieve that future target. Established certain CEQA streamlining provisions based on a land use project's location relative to frequent transit.
SB 391 (2009)	Imposed a requirement that the California Transportation Plan demonstrate how the state will achieves 80% reduction in GHG emissions versus 1990 levels.
SB 716 (2009)	Required Local Transportation Funds (created by the TDA) be made available for public transit purposes rather than local streets and roads in counties that grew to 500,000 or more in population between 1970 and 2000.
Proposition 22 (2010)	A constitutional amendment which prohibited the state from redirecting certain taxes to the general fund, including the use of the gasoline sales tax to pay for transportation bonds that had been previously paid for out of the general fund.
AB X8 6 & 9, SB 70 (2010), AB 105 (2011)	Fuel Tax Swap: Repealed the state sales tax on gasoline, a portion of which had been programmed for public transportation under Proposition 42 (2002) and had been transferred to the general fund prior to Proposition 22 (2010). Reinstated funding for transit operations after the fuel tax swap by establishing a new state sales tax on diesel fuel. Aimed to maintain annual ongoing STA funding of approximately $350 million per year. AB 105 reinstated the fuel tax swap after Proposition 26 (2010) increased the vote threshold to two-thirds of the legislature.
SB 743 (2013)	Instructed the Office of Planning and Research to remove Level of Service impact analysis from the CEQA Guidelines. The Office of Planning and Research has proposed VMT as a replacement metric, which reduces the environmental review burden for transit-enhanced roadways, including signal priority and dedicated lanes
AB 946 (2013)	Authorized a bus-on-shoulder operation on highways in Monterey and Santa Cruz counties.
SB 142 (2013)	Authorized transit operators to create a special benefit district, a tool previously only available to Santa Clara VTA and Los Angeles Metro.

SB 628 (2014)	Authorized Enhanced Infrastructure Financing Districts to fund, through tax increment financing, infrastructure projects, including transit facilities and transit priority projects.
SB 862 (2014)	Specified an investment plan for the Greenhouse Gas Reduction Fund. Established two programs with public transit as the primary beneficiary: the Low Carbon Transit Operations Program, to be administered by the Department of Transportation, and the Transit and Intercity Rail Capital Program, to be selected by the California Transportation Agency and administered by the California Transportation Commission.
SB 1077 (2014)	Created a Road User Charge pilot program and Technical Advisory Committee. Future implementation of a Road User Charge could affect ridership demand and create a new source of funding for transit.
AB 194 (2015)	Extended the California Transportation Commission's authority to authorize High-Occupancy Toll lanes and streamlines the process for using revenues to fund new or expanded express bus services or transit pursuant to an expenditure plan.
SB 9 (2015)	Modified the Transit and Intercity Rail Capital Program (TIRCP) to create a five-year funding program and allows agencies to submit multiple projects which may be funded over multiple years.
SB 508 (2015)	Revised the Transportation Development Act to eliminate a provision that required operators to exceed farebox recovery ratios from the 1978-79 fiscal year and to reduce funding penalties for transit operators that do not meet specified cost-efficiency standards.
SB 824 (2016)	Added the requirement that recipients of Low Carbon Transit Operations Program funding demonstrate that those monies do not supplant other funds. Agencies may bank their funding shares for up to four years and transfer their funding shares to another transit agency within the region.
SB 32 (2016)	Amended AB 32 (2006) to create a statutory GHG reduction target of 40% below 1990 levels by 2030. Creates urgency and authority of law behind transit-related GHG reductions.
AB 197 (2016)	Established a Joint Legislative Committee on Climate Change Policies to make recommendations on the state's GHG reduction policies. Requires the Air Resources Board to consider social costs of GHG emissions.

California Executive Orders and Executive Actions Affecting Transit

In February 1978, California Governor Edmund G. Brown Jr. adopted the state's first Environmental Goals and Policy Report by executive order. The 1978 Report, *An Urban Strategy for California*,[1] outlined a strategy "to meet the needs of more people in California, while at the same time respecting fundamental limits on our tax dollars and natural resources." The report identified transportation funding's first priority as "serving the long-term needs of existing urban and suburban areas through maintaining and rehabilitating existing facilities, providing public transportation, reducing dependence on individual auto use, increasing the efficiency of existing facilities, and completing gaps in the existing freeway system." These expenditures were to be prioritized over expenditures serving new development.

In 2007, Governor Arnold Schwarzenegger issued Executive Order S-04-07, which established a Low Carbon Fuel Standard (LCFS) to decarbonize transportation fuels versus diesel and gasoline. While transit agencies had been early adopters of alternative fuels that have a reduced carbon footprint, LCFS's applicability to transit was not immediately clear. However, now a growing set of transit agencies that use alternative fuels can generate credits and revenues from the program (discussed further in Chapter 5).

In August through October of 2013 Governor Brown commissioned a board of investigation to examine labor disputes at Bay Area transit agencies. This board intervened to prevent strikes by BART and AC Transit workers, determining that "significant disruption in public transportation services and significant harm to the public's health, safety, and welfare."[2]

Ongoing Issues

In 2013, the U.S. Department of Labor blocked Federal Transit Administration grants to California Agencies in response to the Public Employees' Pension Reform Act of 2013. Funds are no longer blocked, but the State of California is in an ongoing legal dispute with the U.S. Department of Labor over pension reform in the state and mass transit employee protections if 49 U.S.C § 5333 (13(c) of the Urban Mass Transportation Act).

California State Agency Actions

In 2000, the California Air Resources Board adopted its Fleet Rule for Transit Agencies (13 CCR § 2020 et. seq) to reduce the state's urban nitrogen oxides (NOx) and particulate matter

[1] California Office of Planning and Research. (1978). "An Urban Strategy for California." Retrieved from https://www.opr.ca.gov/docs/urban_strategy.pdf

[2] Office of Governor Edmund G. Brown, Jr. (2013). "Governor Brown seeks court order to prevent AC Transit Strike." Retrieved from https://www.gov.ca.gov/news.php?id=18275

(PM) emissions. The rule required agencies to choose one of two fossil fuel paths (diesel or alternative fuel) for their fleets and to purchase vehicles that met progressively more stringent emissions requirements over time.

In 2010, the Air Resources Board postponed a requirement that urban transit agencies purchase zero-emission vehicles for at least 15% of new bus acquisitions.

With several new and longstanding bus manufacturers are marketing and delivering battery-electric buses to California transit agencies, the Air Resources Board has renewed interest in zero-emission transit vehicles. The Air Resources Board is currently engaged in rulemaking for its Advanced Clean Transit Regulation. In June 2015, the State Transportation Agency provided $24,403,000 in funding to the Antelope Valley Transit Authority for the purchase of at least 29 electric buses, including 13 60-foot articulated electric buses. In August 2016, the State Transportation Agency provided $13,930,000 in Transit and Intercity Rail Capital Program funding to Foothill Transit and the Antelope Valley Air Quality Management District for the purchase of 35 zero emissions buses and 10 zero-emissions vanpool vehicles.

In May 2016, the California Air Resources Board adopted regulatory guidance for transit agencies on the Low Carbon Fuel Standard[3] (LCFS), which details how transit agencies may opt in to the LCFS program to possibly generate revenues from operating alternative fuel vehicles. The LCFS program is discussed in greater detail in Chapter 5.

Federal Transit Policy

In 1964, Congress passed the Urban Mass Transportation Act to shore up privately-operated mass transportation facilities that had fallen into disrepair through a vicious cycle of deferred capital investment, declining service quality, and fare increases.[4] The federal (5309) discretionary grant program was established to provide funding to construct, rehabilitate and repair metropolitan transportation systems.[5]

Transit and highway planning were distinct processes until the 1974 National Mass Transportation Assistance Act, which established the "3C" planning process, comprising:

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[3] California Air Resources Board. (2016). "Low Carbon Fuel Standard Regulatory Guidance 16-07." Retrieved from https://www.arb.ca.gov/fuels/lcfs/guidance/regguidance_16-07.pdf

[4] Weiner, Edward. (2008). *Urban Transportation Planning in the United States: History, Policy, and Practice* (3rd ed). New York: Springer.

[5] Congress appropriated the equivalent of $1.17 billion per year (2016 dollars) for public agencies to construct, rehabilitate, and acquire mass transit facilities that were under private ownership. The federal (5309) discretionary grant program peaked near $6 billion (2016 dollars) in 1974, and is now $2.3 billion for FY2016.

- **Continuing**: Planning must be maintained as an ongoing activity and should address both short-term needs and the long-term vision for the region;
- **Cooperative**: The process must involve a wide variety of interested parties through a public participation process; and
- **Comprehensive**: The process must cover all transportation modes and be consistent with regional and local land use and economic development plans.

Table 2-2: Historically Significant Federal Transit Legislation

Legislation	Significance for Strategic Transit Planning
1964 Urban Mass Transportation Act	Established a federal role in funding urban mass transportation. Section 5309 capital grants funded ⅔ of net project costs in metropolitan areas that had completed a comprehensive planning process, but only one-half in areas without a plan. In 1964, $1.17 billion (2016 dollars) in funds were appropriated. However, appropriations were made annually on a one-time basis, which led to uncertainty for multi-year capital projects.
1970 Urban Mass Transportation Assistance Act	The 1970 Act established a long-term commitment of federal funds for transit and expanded funding levels, with the 2016-equivalent of $3 billion authorized in fiscal year 1972 alone.
1974 National Mass Transportation Assistance Act	The 1974 Act brought first authorization of federal funds for transit operating assistance, funding the discretionary transit capital grant program at a 2016-equivalent of $5.97 billion annually in 1974. The Act integrated the highway and transit planning processes, which had until then been separate. The Act also required that off-peak fares for elderly and handicapped be capped at half the price of a regular, adult fare.

The federal transit capital investment program began to shrink by the early 1980s, just as local demand for these funds was growing. By 1982, the transit capital grant program had shrunk to $2.76 billion in 2016 dollars. A 1982 revision to the Urban Mass Transportation Capital Investment Policy established the current planning process for projects seeking federal funding, which involves incremental decisions on projects at each stage, from alternatives analysis, to

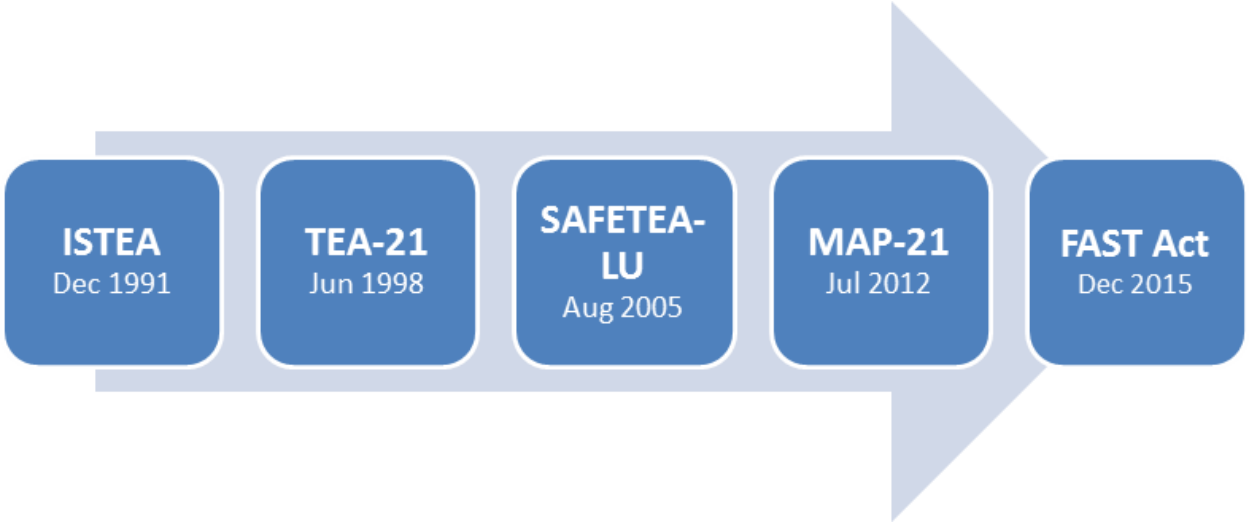
preliminary engineering, final design, and lastly construction. The 1987 Surface Transportation Reauthorization included $2.33 billion (in 2016 dollars) for transit capital grants.

Following the enactment of the Americans with Disabilities Act (ADA) of 1990, the US Department of Transportation issued a regulation in 1991 requiring agencies operating fixed-route transit systems to provide paratransit to disabled persons. This entailed significant, ongoing financial obligations public transit operators.

The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) expanded the scope of metropolitan transportation policy and planning, with an expanded focus on intra-regional coordination and environmental impacts. ISTEA was the first federal transportation bill that made federal funds contingent on a region's ability to demonstrate conformity with federal air quality regulations developed under the Clean Air Act. ISTEA expanded the role of Metropolitan Planning Organizations in coordinating multimodal regional planning. ISTEA authorized $2.31 billion (in 2016 dollars) for discretionary transit in 1992, increasing to $4.37 billion by 1997.

In 1994, President Clinton issued Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," which requires that the federally-mandated environmental impact assessment process be used to address environmental justice issues.

Figure 2-1: Timeline of Recent Federal Transportation Funding Reauthorization Legislation



Federal programs come and go with revisions to the authorizing legislation. The Transportation Equity Act for the 21st Century (TEA-21) brought the Job Access and Reverse Commute (JARC) Program. The Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) established the Small Transit Intensive Cities, Small Starts,

and New Freedom programs and established a requirement for coordinated plans for regions that received funds from multiple social service-focused programs. These and other programs were repealed or consolidated in MAP-21. Changes in the 2015 FAST Act that affect strategic transit planning are listed in Table 2-3.

Table 2-3: FAST Act Amendments Affecting Strategic Transit Planning in California

Section	Change
3019	New provision for multi-agency vehicle purchasing and leasing.
5303-5305	Introduced planning grants with a new emphasis on intercity transportation.
5307	Amended Urbanized Area Formula grant program to include paratransit service in "100 Bus rule" allowing systems with up to 100 buses operating in peak service to use up to 50% of their 5307 funding for operating expenses.
5309	Amended the Capital Investment Grant program to expand eligibility to joint public transportation and intercity rail projects.
5316	Job Access and Reverse Commute program expired and integrated into other programs.
5326	Made new funding available transit asset management evaluation and reporting programs
5329	Strengthened the Public Transportation Safety Program established in MAP-21
5339	Allowed entities that operate fixed route bus service to receive Buses and Bus Facilities Grant funds, with up to 0.5% eligible for use on workforce development activities.

California Transportation Planning Documents

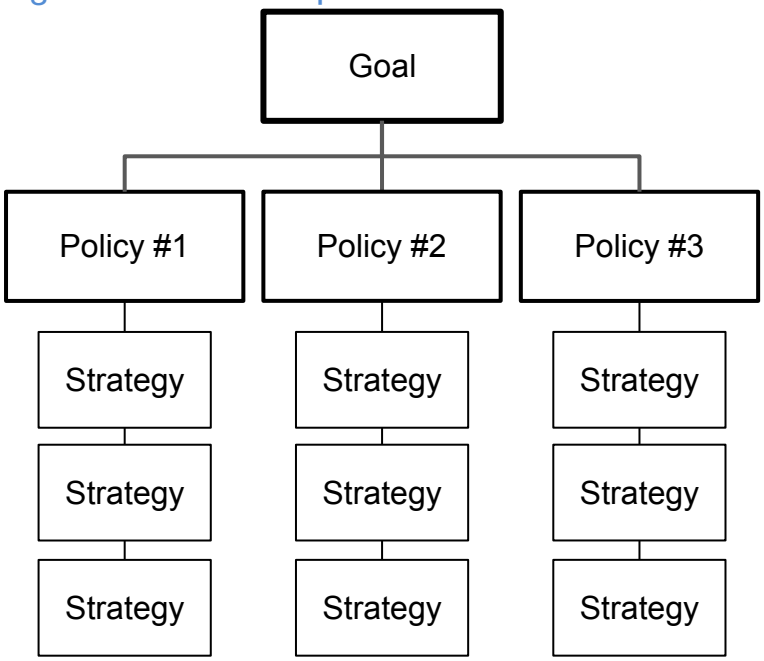
California Transportation Plan 2040 (CTP 2040)

The California Transportation Plan (CTP 2040) is the State's long-range framework for meeting future transportation needs while reducing statewide greenhouse gas emissions in accordance with AB 32 (2006) and now SB 32 (2016), as required by SB 391 (2009). The planning process began in 2013 and the final plan was published in June 2016.

The plan encompasses the state's many transportation modes: passenger vehicles, commercial freight trucks, rail, water transportation, aviation, bicycling, walking, and public transit. The Statewide Transit Strategic Plan is one of 7 modal plans identified in CTP 2040

The CTP 2040 presents general broad goal statements that inform more specific policies on how the transportation system should operate. Each goal has several related policies, and each policy has several specific strategies to achieve that goal and policy.

Figure 2-2: Relationship between CTP 2040 Goals, Policies, and Strategies



The California Transportation Plan 2040 has 6 goals:

- Improve multimodal mobility and accessibility for all people
- Preserve the multimodal transportation system
- Support a vibrant economy
- Improve public safety and security
- Foster livable and healthy communities and promote social equity
- Practice environmental stewardship

The Statewide Transit Strategic Plan will inherit the transit-relevant goals, policies, strategies, modeling assumptions, implementation measures from CTP 2040. Table 2-4 below is a reproduction of selected strategies and related goals and policies that affect transit in California.

Table 2-4: CTP 2040 Strategies that Impact Statewide Strategic Transportation Planning

GOAL: **IMPROVE MULTIMODAL MOBILITY AND ACCESSIBILITY FOR ALL PEOPLE**	
Policy 1	Manage and operate an efficient integrated system.
P1-S3	Implement programs to reduce vehicle trips while preserving personal mobility, such as employee transit incentives, telecommute programs and alternative work schedules, carsharing, parking policies, public education programs, and other strategies that enhance and complement land use and transit strategies.
P1-S4	Continue incremental improvements to the state's intercity and commuter rail system, while providing for connectivity to a future high-speed rail (HSR) network, and local transit and tribal transit networks.
Policy 3	Provide viable and equitable multimodal choices including active transportation.
P3-S10	Incorporate safe facilities for pedestrians, bicyclists and transit into roadway capacity and expansion projects.
P3-S12	Simplify the environmental and permitting process to more easily integrate bike, pedestrian, and transit improvements into maintenance projects.
GOAL: **PRESERVE THE MULTIMODAL TRANSPORTATION SYSTEM**	
Policy 2	Apply sustainable preventive maintenance and rehabilitation strategies.
P2-S4	Implement a strategic approach for assessing and prioritizing transit assets to bring the public transit system into good repair (Federal Transit Administration [FTA] FAST Act State of Good Repair and Asset Management).
Policy 3	Adapt the transportation system to reduce impacts from climate change.
P3-S9	Expand, repair, and upgrade existing roadways to increase access for walking, bicycling, public transit use, and freight use.
P3-S10	Incorporate safe facilities for pedestrians, bicyclists and transit into roadway capacity and expansion projects.
P3-S12	Simplify the environmental and permitting process to more easily integrate bike, pedestrian, and transit improvements into maintenance projects.

GOAL: **SUPPORT A VIBRANT ECONOMY**	
Policy 1	Support transportation choices to enhance economic activity.
P4-S1	Develop and promote incentive programs designed to encourage efficient travel and utilization of active modes (e.g., Complete Streets).
P4-S2	Utilize technology to inform travelers of the best available travel options in terms of both time and cost.
GOAL: **IMPROVE PUBLIC SAFETY AND SECURITY**	
Policy 1	Reduce fatalities, serious injuries, and collisions.
P4-S3	Continue to install and test positive train control (PTC) technology on all intercity and commuter passenger rail.
P4-S4	Invest in at-grade railroad crossing safety on over 10,000 at-grade (level) railroad crossings.
GOAL: **FOSTER LIVABLE AND HEALTHY COMMUNITIES AND PROMOTE SOCIAL EQUITY**	
Policy 1	Expand engagement in multimodal transportation planning and decision-making.
P4-S3	Develop partnerships with schools to support increased use of public and transit options, walking, and bicycling among students and teachers (Safe Routes to School).
Policy 2	Integrate multimodal transportation and land use development.
P2-S5	Encourage increased densities and mix of land uses, and other “smart growth” principles to support transit service, walking, and bicycling while accommodating goods movement.
P2-S8	Promote incentives that reward employers who locate near transit or housing; and developers who build housing near employment centers.
P2-S9	Target funding toward existing communities—through strategies like HSR/transit-oriented, mixed-use development and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.

Policy 3	Integrate health and social equity in transportation planning and decision-making.
P3-S10	Develop models that integrate land use, transportation, health, and environmental issues.
P3-S11	Identify sustainability and equity indicators to enhance current transportation system PMs, such as access to public transit, safe transportation, recreation, healthy food, economic opportunities, and medical services.
GOAL: **PRACTICE ENVIRONMENTAL STEWARDSHIP**	
Policy 3	Reduce GHG emissions and other air pollutants.
P4-S10	Improve links between land use planning and climate adaptation planning by using the tools such as the previous California Regional Blueprint Program and Sustainable Communities Strategies (SCSs) to better integrate adaptation strategies into regional plans, general plans, and Local Coastal Programs (LCPs).
Policy 4	Transform to a clean and energy-efficient transportation system.
P4-S11	Ensure transportation systems, including multimodal options, are more efficient through smart land use, operational improvements, and ITS.

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CTP 2040 Implementation Recommendations

The plan also included several recommendations for implementation to support CTP 2040 goals. The recommendations in Table 2-5 pertain to transit.

Table 2-5: CTP 2040 Recommended Implementation Measures Pertaining to Transit

Expand Transit and Rail Services and Operations	
Short-Range	Modernize rail and transit networks for intercity transit connections. Support technologies and capital improvements that increase convenience and competitiveness… includ[ing] real-time transit information and trip planning tools, universal payment systems, as well as cost-effective infrastructure improvements optimizing reliability and connectivity between systems.

Analyze the implications of changing market demands for transit and rail service and demographics and optimize existing resources to improve service to those markets.

Improve transit payment methods to speed up vehicle boarding, which in turn can increase the efficiency of buses arriving on-time more often.

Expand funding for transit and rail service operations and capital improvements

Coordinate with tribes to expand transit services.

Work with other State and regional agencies and operators to improve the perception of transit and rail in California through marketing and outreach.

Continue to coordinate between Caltrans modal divisions.

Share statewide successes and lessons learned in order to accelerate the implementation of cost-effective strategies to improve transit and rail.

Streamline reporting processes for State and federal grants, and funding allocations.

Provide statewide resources for customer service improvements like real-time passenger information systems.

Report publicly-sponsored vanpool service data in order to attract federal operating funds.

Support employer-assisted housing and use of Transportation Demand Management (TDM) policies with employers in transit corridors.

Mid-to-Long-Range

Implement rail capital improvements that will support a greatly expanded rail and transit system in California. Support seamless transfers between local-regional transit and passenger rail systems.

Help transit operators understand real-time passenger information systems and offer grants that can help offset initial costs of publishing data.

	Caltrans Division of Rail and Mass Transportation can work with local transit stakeholders throughout the State to evaluate and learn from the bus rapid transit (BRT) projects.
	Improve perception of transit services by working with other state and local agencies.
	Improve upon scheduled transfers between regional transit services.
Improve Multimodal Mobility and Accessibility for All	
Short-Range	Implement land use strategies that make travel easier through the reduction of distances in consumer activities (e.g., shopping, recreation, etc.).
	Create public spaces with bicycle/pedestrian and transit access in order to reduce automobile dependency.
	Provide funding and emphasize Transportation Demand Strategies such as ridesharing, vanpooling, park-and-ride lots, transportation information dissemination, and employer outreach programs. Focus on HSR/transit-oriented development (TOD) projects that capitalize on incorporating high-density, mixed use areas thereby reducing individual dependency on cars and encouraging the use of transit.
	Create supportive policies and secure funding for the promotion of shared mobility (car sharing, bike sharing, real-time ridesharing, Transportation Network Companies, scooter share, shared neighborhood electric vehicles, and on-demand shuttle and jitney services).
	Support a unified or universal transportation account that combines all forms of public transportation payments including transit fares, municipal parking and toll collection into a single user-friendly system.
Mid-Range	Support infill development to slow urban sprawl and increase density. This will reduce distances between consumer activities, thus encouraging more people to take advantage of transit services, bicycling and walking.
	Increase the efficiency and reliability of transit service trips by timing signals to favor public transit.

	Develop rideshare programs and efficient parking management strategies to allow more people to travel using existing infrastructure, and support HSR/TOD and alternative transportation choices.
Coordinate Data and Analysis	
Short-Range	Coordinate data and analysis efforts across regions to ensure consistency and comparability of results. Support funding for the purchase and maintenance of a statewide transit data collection repository that can capture and organize the transit data funneled to Caltrans by local transit providers.
Invest Strategically	
Short-Range	Support a competitive capital program for transit capital replacement, acquisition, and the development and construction of transit centers and bus maintenance facilities.
Advance Modeling and Data	
Short-Range	Secure funding for regular modal surveys (including transit on-board surveys, and pedestrian/bicycle activity surveys), and big data analysis using anonymous cell phone/GPS data to improve understanding of travel patterns.

CTP 2040 Modeling Assumptions

SB 391 (2009) required CTP 2040 to show how the state's transportation system would achieve the maximum greenhouse gas reductions feasible in support of an existing statewide goal to reduce greenhouse gas emissions to 80% below 1990 levels by 2050. These results are presented in Alternative 3 of the CTP 2040. In pursuit of this goal, modelers assumed significant changes in the provision of transit service in California that would have the combined effect of increasing statewide transit ridership[6]:

- By 2040, "20% of local bus services are converted to bus rapid transit"
- By 2040, "Transit service levels were assumed to double over 2040 baseline conditions, transit speeds for all services were assumed to increase by 50 percent, transit fares for all services were assumed to be free…" The 2040 baseline condition is the Alternative 1

[6] Caltrans. (2016). California Transportation Plan 2040. Appendix 7, 42.

modeling scenario, which included expanded transit service meant to keep up with population growth

CTP 2040 Performance Metrics

CTP 2040 sets many performance metrics to monitor progress towards goals. Those relevant to strategic transit planning are in Table 2-6 below.

Table 2-6: CTP Performance Metrics for Transit

CTP 2040 Performance Metric	Data Source
Transit mode share - work trips	*Existing:* American Community Survey 3-year data for table B08301: Means of Transportation to Work
Transit mode share - all trips	*Existing:* California Household Travel Survey National Household Travel Survey
Percentage of transit assets that have surpassed FTA useful life period	*Planned:* National Transit Database 2017 and beyond, with the expansion of Asset Inventory Module
Transit accessibility: housing/jobs within 0.5 miles of a major transit stop	*Potential*: Use of expanded, updated online mapping tools such as UCLA/SCAG's REVISION Sustainable Communities Strategies Visualization Tool[7], the Center for Neighborhood Technology's TOD Database[8], or Next 10's transit scorecard[9]
Transit/rail travel time reliability	*Potential:* Processing of "big data" from transit, including real-time arrival information feeds and onboard automated passenger counters.
Transit accessibility	*Existing*: U.S. EPA Smart Location Database[10], WalkScore TransitScore[11] (proprietary)
Travel time to jobs	No current statewide source specific to transit

[7] http://revision.lewis.ucla.edu
[8] http://toddata.cnt.org/
[9] http://next10.org/transitscorecard
[10] https://www.epa.gov/smartgrowth/smart-location-mapping
[11] https://www.walkscore.com/transit-score-methodology.shtml

Caltrans Strategic Management Plan

The Strategic Management Plan 2015-2020 is an internal plan for Caltrans. Developed by the Office of the Director, the plan guides the internal departmental direction and decision-making. The 2015-2020 plan contained several performance measures to monitor success, including a target to double transit mode share by 2020, using the 2010-2012 California Household Travel Survey share as a baseline. The California Statewide Transit Strategic Plan team, in consultation with the Project Executive Committee, interprets this goal as an increase from the 2010-12 baseline of 4.4% of all trips made with public or private transit as the primary mode, to 8.8%. The feasibility of this goal is discussed further in Chapter 4.

State Rail Plan

Note: The State Rail Plan is currently under development. Caltrans Division of Rail and Mass Transportation staff provided the UCLA ITS project team with a presentation given to the Rail Plan Stakeholder Advisory Committee and a working discussion draft that describes a rough vision for the 2040 statewide passenger rail system. Because of the concurrent development of the State Rail Plan and the Statewide Transit Strategic Plan, this section makes some recommendations based on those preliminary documents. The UCLA ITS project team will continue to coordinate with State Rail Plan staff into the future, including on possible legislative modifications that may be necessary for bus-only ticketing on regional or intercity services which connect with rail.

Rail-Transit Coordination and Future Transit Capital Planning

The State Rail Plan working discussion draft considers how California would transition from existing passenger rail markets to potential 2040 passenger markets with the addition of high-speed rail and expanded regional rail. California's proposed high-speed rail system will provide the backbone for statewide rail service, with network connections and integration and schedule coordination with intercity, commuter, and local rail service. The coordinated high-speed rail and conventional rail planning exercise will lead to the identification and development of regional and subregional rail hubs, where local transit services connect to each other, intercity bus service, rail, and serve transit-oriented districts that would emerge around these hubs. The identification of the hubs and integration of regional and local transportation and land use plans could help prioritize investments in bus facilities and fixed guideway projects into the future. High-quality transit service feeding high-speed rail stations can decrease the need for parking while increasing the potential for rail-compatible land uses. Transit agencies serving potential regional and subregional hub areas should also be involved in selecting and planning for designated regional hubs.

Policy Changes to Intercity Bus Service

Changes in policy will allow bus-only ticketing for connecting and regional bus service (that currently can be booked only with a rail ticket), potentially increasing demand for intercity bus service connecting with regional and subregional rail hubs. The draft materials state that rail-integrated bus service "could be met by express bus routes operated by local transit districts, a commercial operator, or by provision of dedicated interurban feeder bus as part of the Thruway bus network." The draft materials and the CTP 2040 recommend that multi-agency journeys could be made using a single ticket or fare medium.

The combination of bus-only ticketing and partnerships with local transit districts could allow connecting bus service to expand to new markets. A goal of the working discussion draft is to serve communities of greater than 40,000 people with integrated bus service. Combining integrated rail and bus-only trips, both to the rail hub and along the way, would enhance demand to justify more frequent service and expansion to new markets.

At the time of last review, the State Rail Plan materials stipulate that express bus stops "of state interest will generally feature convenient access, some park and ride facilities, and connectivity to local transit." Where a community's downtown is separate from a new or existing park-and-ride facility, there may be a trade-off between the degree of connectivity to local transit and the availability of park-and-ride spaces for intercity bus passengers.

Table 2-7: Additional Recommendations with Impact for Transit Capital Planning

Geographic Region	State Rail Plan Working Draft Recommendation
San Francisco Bay Area	Recommendation of a second transbay tube that can serve regional, intercity express, and high-speed rail trains in addition to the existing BART tube.
Southern California	Recommendation to explore infrastructure upgrades to allow skip-stop services along the LA Metro Expo Line to connect LA Union Station with Santa Monica in 30-minutes, versus approximately 55 minutes as currently scheduled. Recommendation for 30-minute service between LAX and Downtown Los Angeles and Van Nuys
Statewide	Intercity rail and regional/commuter rail will continue to operate on shared facilities.

High Speed Rail 2016 Business Plan

The California High-Speed Rail Authority is required to update its business plan every two years. The 2016 California High-Speed Rail Business Plan sets forth a plan to complete the San Jose-Bakersfield segment by 2024 and begin offering passenger service by 2025.

The California High-Speed Rail Authority is focused on three core objectives:

- Initiate high-speed rail passenger service as soon as possible.
- Make concurrent investments throughout the system that will be linked together over time.
- Position the Authority to construct additional segments as funding becomes available.

The plan envisions a blended system of shared track in metropolitan regions, where high-speed trains would share tracks with commuter and regional rail in metropolitan Los Angeles and San Francisco.

Figure 2-3 below shows Phases 1 and 2 of the state's planned high speed rail system, along with the regional rail corridors.

Figure 2-3: Statewide Rail Modernization Map[12]

[12] California High-Speed Rail Authority. (2016). *Connecting and Transforming California: 2016 Business Plan.* Retrieved from: https://www.hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf

Conclusion

While transit is decidedly a local enterprise, local planning and managerial decisions are shaped by state and federal policies and funding programs. Federal transit policy may be out of the state's influence, but this does not mean the state's role in transit is subordinate to the federal government. State policies can build on federal regulations and programs to steer California's transit agencies toward aiding the state's more aggressive environmental, equity, and economic goals. The potential for changes to federal transit policies can be seen an opportunity to restructure state transit policy in support of mobility and climate goals that have emerged in the years since California created a consolidated statewide transit policy and funding programs in the 1970s.

3

CHAPTER

Local Planning for the Future of California Public Transit

Chapter 3: Local Planning for the Future of California Public Transit

Introduction

While state-level transportation planning documents express statewide goals for transit, individual agency plans include goals that individual communities have developed for their local transportation systems. Taken together, these local plans set the priorities that will shape the development of the state's transit networks. Achieving the statewide goals set in the California Transportation Plan 2040 (CTP 2040) and the Caltrans Strategic Management Plan 2015-2020 will require the broader incorporation of statewide goals into local planning documents and coordinating local and regional agency plans.

This chapter compares the goals and priorities from the planning documents of over 85 regional and local transportation planning agencies and transit operators. These included documents of the following types, described in further detail below: 1) Regional Transportation Plan and Sustainable Community Strategy (RTP/SCS); 2) the Long Range Transportation Plan (LRTP); 3) the Short Range Transit Plan (SRTP); and 4) The Coordinated Public Transit-Human Services Transportation Plan (Coordinated Plan). Together, these sets of plans influence the direct provision and use of transit in California. The focus of the goals in these plans varies by the type of plan as well as by the agency's size, what modes it operates, and where geographically it is located. The assessment includes plans adopted as of Fall 2016.

Local and Regional Plans Assessed

The **RTP/SCS** identifies transportation needs in a metropolitan region and prioritizes projects based on those needs. Large regional transportation planning agencies known as Metropolitan Planning Organizations (MPOs) create the RTP/SCS, thus these plans span both a large region and period of time (20+ years). The RTP/SCS is a state and federally mandated planning document for MPOs.

The **LRTP** is authored by large transit operators that also act as transportation planning agencies. The LRTP allows large transit operators to adequately accommodate and plan for future demands on the transit system they operate.

The **SRTP** is similar to an LRTP and is prepared by all transit operators to identify short-term challenges (including limited funding resources), develop strategies, and plan for anticipated changes in their systems. The SRTP allows agencies to qualify for state and federal funding.

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Coordinated Plans evaluate existing transportation services within a region or area and identify ways by which limited resources can be most efficiently allocated in the provision of transportation for sensitive groups, such as senior citizens and disabled and/or low-income persons. These plans set forth actions to help meet the transportation needs of these populations.

Planning Goals

Table 3-1 below lists fifteen transit-related goals identified from a review of CTP 2040 and other planning documents. The goals listed are categorized into those that relate directly to the provision and use of transit and those that result indirectly from transit provision and use.

The goals that directly influence the provision and use of transit include: service efficiency and effectiveness, congestion reduction, state of good repair of the transit system, land use integration, interagency coordination, and increasing transit ridership.

The goals that are indirect products of transit use include: social equity, improving transportation choices, environmental justice and sustainability, safety, affordable mobility, and social service for low-income and the disabled. Pursuing this indirect set of goals requires a comprehensive, multidisciplinary approach with the coordination of many players.

Since transit operators prepare LRTPs and SRTPs, those documents' goals are centered on the direct provision and use of transit. Because RTP/SCSs are produced by MPOs and Coordinated Plans are prepared by RTPAs, their documents state goals that emerge indirectly from the use of transit. Since MPOs span a larger geographic region, they can have a greater influence on these goals, which require coordination and planning on a larger, regional scale.

Table 3-1: All Goals Used in Plan Analysis[1]

Goals that directly address the provision and use of transit	
Congestion reduction	Reducing traffic/congestion.
Service efficiency (costs)	Cost-efficient and cost-reduction strategies and practices in running the service.
Service effectiveness (ridership, given costs)	Achieving an adequate amount of riders, given the costs associated with running the service.
Increasing transit ridership	Increasing transit ridership.
Land use integration	Integrating service in a variety of land use areas (residential, commercial, mixed-use).
Interagency coordination	Coordinating with other transit agencies, for example to allow transfers between different agencies to synchronize smoothly.
State of good repair	Maintaining reliable transit infrastructure (track, signal systems, bridges, tunnels, vehicles, and stations).
Goals that indirectly flow from transit use	
Affordable mobility	Ensuring affordable fares especially for those transit-dependent populations.
Social service for disabled	Increasing service and access for the disabled population.
Social service for low-income	Increasing service and access for the low-income population.

[1] Note: Plans' formats vary, with no consistency in how goals and objectives are addressed. For instance, some plans addressed them as "policy objectives/strategies" or "performance targets", instead of "goals and objectives." Furthermore, not all goals are stated explicitly in the plans reviewed; some are implicit and required some discernment from the authors of this report as to whether a goal was attached to an associated policy or implementation measure to support it.

Social equity	Providing accessible and efficient service to those who need it most (economically, socially, and physically disadvantaged groups) in order to compensate for overall inequities.
Improving transportation choices	Encouraging and providing access for a variety of travel modes (multimodal).
Environmental sustainability	Prioritizing environmental sustainability (reduction of greenhouse gas emissions, air pollution, etc.)
Environmental justice	Promoting environmental justice through fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of laws, regulations, and policies.
Safety	Providing safe service for all riders, employees, and the public.

Metropolitan Planning Organization Plans

Federal legislation requires a Metropolitan Planning Organization for any urbanized area (plus all non-urbanized parts of counties included in the urbanized area) with a population greater than 50,000.[2] California has 18 federally-designated Metropolitan Planning Organizations (MPOs). MPOs help ensure that existing and future transportation project and program expenditures are based on the continuing, cooperative and comprehensive (3-C) planning process mandated by federal statute. An MPO has five main functions:

1. Maintain a setting for regional decision-making;
2. Prepare an Overall Work Program (OWP);
3. Involve the public in this decision-making;
4. Prepare an RTP; and,
5. Develop a Transportation Improvement Program (TIP).[3]

[2] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

[3] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

In order to execute their transportation planning functions, MPOs receive annual federal metropolitan planning funds from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

In addition, California has 26 Regional Transportation Planning Agencies (RTPAs), which are responsible for preparing RTPs as described in California Government Code Section 29532, and receive annual state planning funds known as rural planning assistance (RPA). Figure 3-2 below identifies the 18 MPOs and the 26 RTPAs that prepare RTPs. [4]

Regional Transportation Plans and Sustainable Community Strategies (RTP/SCS) Planning Requirements

The Regional Transportation Plan (RTP), also called a Metropolitan Transportation Plan (MTP) or Long-Range Transportation Plan (LRTP), is a planning document used by both Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) in California to conduct strategic long-range planning in their regions for a minimum of 20 years. An RTP is a reflection of a region's vision and goals. According to the 2016 Final Draft Regional Transportation Guidelines, an RTP should also incorporate state goals for transportation, environmental quality, economic growth, and social equity.[5]

Figure 3-1 illustrates the linkages between the local, regional, state, and federal transportation planning process.[6]

[4] 2010 California Regional Transportation Plan Guidelines, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/2010%20RTPGuidelines_Jan2011_Technical_Change.pdf

[5] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

[6] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

Figure 3-1: Federal and State Transportation Planning Process Flowchart

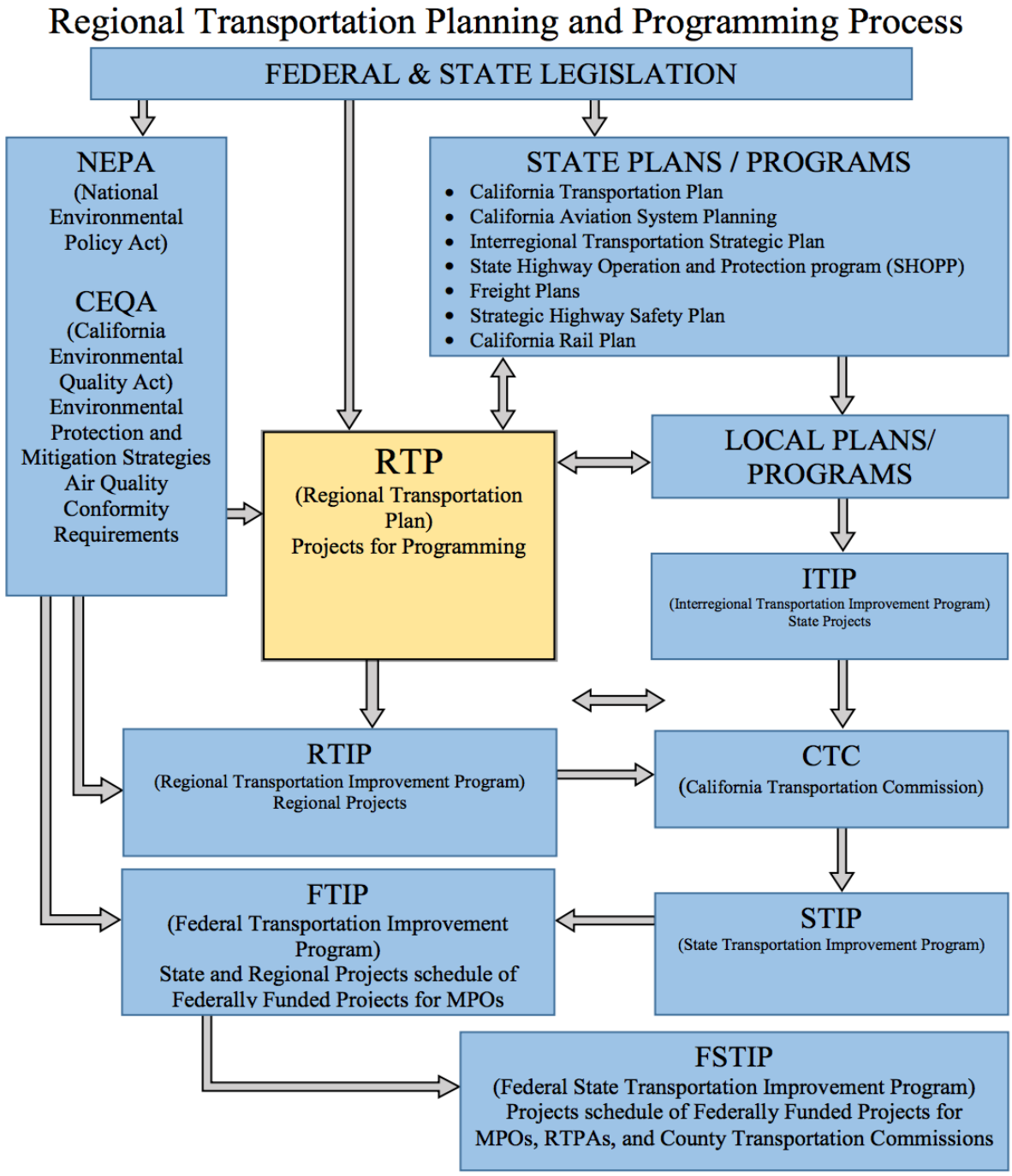

Figure 3-2: 18 MPOs and 26 RTPAs in California[7]

[7] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

State and Federal Requirements

The RTP Guidelines adopted by the California Transportation Commission (CTC) apply to the RTPs prepared by both RTPAs and MPOs.[8] Federal planning regulations[9], which reflect changes from the MAP-21 and FAST Federal transportation reauthorization bills, apply to MPOs, and statewide planning regulations apply to non-MPO areas (RTPAs).[10] Both state and federal statutes require MPOs located in federally designated air quality nonattainment areas to update their RTPs every 4 years; state statute gives MPOs located in air quality attainment regions the option to update their RTPs every five years.[11]

Transportation planning and land use planning have become more closely connected since the 2008 passage of California Senate Bill 375 (SB 375), which made the reduction of greenhouse gases (GHG) one of the key objectives in transportation planning. SB 375 mandates MPOs to develop a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS). The SCS is integrated in the RTP and outlines the MPO's plans to meet its regional GHG emission reduction targets determined by the California Air Resources Board (ARB) through a model forecast that shows the combination of the planned transportation network, forecasted land use development patterns, and transportation policies that will allow the region to attain per-capita requirements in passenger vehicle use.[12] The combined RTP/SCS for each MPO aims to improve transportation mobility and address federal air quality criteria pollutants, and ensures that the statewide regional transportation system addresses tribal, local, regional, and statewide mobility and economic needs.[13] The planning requirements specified in SB 375 pertain only to the state's 18 MPOs and not to the 26 rural RTPAs that also prepare RTPs.

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[8] California Government Code Section 65080.
[9] Title 23 CFR Part 450 and 771 and Title 49 CFR Part 613.
[10] 2010 California Regional Transportation Plan Guidelines, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/2010%20RTPGuidelines_Jan2011_Technical_Change.pdf
[11] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf
[12] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf
[13] 2010 California Regional Transportation Plan Guidelines, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/2010%20RTPGuidelines_Jan2011_Technical_Change.pdf

The CTC cannot fund projects in the State Transportation Improvement Program (STIP) that are not included in an RTP. State statutes require that RTPs serve as the foundation of the Federal Transportation Improvement Program (FTIP). The FTIPs are prepared by MPOs and identify the next four years of transportation projects to be funded. In addition, RTPs should include the following four components: 1) Policy Element, 2) Sustainable Communities Strategy, 3) Action Element, and 4) Financial Element.[14] An RTP should promote a regional intermodal transportation system that is safe and efficient when linked with land use planning and should serve the mobility needs of goods and people.[15]

Analysis of Regional Transportation Plans and Sustainable Community Strategies

The RTP/SCSs were gathered for all 18 federally designated Metropolitan Planning Organizations (MPOs). The plans were then analyzed by the goals mentioned above in Table 3-1. The plans assessed are included in Table 3-2 below.

Table 3-2: All 18 MPOs and their RTP/SCSs Analyzed

MPO	RTP/SCS (Date)
Association of Monterey Bay Area Governments (AMBAG)	Moving Forward Monterey Bay 2035 (June 2014)
Butte County Association of Governments (BCAG)	2012-2035 Metropolitan Transportation Plan/ Sustainable Communities Strategy (December 2012)
Fresno Council of Governments (Fresno COG)	2014 Regional Transportation Plan/ Sustainable Communities Strategy (May 2014)

[14] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

[15] 2010 California Regional Transportation Plan Guidelines, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/2010%20RTPGuidelines_Jan2011_Technical_Change.pdf

Kern Council of Governments (Kern COG)	2014 Regional Transportation Plan/ Sustainable Communities Strategy (June 2014)
Kings County Association of Governments (KCAG)	2014 Regional Transportation Plan (June 2014)
Madera County Transportation Commission (Madera CTC)	2014 Regional Transportation Plan/ Sustainable Communities Strategy (July 2014)
Merced County Association of Governments (MCAG)	2014-2040 Regional Transportation Plan/ Sustainable Communities Strategy (Adopted Sept. 2014, amended May 2016)
Metropolitan Transportation Commission (MTC)	Plan Bay Area (July 2013)
Sacramento Area Council of Governments (SACOG)	2016 Metropolitan Transportation Plan/ Sustainable Communities Strategy (February 2016)
San Diego Association of Governments (SANDAG)	San Diego Forward The Regional Plan (October 2015)
San Joaquin Council of Governments (SJCOG)	2014-2040 Regional Transportation Plan/ Sustainable Communities Strategy (June 2014)
San Luis Obispo Council of Governments (SLOCOG)	2014 Regional Transportation Plan (April 2015)
Santa Barbara County Association of Governments (SBCAG)	2040 Regional Transportation Plan/ Sustainable Communities Strategy (August 2013)
Shasta Regional Transportation Agency (SRTA)	2015 Regional Transportation Plan for Shasta County (June 2015)
Southern California Association of Governments (SCAG)	2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy (April 2016)

Stanislaus Council of Governments (StanCOG)	2014 Regional Transportation Plan/ Sustainable Communities Strategy (June 2014)
Tahoe Metropolitan Planning Organization (TMPO)	Regional Transportation Plan/ Sustainable Communities Strategy Mobility 2035 (December 2012)
Tulare County Association of Governments (TCAG)	2014-2040 Regional Transportation Plan/ Sustainable Communities Strategy (June 2014)

Table 3-3 shows the prevalence of a goal in an MPO's RTP/SCS. Most RTP/SCS reference improving transportation choices, environmental sustainability, safety, social service for low-income, social equity, and land use integration. More than half of the goals appear in most of the MPO's RTP/SCSs. Based on the plans studied, there does not appear to be a difference between the stated goals of MPOs the four large MPOs and MPOs in other areas.

Table 3-3: Prevalence of Goal in RTP/SCS by MPO

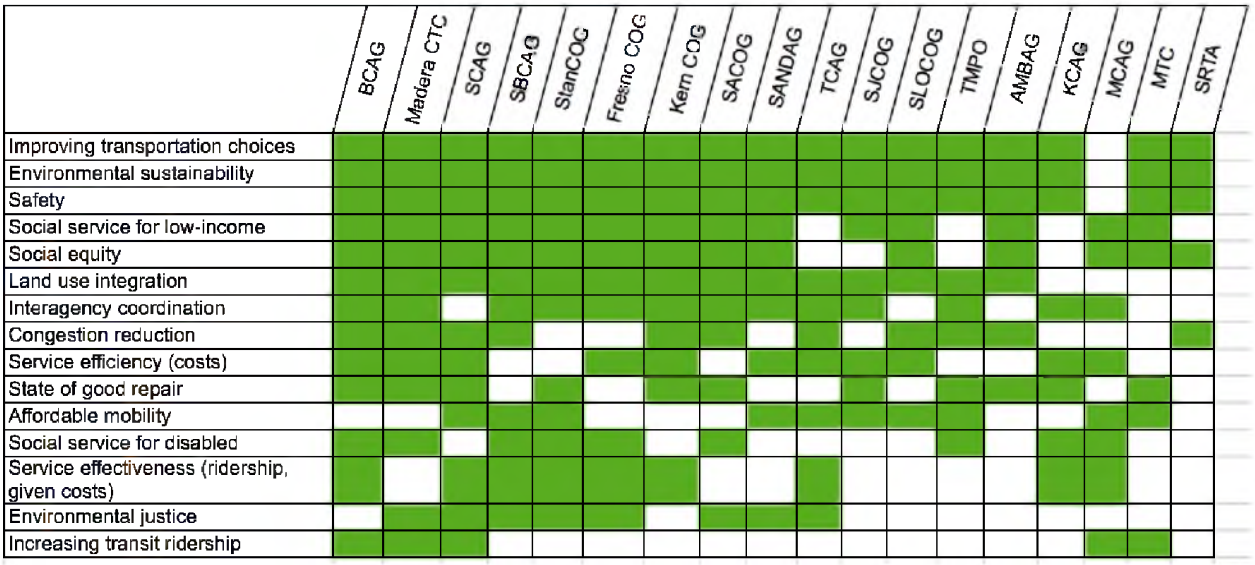
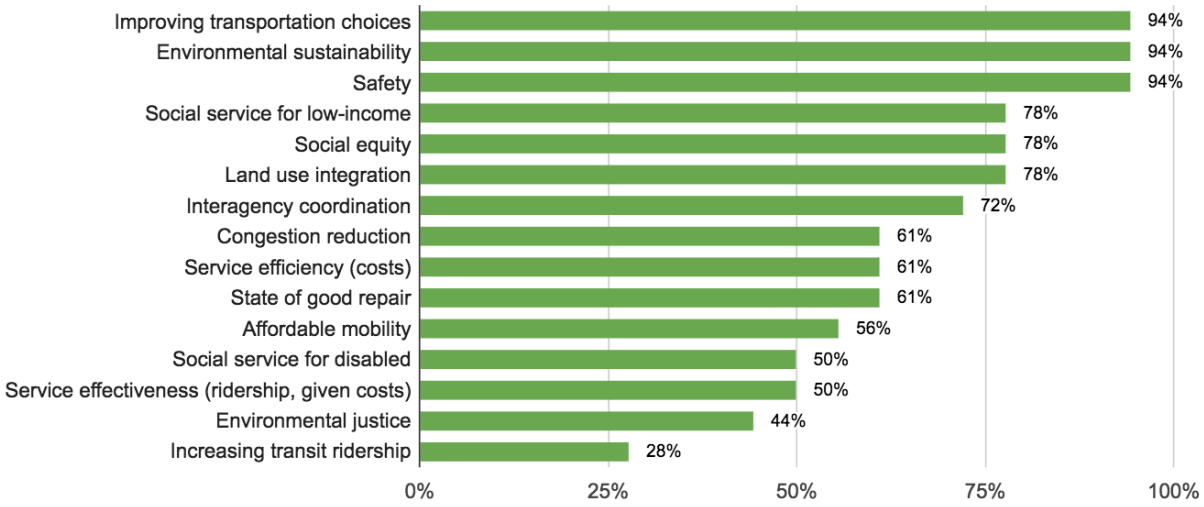


Figure 3-3: Prevalence of RTP/SCS Goal Statements



Improving transportation choices, environmental sustainability, safety, social service for low-income, social equity and land use integration are goals that are indirectly associated with transit use. Meeting these goals requires a multidisciplinary approach and coordination with various different agencies and departments, with which MPOs must constantly collaborate.

Table 3-4 below presents selected goal statements for the top ranked goals from all the RTP/SCSs examined. These goal statements are presented as examples of clear or measurable objectives from the RTP/SCSs.

Table 3-4: Selected Goal Statements for Most Prevalent Goals from RTP/SCSs

GOAL: **IMPROVING TRANSPORTATION CHOICES**	
Agency	*Goal Statement(s)*
Madera CTC	Promote Intermodal Transportation Systems that are fully accessible, encourage quality growth and development, support the region's environmental resource management strategies, and are responsive to the needs of current and future travelers.
SLOCOG	Provide reliable, integrated, and flexible travel choices and a reduction in congestion within and through the region.

SRTA	Provide an integrated, context-appropriate range of practical transportation choices. Develop an integrated, context-appropriate range of local transportation choices. Develop an integrated, context-appropriate range of interregional transportation choices.
GOAL: **ENVIRONMENTAL SUSTAINABILITY**	
Agency	*Goal statement(s)*
SANDAG	The transportation system should promote environmental sustainability and foster efficient development patterns that optimize travel, housing, and employment choices. The system should encourage growth away from rural areas and closer to existing and planned development.
SCAG	Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).
SLOCOG	Conserve and protect natural and sensitive resources. Preserve aesthetic resources and promote environmental enhancements with all transportation projects.
GOAL: **SAFETY**	
Agency	*Goal statement(s)*
SANDAG	The transportation system should be well maintained to protect the public's investments in transportation. It is critical to ensure a safe regional transportation system by keeping the region's transportation system in a good state of repair. Improve emergency preparedness within the regional transportation system.
SJCOG	Increase safety and security.

	Facilitate projects that reduce the number of and severity of traffic incidents. Encourage and support projects that increase safety and security Improve communication and coordination between agencies and public for emergency preparedness.
GOAL: **SOCIAL SERVICE FOR LOW-INCOME**	
Agency	*Goal statement(s)*
MCAG	Provide an efficient, effective, coordinated regional transit system that increases mobility for urban and rural populations, including transportation disadvantaged persons.
SJCOG	Improve the quality of life for residents. Encourage transportation investments that support a greater mix of housing options at all income levels.
SACOG	Plan for service to transit-dependent populations: disabled, low-income, senior, youth within a context of service to attract riders who now drive. Ensure community outreach to low-income and minority communities whose needs and concerns otherwise might be overlooked.
GOAL: **SOCIAL EQUITY**	
Agency	*Goal statement(s)*
Kern COG	Ensure an equitable distribution of the benefits among various demographic and user groups. While all goals are considered interrelated and important, mobility is considered the plan's highest goal.
SANDAG	The transportation system should be designed to provide an equitable level of transportation services to all segments of the population.

	Create equitable transportation opportunities for all populations regardless of age, ability, race, ethnicity, or income. Ensure access to jobs, services, and recreation for populations with fewer transportation choices.
SLOCOG	Avoid a disproportionately adverse impact to all sectors of the population. Provide equitable levels of funding and transportation services to all areas, users, communities, and socio-economic groups.

GOAL: **LAND USE INTEGRATION**	
Agency	*Goal statement(s)*
Fresno COG	A coordinated policy for public transportation that complements land use and air quality policies.
SACOG	Support road, transit, and bridge expansion investments that are supportive of MTP/SCS land use patterns.
SCAG	Encourage land use and growth patterns that facilitate transit and active transportation.

Comparison of Goals from California's Four Large MPOs

The four largest MPOs in California, MTC, SACOG, SCAG, and SANDAG, represent 87% of the state's population. As such, their plans have a profound impact on the future of California. The similarities and differences in their RTP/SCS are summarized in the prevalence of their goals, illustrated in Table 3-5 below.

All four MPOs reference goals and policies related to social service for low-income, social equity, improving transportation choices, environmental sustainability, state of good repair, and safety in their RTP/SCSs. Overall, increasing transit ridership, service effectiveness, and interagency coordination are low on the priority list for these large metropolitan regions.

Table 3-5: RTP/SCS Goals of Four Largest MPOs in CA Compared

	SCAG	SACOG	SANDAG	MTC
Social service for low-income	■	■	■	■
Social equity	■	■	■	■
Improving transportation choices	■	■	■	■
Environmental sustainability	■	■	■	■
State of good repair	■	■	■	■
Safety	■	■	■	■
Affordable mobility	■		■	■
Congestion reduction	■	■	■	
Environmental justice	■	■	■	
Social service for disabled		■	■	
Service efficiency (costs)	■		■	
Land use integration	■	■		
Increasing transit ridership	■			■
Service effectiveness (ridership, given costs)	■			
Interagency coordination		■		

Metropolitan Transportation Commission (MTC)

Plan Bay Area is MTC's 2013 RTP/SCS. The plan includes a total 15 performance measures/targets, of which two are state-mandated, such as the greenhouse gas emission reduction target and the housing target. The plan's housing target is to provide enough housing for the region's population for the next three decades. Additionally, MTC includes goals related to healthy and safe communities, open space and agriculture preservation, equitable access, economic vitality, and transportation system effectiveness.

Of the 15 goals assessed, *Plan Bay Area* prioritizes eight of them: social service for low-income populations, social equity, improving transportation choices, environmental sustainability, state of good repair, safety, affordable mobility, and increasing transit ridership. Table 3-6 below lists the transportation related goals outlined in *Plan Bay Area*.

Table 3-6: Transportation Related Goals from Plan Bay Area

TRANSPORTATION RELATED POLICIES	
Climate Protection	Reduce per-capita CO2 emissions from cars and light-duty trucks by 15 percent.
Healthy and safe communities	Reduce by 50 percent the number of injuries and fatalities from all collisions (including bike and pedestrian). Increase the average daily time walking or biking per person for transportation by 70 percent (for an average of 15 minutes per person per day).
Transportation system effectiveness	Increase non-auto mode share by 10 percentage points (to 26 percent of trips). Decrease automobile vehicle miles traveled per capita by 10 percent. Maintain the transportation system in a state of good repair. Increase local road pavement condition index (PCI) to 75 or better. Decrease distressed lane-miles of state highways to less than 10 percent of total lane-miles. Reduce share of transit assets past their useful life to 0 percent.
Equitable access	Decrease by 10 percentage points (to 56 percent, from 66 percent) the share of low-income and lower-middle income residents' household income consumed by transportation and housing

Sacramento Area Council of Governments (SACOG)

The Metropolitan Transportation Plan / Sustainable Communities Strategy (MTP/SCS): Building a Sustainable Transportation System is SACOG's 2016 RTP/SCS. SACOG dedicates a chapter for policies and supportive strategies in its RTP/SCS. Its policies and strategies are guided by six main principles: smart land use, environmental quality and sustainability, financial stewardship, economic vitality, access, and mobility. Table 3-7 below lists the transportation related goals outlined in SACOG's regional transportation plan.

Table 3-7: Transportation Related Policies and Strategies from SACOG MTP/SCS

TRANSPORTATION-RELATED POLICIES	
Policy 2	Educate and provide information to policymakers, local staff, and the public about the mutually supportive relationship between smart growth development, transportation, and resource conservation.
Policy 3	SACOG encourages local jurisdictions in developing community activity centers well suited for high-quality transit service and complete streets.
Policy 8	Support and invest in strategies to reduce vehicle emissions that can be shown as cost effective to help achieve and maintain clean air and better public health.
Policy 9	Use the best information available to implement strategies and projects that lead to reduced Greenhouse Gas (GHG) emissions.
Policy 11	Pursue and support enactment of sustainable funding sources adequate for maintenance and rehabilitation of highways, streets and roads and operations and maintenance of transit services for the region.
Policy 16	Study ways to use pricing more effectively in funding of transportation.
Policy 19	Ensure coordination among all forms of existing and expanded transit services, including those provided by social services agencies, for a more effective system.
Policy 20	SACOG should work with transit operators to pursue improvements to transit access, security, comfort, schedules and information whenever opportunities arise.
Policy 21	SACOG should develop guidelines for rural transit services, as a lifeline for non-drivers and park-and-ride service for commuters.
Policy 22	SACOG in partnership with community and employer organizations intends to support proactive and innovative education and transportation demand management programs covering all parts of the urbanized area, to offer a variety of choices to driving alone.

Policy 23	SACOG expects operators to plan for service to transit-dependent populations – disabled, low-income, senior, youth – within a context of service to attract riders who now drive.
Policy 27	Support road, transit, and bridge expansion investments that are supportive of RTP/SCS land use patterns.
Policy 28	Prioritize transit investments that result in an effective transit system that serves both transit-dependent and choice riders.
Policy 29	SACOG encourages locally determined developments consistent with Blueprint principles and local circulation plans to be designed with walking, bicycling and transit use as primary transportation considerations.

Although SACOG's MTP/SCS shares many of the goals associated with the other three large MPO regions in California, it is the only one to prioritize interagency coordination. In addition, SACOG emphasizes sharing knowledge with decision-makers about the relationship between smart growth and transportation. SACOG also mentions developing community centers that will be suitable for high quality transit services. However, SACOG is the only MPO of the four largest not to prioritize affordable mobility.

San Diego Association of Governments (SANDAG)

San Diego Forward: The Regional Plan is San Diego Association of Governments (SANDAG)'s 2015 RTP/SCS. The plan's six visions and goals cover mobility choices, regional economic prosperity, healthy and complete communities, habitat and open space preservation, partnerships/collaboration, and environmental stewardship. The plan emphasizes growth in urbanized areas, setting aside more open space, protecting coastlines and other water resources in the region, safety, equitable transportation opportunities for all people, and reiterates access to jobs, services, and recreation for people with fewer options. The plan also addresses environmental sustainability through greenhouse gas emission reduction targets and cleaner transportation investments that have additional environmental benefits. Lastly, for a prosperous economy, it discusses maximizing the economic benefits of transportation investments and enhancing the goods movement system.

In addition to the common goals shared with the other three large MPOs, *San Diego Forward* touches upon better access to jobs and activities, roles of freight movement in the economy, and emergency preparedness within the regional transportation system. However, the plan does not include explicit goals that address increasing transit ridership, service effectiveness, congestion reduction, social service for disabled, and state of good repair in the six visions and

goals discussed in its plan. Table 3-8 below lists the transportation related goals outlined in *San Diego Forward*.

Table 3-8: Transportation Related Policies and Strategies from San Diego Forward

TRANSPORTATION RELATED POLICIES	
Mobility Choices	Provide safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play. Take advantage of new technologies to make the transportation system more efficient and accessible.
Regional Economic Prosperity	Invest in transportation projects that provide access for all communities to a variety of jobs with competitive wages. Build infrastructure that makes the movement of freight in our community more efficient and environmentally friendly.
Healthy and Complete Communities	Create great places for everyone to live, work, and play. Connect communities through a variety of transportation choices that promote healthy lifestyles, including walking and biking. Increase the supply and variety of housing types -- affordable for people of all ages and income levels in areas with frequent transit service and with access to a variety of services.
Habitat and Open Space Preservation	Focus growth in areas that are already urbanized, allowing the region to set aside and restore more open space in our less developed areas. Protect and restore our region's urban canyons, coastlines, beaches, and water resources.
Partnerships/ Collaboration	Collaborate with Native American tribes, Mexico, military bases, neighboring counties, infrastructure providers, the private sector, and local communities to design a transportation system that connects to the megaregion and national network, works for everyone, and fosters a high quality of life for all. As we plan for our region, recognize the vital economic, environmental,

	cultural, and community linkages between the San Diego region and Baja California.
Environmental Stewardship	Make transportation investments that result in cleaner air, environmental protection, conservation, efficiency, and sustainable living. Support energy programs that promote sustainability.

Southern California Association of Governments (SCAG)

2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy is Southern California Association of Governments (SCAG)'s 2016 RTP/SCS. It prioritizes policies related to 13 of the 15 goals examined. The two goals not explicitly emphasized in its RTP/SCS are social service for disabled and interagency coordination. However, SCAG is the only of the four large MPOs to stress the goals of increasing ridership and service effectiveness in its RTP/SCS. SCAG's RTP/SCS highlights accessibility for all people and goods, environmental sustainability, land use and transportation integration, and safety of the regional transportation system. In its guiding policies, the RTP/SCS states that ensuring safety, efficiency, and state of good repair on a multimodal transportation system are the highest priorities for funding in the region. SCAG's RTP/SCS includes 9 goals and 8 guiding policies (shown in Table 3-9 below).

Table 3-9: Transportation Related Goals and Guiding Policies from SCAG RTP/SCS

GOALS	
Goal 1	Align the plan investments and policies with improving regional economic development and competitiveness.
Goal 2	Maximize mobility and accessibility for all people and goods in the region.
Goal 3	Ensure travel safety and reliability for all people and goods in the region.
Goal 4	Preserve and ensure a sustainable regional transportation system.
Goal 5	Maximize the productivity of our transportation system.
Goal 6	Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).
Goal 7	Actively encourage and create incentives for energy efficiency, where possible.

Goal 8	Encourage land use and growth patterns that facilitate transit and active transportation.
Goal 9	Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security.
GUIDING POLICIES	
Policy 1	Transportation investments shall be based on SCAG's adopted regional Performance Indicators.
Policy 2	Ensuring safety, adequate maintenance and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
Policy 3	RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
Policy 4	Transportation demand management (TDM) and active transportation will be focus areas, subject to Policy 1.
Policy 5	HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.
Policy 6	The RTP/SCS will support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies.
Policy 7	The RTP/SCS will encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system and sustainable outcomes in the long run.
Policy 8	Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

Regional Differences

All four metropolitan regions address concerns of environmental sustainability in their RTP/SCSs and set goals for greenhouse gas emission reductions to improve air quality and public health. Likewise, equitable access to the transportation system is also an emphasis of all four RTP/SCSs, along with improving transportation choices.

However, there are regional differences in the prevalence of goals among the four RTP/SCSs. For instance, SACOG discusses the importance of sharing knowledge with decision-makers and the public about the relationship between smart growth development and transportation. It aims to partner with communities and employer organizations to support education and transportation demand management programs. SACOG's is the only plan to explicitly reference interagency coordination. Unlike other MPOs', SACOG's plan also discusses developing community activity centers to accompany high-quality transit services. Both SACOG and SANDAG include goals related to social service for disabled people.

SANDAG's plan stresses the role of the transit system in connecting people with jobs, especially those with fewer transportation choices. While only SCAG and MTC clearly state goals related to increasing transit ridership. And finally, SCAG's plan is the only one to explicitly include goals relating to service effectiveness.

Innovative Revenue Sources

Four of California's 18 MPOs propose additional sources for revenue or user fees in their RTP/SCS which are noteworthy. These are presented in Table 3-10 below.

Table 3-10: Potential New Revenue Sources Proposed by Four MPOs

MPO	Additional Revenue Source
Butte CAG	Butte CAG explored various potential new revenue sources, including two innovative sources: a regional impact fee and peak hour congestion pricing. The regional impact fee would charge an impact fee for new development in the region. This could integrate infrastructure provision and tax policy to create equity both across jurisdictions and between the different levels of government. Peak hour congestion pricing would charge a fee to those using transportation facilities during the peak period. In addition to generating revenue, peak hour congestion pricing would also give users a financial incentive to use transportation facilities during non-peak hours, thus distributing system demand over the course of a day. Noteworthy is that Butte CAG is a smaller MPO outside a major region that is considering a funding mechanism more prevalent in urban major areas.
Kern COG	Kern COG explored a toll-based system with congestion pricing and mileage-based user fees as potential supplements to, or replacements for, the gas tax. The toll-based system would supplement the gas tax and could charge vehicles based on weight per tire, which would encourage the trucking

	industry to find innovative ways to reduce weight per wheel, thus lessening roadway wear and tear. The analysis assessing the mileage-based user fee assumed a $0.05 (2011 dollars) charge per mile starting in 2025 and indexed to increase at an annual rate of 2.5%. The incremental increase in revenue by transitioning to a mileage-based charge system would generate $110.3 billion, from FY 2025 to FY 2035.
SCAG	SCAG identified eight categories of funding sources that are considered to be reasonably available and are included in the financially constrained plan. These sources were identified on the basis of their potential for revenue generation, historical precedence and the likelihood of their implementation in the RTP timeline. The following are four noteworthy categories: ● A regional mileage-based user fee: a charge estimated at about $0.04 (in 2015 dollars) per mile starting in 2025 and indexed to maintain purchasing power ● Highway tolls: Toll revenues generated from the East-West Freight Corridor and regional express lane network. ● Private equity participation: may be applicable for key initiatives like toll facilities and freight rail package. ● Value Capture Strategies: Assumes formation of special districts including use of tax increment financing for specific initiatives.
Tahoe MPO	The Tahoe MPO explored three potential funding options: the Trans-Sierra Transportation Coalition, the Lake Tahoe Transportation Mandates, and increased flexibility in the use of transportation funds. The Trans-Sierra Transportation Coalition is a concept led by the Tahoe Transportation District that unifies the larger Lake Tahoe area to develop a package of transportation investments that benefit the larger region as a whole. The Lake Tahoe Transportation Mandates aim to improve federal and state funding participation in order to represent the over 85% public land ownership in the Lake Tahoe Region, and would aim to fine-tune existing funding formulas to use a blended population number that includes second homeowners, full-time residents, and visitors. The Tahoe Region's legislative platform could increase flexibility in the use of transportation funds. In addition, the MPO lists the following funding sources for further research: vehicle license impact fees, sales taxes, redevelopment agency tax increment

	funding (from Nevada), strategic parking management, parking in-lieu fees, and transit pass program sales.

County Transportation Commission Plans

Long Range Transportation Plan Requirements

The Long Range Transportation Plan (LRTP) is a document that guides long-range investment and informs the development of a RTP/SCS. Some agencies that are both transit operators and planning agencies use the LRTP to conduct transportation planning for their region. As transit operators, they use the LRTP to plan and prepare for future transportation needs as a transit provider.

For Southern California transportation planning efforts, it is an essential building block. Orange County Transportation Authority (OCTA) submits its LRTP to the Southern California Association of Governments (SCAG) as the County's transportation plan.[16] Imperial, Los Angeles, Riverside, San Bernardino and Ventura Counties do the same. As an MPO from an area in nonattainment, SCAG is required to develop its RTP/SCS every 4 years and projects must be included in the RTP/SCS in order to be eligible for federal and state funding. Through the LRTPs submitted to SCAG, all transportation projects and programs in the six counties are incorporated into the RTP/SCS for Southern California and subsequently programmed for funding in the Federal Transportation Improvement Program (FTIP).[17] OCTA develops an LRTP as its vision for mobility over the next 20+ years and is updated every 4 years to reflect changing demographics, economic trends, and mobility needs in the county.[18]

Analysis of Long Range Transportation Plans

Long Range Transportation Plans (LRTPs) were gathered for a select set of agencies. The plans were then analyzed by the set of goals mentioned in Table 3-1. The plans assessed are included in Table 3-11 below.

[16] Orange County Transportation Authority 2014 Long Range Transportation Plan. Available at http://www.octa.net/pdf/OCTALRTP_Final.pdf
[17] Orange County Transportation Authority 2014 Long Range Transportation Plan. Available at http://www.octa.net/pdf/OCTALRTP_Final.pdf
[18] Orange County Transportation Authority 2014 Long Range Transportation Plan. Available at http://www.octa.net/pdf/OCTALRTP_Final.pdf

Table 3-11: List of LRTPs Analyzed

Agency	Plan (Date)
El Dorado County Transportation Commission	Western El Dorado County Short-and-Long-Range Transit Plan (July 2014)
Imperial County Transportation Commission (ICTC)	Imperial County 2013 Transportation Plan (November 2013)
Los Angeles County Metropolitan Transportation Authority (LACMTA)	2009 Long Range Transportation Plan (October 2009)
Orange County Transportation Authority (OCTA)	Outlook 2035: 2014 Long Range Transportation Plan (September 2014)
Riverside Transit Authority (RTA)	Ten-Year Transit Network Plan (January 2015)
Valley Transportation Authority (VTA)	Valley Transportation Plan 2040 for Santa Clara County (October 2014)
San Francisco County Transportation Authority	San Francisco Transportation Plan 2040 (December 2013)
Ventura County Transportation Commission (VCTC)	Ventura County Comprehensive Transportation Plan (August 2013)

Table 3-12: Prevalence of Goal in LRTP

	Orange County	El Dorado County	Los Angeles County	Ventura County	Santa Clara County	San Francisco County	Riverside County	Imperial County
Service efficiency (costs)	■	■	■		■	■	■	
Safety	■	■	■	■	■	■		
Congestion reduction	■	■	■	■	■			
Increasing transit ridership	■	■	■		■		■	
Land use integration	■		■	■	■	■		
Improving transportation choices	■		■	■	■	■		
Environmental sustainability	■	■	■	■		■		
State of good repair	■			■	■	■		
Service effectiveness (ridership, given costs)	■	■					■	
Affordable mobility		■		■				
Social service for disabled		■						
Social service for low-income		■						
Social equity		■						
Environmental justice			■					
Interagency coordination	■							

Table 3-12 above shows the prevalence of goals in the LRTPs reviewed. Figure 3-4 below shows the most common goals referenced are: safety, service efficiency, environmental sustainability, improving transportation choices, land use integration, increasing transit ridership, and congestion reduction. The LRTPs include a shared balance of goals that directly address the provision and use of transit and goals that come from transit use. This is not surprising because the LRTPs are authored by both transit operators and transportation planning agencies. These large transit agencies have direct influence on the transit system in their area. The area in which they operate is expansive, so they must plan to accommodate future demands on the transit system. This calls for coordination with various departments and agencies in the region and the role of these large transit operators often mirrors that of a MPO.

Figure 3-4: Prevalence of Analyzed Goals in Selected LRTPs

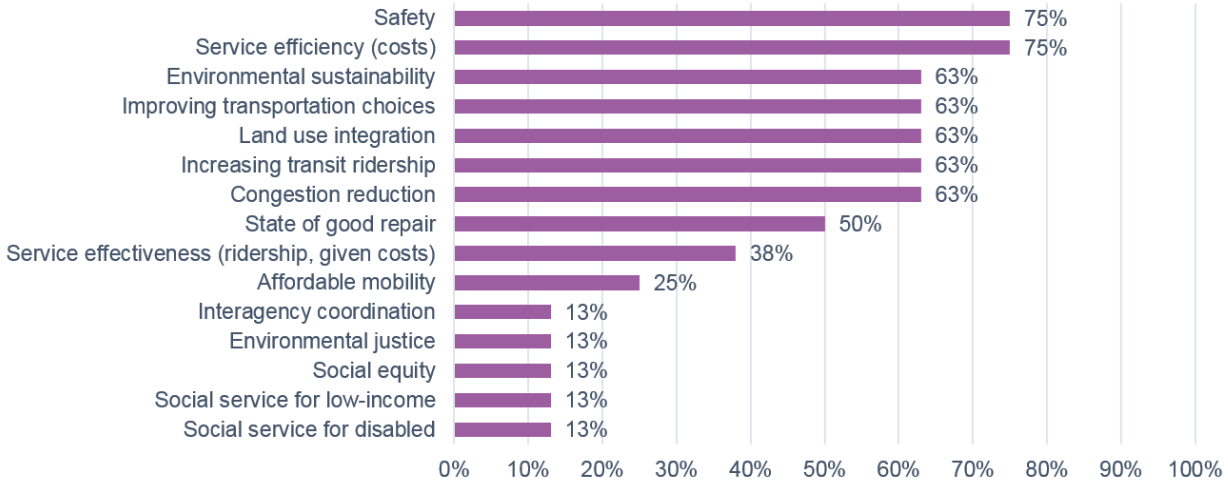


Table 3-13 shows selected goal statements from the LRTPs that were reviewed. These goal statements were chosen because they reflect the clear, measurable objectives of the agencies.

Table 3-13: Selected Goal Statements for Most Prevalent Goals from LRTPs

GOAL: **SAFETY**	
Agency	Goal Statement(s)
San Francisco County Transportation Authority	Build the pedestrian and bicycle strategies to establish safer neighborhood networks citywide. Freeway management and transit efficiency strategies to increase safety and encourage carpools.
GOAL: SERVICE EFFICIENCY (COSTS)	
Agency	Goal statement(s)
Los Angeles County Metropolitan Transportation Authority	Improving arterials by adding capacity and using technology to increase the efficiency of our roadway network. Metro transit fare revenues currently pay for only 29 percent of our cost to operate transit services. Cost savings are essential to improving this

	percentage to the planned level of 33 percent. Specific cost strategies are being implemented, but fare adjustments will be necessary to avoid serious deterioration in transit service. Optimize vehicle throughput at free-flow speeds through dynamic pricing. Generate sufficient revenue to sustain the financial viability of the ExpressLanes.
GOAL: **CONGESTION REDUCTION**	
Agency	Goal statement(s)
San Francisco County Transportation Authority	Continue to develop pricing approaches to congestion management. The Transportation Authority Board adopted the Mobility Access and Pricing Study exploring various scenarios for possible congestion charges downtown.
GOAL: **INCREASING TRANSIT RIDERSHIP**	
Agency	Goal statement(s)
VTA	Utilize improvements to develop an expanding ridership base by providing higher-quality, market-oriented service.
GOAL: **LAND USE INTEGRATION**	
Agency	Goal statement(s)
VCTC	Have a connected and integrated transportation system. Driving, taking transit, bicycling and walking will be easier thanks to a more connected transportation system in Ventura County. The system will also improve connections between neighborhoods, cities, and counties, and important places like jobs, schools and businesses. Better planning between transportation, land use, housing, environmental and economics will improve these connections.

GOAL: **IMPROVING TRANSPORTATION CHOICES**	
Agency	Goal statement(s)
VCTC	Provide convenient and accessible options. Many options that are easy to use at local and regional levels will help to improve connectivity. Improving local streets, roads, highways and rail will expand and enhance their use for bus, bicycle, pedestrian, train, rideshare, car share, and future technology options, creating more choices for traveling locally and beyond.
GOAL: **ENVIRONMENTAL SUSTAINABILITY**	
Agency	Goal statement(s)
OCTA	Support transportation, land use, and environmental strategies for sustainability for potential GHG impacts.

Transit Agency Plans

Short Range Transit Plan Requirements

Federal transportation statutes require that MPOs, in partnership with state and local agencies, develop and periodically update a long-range Regional Transportation Plan (RTP), and a Transportation Improvement Program (TIP) which implements the RTP by programming federal funds to transportation projects contained in the RTP.[19] The Short Range Transit Plan (SRTP) is not a federal requirement for receiving funding. However, coordination between operators and MPOs or CTCs is a requirement in developing the RTP and TIP, and the SRTP is a best practice for coordination.[20] Several MPOs and CTCs require SRTPs from local operators, which receive federal pass-through funds.

Analysis of Short Range Transit Plans

California has 269 transit agencies varying in type (bus only, rail only, or bus and rail), ranging in size (number of vehicles), and differing in locale (urban or rural). As their contexts vary, so do SRTPs. This analysis evaluates those differences among agencies of different size and context. Table 1-3 on page 1-5 lists agencies by their classification.

[19] Title 23 U.S.C §134

[20] Title 49 U.S.C § 5310

The SRTPs of all agencies with more than 100 vehicles, and a random sample of SRTPs representing one-third of all agencies with fewer than 100 vehicles were studied.

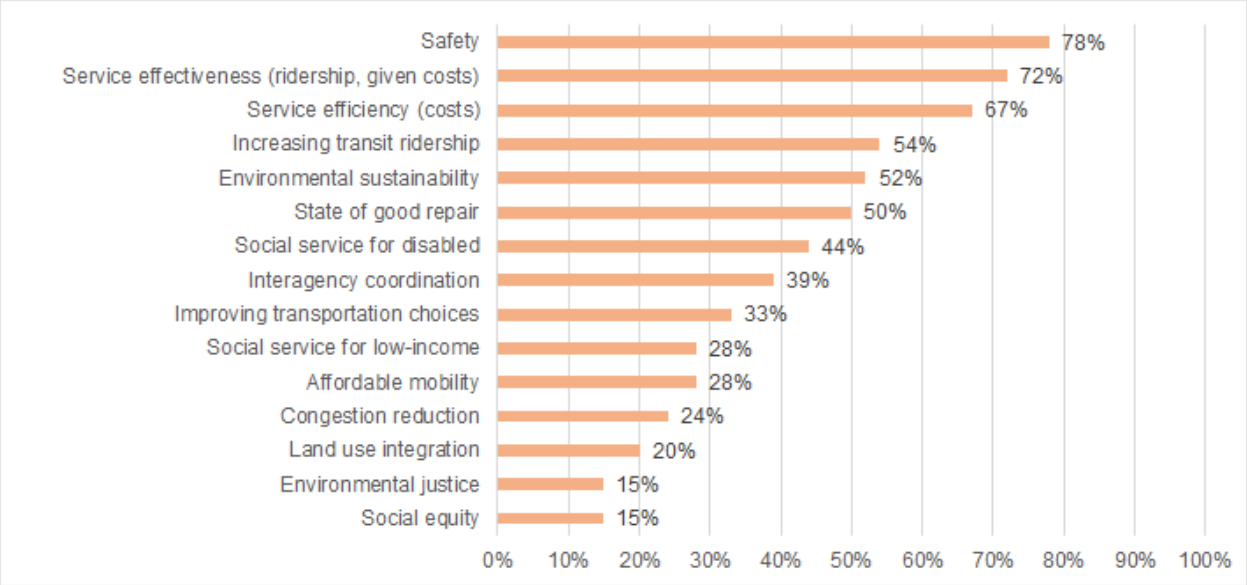
Table 3-14: List of Analyzed Short Range Transit Plans

Alameda-Contra Costa Transit District	Metrolink
Antelope Valley Transit Authority	Montebello Bus Lines
Caltrain	Monterey-Salinas Transit
Central Contra Costa Transit Authority	Napa County Transportation and Planning Agency
City of Elk Grove	North County Transit District
City of Fairfield- Fairfield and Suisun Transit (FAST)	Norwalk Transit System
City of Folsom (Folsom Stage Line)	Omnitrans
City of Gardena Transportation Department (GTran)	Orange County Transportation Authority
City of Lodi (Transit Division)	Riverside Transit Agency
City of Los Angeles Department of Transportation	Sacramento Regional Transit District
City of Petaluma	San Diego Metropolitan Transit System
City of San Luis Obispo (SLO Transit)	San Francisco Bay Area Rapid Transit District (BART)
Eastern Contra Costa Transit Authority (Tri Delta)	San Francisco Municipal Railway (Muni)
Foothill Transit	San Joaquin Regional Transit District
Fresno Area Express	San Mateo County Transit District
Gold Coast Transit	Santa Barbara Metropolitan Transit District
Golden Empire Transit District	Santa Clara Valley Transportation Authority
Golden Gate Bridge Highway and Transportation District	Santa Cruz Metropolitan Transit District
Imperial Transportation Commission	Santa Monica's Big Blue Bus

Livermore / Amador Valley Transit Authority	Torrance Transit System
Long Beach Transit	Unitrans- City of Davis/ASUCD
Los Angeles County Metropolitan Transportation Authority (Metro)	Victor Valley Transit Authority
Marin County Transit District	El Dorado County Transit Authority

Figure 3-5 shows that the five most prevalent goals in the SRTPs are safety, service effectiveness, service efficiency, increasing transit ridership, and environmental sustainability.

Figure 3-5: Prevalence of Goals in SRTPs



Goals by Agency Mode of Service

Table 3-15 below shows the frequency that goals appeared in an agency's SRTP by the type of mode the agency operates. As shown, agencies that operate rail and both bus and rail tended to include more goals. For example, all agencies operating rail and both bus and rail reference safety in their SRTPs, whereas only 74% of bus only agencies have safety mentioned. Goals of most types appear with less frequency in the SRTPs of bus only agencies. Congestion reduction and improving transportation choices are goals that appear with higher frequency among agencies with both bus and rail operations, as opposed to one or the other.

Table 3-15 SRTP Goal Prevalence by Agency Modes of Service

Agency Mode	Bus Only	Bus & Rail	Rail Only	All
Number of agencies	38	5	3	46
Safety	74%	100%	100%	78%
Service effectiveness (ridership, given costs)	71%	60%	100%	72%
Service efficiency (costs)	63%	80%	100%	67%
Increasing transit ridership	45%	100%	100%	54%
Environmental sustainability	45%	100%	67%	52%
State of good repair	39%	100%	100%	50%
Social service for disabled	39%	60%	67%	43%
Interagency coordination	39%	40%	33%	39%
Improving transportation choices	26%	80%	33%	33%
Affordable mobility	29%	40%	0%	28%
Social service for low-income	26%	20%	67%	28%
Congestion reduction	18%	60%	33%	24%
Land use integration	16%	40%	33%	20%
Social equity	13%	0%	67%	15%
Environmental justice	8%	40%	67%	15%

Goals by Agency Size

Table 3-16 below lists SRTP goals by agency size. As shown, a greater percentage of large agencies (with 500 or more vehicles) have goals in their SRTPs than do medium or smaller agencies (though the pool of seven large agencies is comparatively small). A smaller share of agencies with fewer than 100 vehicles have goals specified in their SRTPs than their larger

counterparts, though these small agencies were more likely to have interagency coordination and service efficiency listed as a goal than medium-sized agencies (100-500 vehicles). Service efficiency was the most commonly listed goal among small agencies (72%); at medium and larger agencies, safety was the most prevalent goal (95% and 100% respectively).

Table 3-16: SRTP Goal Prevalence by Agency Size

	Agency Size (by Vehicles)		
	<100	**100-500**	**500+**
Number of Agencies	**18**	**21**	**7**
Safety	50%	95%	100%
Environmental sustainability	44%	43%	100%
Service efficiency (costs)	72%	57%	86%
State of good repair	39%	48%	86%
Service effectiveness (ridership, given costs)	67%	76%	71%
Increasing transit ridership	39%	62%	71%
Social service for disabled	33%	43%	71%
Improving transportation choices	11%	38%	71%
Congestion reduction	17%	19%	57%
Interagency coordination	44%	33%	43%
Social service for low-income	22%	29%	43%
Environmental justice	6%	14%	43%
Affordable mobility	17%	38%	29%
Land use integration	11%	24%	29%
Social equity	0%	29%	14%

Goals by Agency Mode of Service and Size

Table 3-17 below shows SRTP goal prevalence by both the modes an agency operates and its fleet size. The smallest agencies are bus only; no bus and rail or rail only agencies in the sample have fewer than 100 vehicles. As the table illustrates, the prevalence of goals among agencies generally seems to be driven more by their size than their mode of operation, except for service effectiveness (which is listed more often among bus only agencies that have 100-500 vehicles than those with over 500) and service efficiency (which is listed more often among medium-sized bus and rail agencies than large ones).

Table 3-17: SRTP Goal Prevalence by Agency Mode and Size

	Bus Only			**Bus & Rail[21]**		**Rail Only**		**All**
Fleet size (vehicles)	**<100**	**100-500**	**500+**	**100-500**	**500+**	**100-500**	**500+[22]**	
Number of agencies	**18**	**18**	**2**	**1**	**4**	**2**	**1**	**46**
Safety	50%	94%	100%	100%	100%	100%	100%	78%
Service effectiveness (ridership, given costs)	67%	78%	50%	0%	75%	100%	100%	72%
Service efficiency (costs)	72%	50%	100%	100%	75%	100%	100%	67%
Increasing transit ridership	39%	56%	0%	100%	100%	100%	100%	54%
Environmental sustainability	44%	39%	100%	100%	100%	50%	100%	52%
State of good repair	39%	39%	50%	100%	100%	100%	100%	50%
Social service for disabled	33%	44%	50%	0%	75%	50%	100%	43%
Interagency coordination	44%	39%	0%	0%	50%	0%	100%	39%

[21] No bus and rail or rail-only agencies in the analysis had fewer than 100 vehicles.

[22] San Francisco BART is the only rail-only agency operating more than 500 vehicles.

Improving transportation choices	11%	39%	50%	0%	100%	50%	0%	33%
Affordable mobility	17%	44%	0%	0%	50%	0%	0%	28%
Social service for low-income	22%	28%	50%	0%	25%	50%	100%	28%
Congestion reduction	17%	17%	50%	0%	75%	50%	0%	24%
Land use integration	11%	22%	0%	100%	25%	0%	100%	20%
Environmental justice	6%	11%	0%	0%	50%	50%	100%	15%
Social equity	0%	28%	0%	0%	0%	50%	100%	15%

Goals by Agency Geography

Table 3-18 below illustrates the prevalence of goals by geography. Agencies in northern California (defined as north of Visalia) more often have service efficiency, service effectiveness, and increasing ridership as goals than their counterparts in southern California. The greatest difference is in the goal of service efficiency, which is listed by 83% of northern agencies but only 50% of southern agencies. Northern agencies also named land use integration, environmental justice, and social equity as goals more often than did southern agencies: 29% versus 9% for land use integration, 21% versus 9% for environmental justice, and 29% versus 0% for social equity.

Table 3-18: SRTP Goal Prevalence by Agency Geography

Agency Geography	**Northern CA**	**Southern CA**
Number of Agencies	24	22
Safety	75%	82%
Service effectiveness (ridership, given costs)	79%	64%
Service efficiency (costs)	83%	50%
Increasing transit ridership	67%	41%
Environmental sustainability	54%	50%

State of good repair	54%	45%
Social service for disabled	50%	36%
Interagency coordination	38%	41%
Improving transportation choices	29%	36%
Affordable mobility	33%	23%
Social service for low-income	38%	18%
Congestion reduction	25%	23%
Land use integration	29%	9%
Environmental justice	21%	9%
Social equity	29%	0%

Table 3-19 below shows selected goal statements for the most prevalent goals in all the SRTPs examined. These goal statements are chosen because they reflect clear, measurable objectives of the transit agencies.

Table 3-19: Selected Goal Statements for Most Prevalent Goals from SRTPs

GOAL: **SAFETY**	
Agency	Goal Statement(s)
Fresno Area Express	FAX buses should, at a minimum, operate in excess of 100,000 miles between preventable accidents, and bus operators should be formally recognized for their safe driving. Buses should be checked daily for proper operation and condition of lights, mirrors, radios and fluid. Detailed mechanical inspections should be done every 1,000 miles. Operations, Maintenance and other employees will be provided safety training at the beginning of their employment and such training will be updated on a regularly scheduled basis. FAX should continue to implement a security program.

North County Transit District	Ensure the safety and security of our employees and customers (number of preventable accidents by mode, NTD reportable accidents, near miss incidents along NCTD railroad corridors, and system incidents).
San Joaquin Regional Transit District	Commit to creating a safe and responsible environment for our employees, our customers, and our community.
GOAL: **SERVICE EFFECTIVENESS (RIDERSHIP, GIVEN COSTS)**	
Agency	Goal statement(s)
Fresno Area Express	Establish and maintain system-wide productivity indicators. Clovis Transit should achieve a 10% farebox recovery ratio for demand responsive (Roundup service) and 20% for fixed route (Stageline Services). Clovis Transit should record and report, at least monthly, the following performance indicators.
North County Transit District	Demonstrate good stewardship of federal, state, and local funds (ridership, farebox recovery, and operating recovery ratio and cost per revenue hour, per boarding, and per revenue mile).
Torrance Transit	In order to maximize efficiency and effectiveness to operation and overall delivery of service, Torrance Transit will strive to improve in the following areas of the seven Transit Performance Measures (TPM) service indicators: - 5% reduction to operating costs per vehicle service hour; - 2% increase to overall farebox revenue, local subsidies, and auxiliary revenue as a proportion of operating cost; - 2% reduction to MTA subsidies per passenger; - 2% increase to passengers per vehicle service hour; and - 2% increase to the farebox recovery ratio as well as farebox revenue per passenger.
GOAL: **SERVICE EFFICIENCY (COSTS)**	
Agency	Goal statement(s)

Marin County Transit District	Meet cost efficiency standards based on cost per revenue hour. The District monitors cost efficiency in terms of operating cost per revenue hour. Currently, performance targets are $120 per hour for fixed-route and $87 per hour for demand response programs.
Napa County Transportation and Planning Agency	Operate safe and efficient service. The following Objectives reflect the need to balance service provision with service efficiency, which can be measured by increased productivity as well as overall ridership: -Improve service reliability -Improve passenger safety and security -Maximize efficiency in schedules -Maintain fleet and facilities in a state of good repair -Replace fleet at end of the useful life
North County Transit District	Secure adequate revenue, protecting our assets, and getting the maximum return on the public investment through fare revenue per passenger and auxiliary/non-transportation revenues.
GOAL: **INCREASING TRANSIT RIDERSHIP**	
Agency	Goal statement(s)
Fresno Area Express	Provide a transit system that meets the public transportation needs of the service area. Clovis Transit shall implement real time dispatching for demand responsive service to improve overall operations and increase ridership.
Golden Gate Bridge Highway and Transportation District	Improve service for the customer and attract new riders. Transit Performance Initiative: Investment and incentive program and regional customer satisfaction survey. Increase ridership levels at or above the rate of population growth.
Napa County Transportation and Planning Agency	Ridership shall grow in relation to population growth in the county (19% in 2020).
GOAL: **ENVIRONMENTAL SUSTAINABILITY**	

Agency	Goal statement(s)
Eastern Contra Costa Transit Authority	Take a leadership role in developing a coherent transportation policy to deal with problems of traffic congestion, air quality, and growth management.
Fairfield and Suisun Transit	Have a positive impact on the community and environment.
Napa County Transportation and Planning Agency	From the resultant reduction in greenhouse gases to decreased congestion, increased transit use can be an integral part in meeting county sustainability goals. Sustainability is also represented by the agency's relationship with the community and business and how their voices are reflected in the decisions that the agency makes. Single occupancy vehicle use should be reduced by 5% by 2020. Single Occupancy Vehicle Use should not exceed 2013 use.

Transit Agency Sustainability Plans

The authors searched for official, adopted sustainability plans for each California Transit Agency which reported at least 100 vehicles to the National Transit Database in 2015. The following are four transit agencies identified to have prepared sustainability plans, indicating their prioritization of sustainability. No other transit agency sustainability plans were identified.

Table 3-20: List of Transit Agency Specific Sustainability Plans

Agency Name	**Plan Title**	**Year Created/ Updated**
Alameda-Contra Costa Transit District	Environmental Sustainability Report	2010
Los Angeles County Metropolitan Transportation Authority (Metro)	Metro Countywide Sustainability Planning Policy & Implementation Plan	2012

Santa Clara Valley Transportation Authority	Sustainability Report	2013
San Francisco County Transportation Authority/San Francisco Municipal Transportation Agency	Transportation Sustainability Program	2015

Coordinated Plans for Specialized and Human Services Transportation

Specialized transit is transportation provided to people with disabilities, seniors, and low-income travelers. In response to the diverse transportation needs of these populations that require flexibility, state and federal legislation established consolidated transportation service agencies and the requirement for coordinated human services transportation plans.

Consolidated Transportation Service Agencies (CTSAs)

Assembly Bill 120 (the Social Services Transportation Improvement Act) called for the establishment of a Consolidated Transportation Service Agency (CTSA) in each county to foster coordination between various transportation services serving individuals lacking mobility, such as people with disabilities, senior citizens, and low-income persons. The role of a CTSA varies by county, CTSAs can be planning agencies or service providers or both. CTSAs that are not service providers receive no funds to implement or provide transportation; rather, their role is to coordinate existing services such as fixed-route bus and light rail, demand-response services (dial-a-ride), or supplemental/human services transportation such as senior shuttles or shuttles for community events.[23] Through the coordination and sharing of resources among transportation providers, CTSAs strive to make better use of vehicles and funding for these service providers,[24] which can be transit agencies, social services from cities and counties, senior centers, faith-based organizations, independent living centers, health care centers, and for-profit paratransit companies.[25]

[23] Baselines: Current and Future Transit and Demographic Trends. 2011. California Statewide Transit Strategic Plan. Caltrans. Available at http://www.dot.ca.gov/hq/MassTrans/STSP/Baselines_rpt_11-08-11.doc

[24] Baselines: Current and Future Transit and Demographic Trends. 2011. California Statewide Transit Strategic Plan. Caltrans. Available at http://www.dot.ca.gov/hq/MassTrans/STSP/Baselines_rpt_11-08-11.doc

[25] Baselines: Current and Future Transit and Demographic Trends. 2011. California Statewide Transit Strategic Plan. Caltrans. Available at http://www.dot.ca.gov/hq/MassTrans/STSP/Baselines_rpt_11-08-11.doc

An example of a CTSA is Paratransit, Inc., the first designated CTSA in California, which serves the Sacramento County area. Paratransit, Inc. works with social service agencies, such as United Cerebral Palsy, Asian Community Center, and Elk Grove Adult Community Training to increase transportation options for seniors, individuals with disabilities, and persons with low incomes.[26] Paratransit, Inc. operates a maintenance shop for its own vehicles and those of other agencies in the Sacramento area, sharing its technical capabilities with community agencies for the maintenance of their fleets. In addition, Paratransit, Inc. has a Partnership Program, with partnership agreements with over a dozen agencies in Sacramento County. By sharing resources, the service provided by the human service agencies becomes more cost effective and results in higher quality service for the client, with more reliable routine pick up and drop off schedules, and an often shorter trip-length due to proximity of individuals to programs. Paratransit, Inc. also offers the Travel Training program, which is designed to teach individuals with disabilities, elderly, and low-income individuals how to use fixed-route public transit rather than door-to-door services.

Coordinated Public Transit-Human Services Transportation Plan

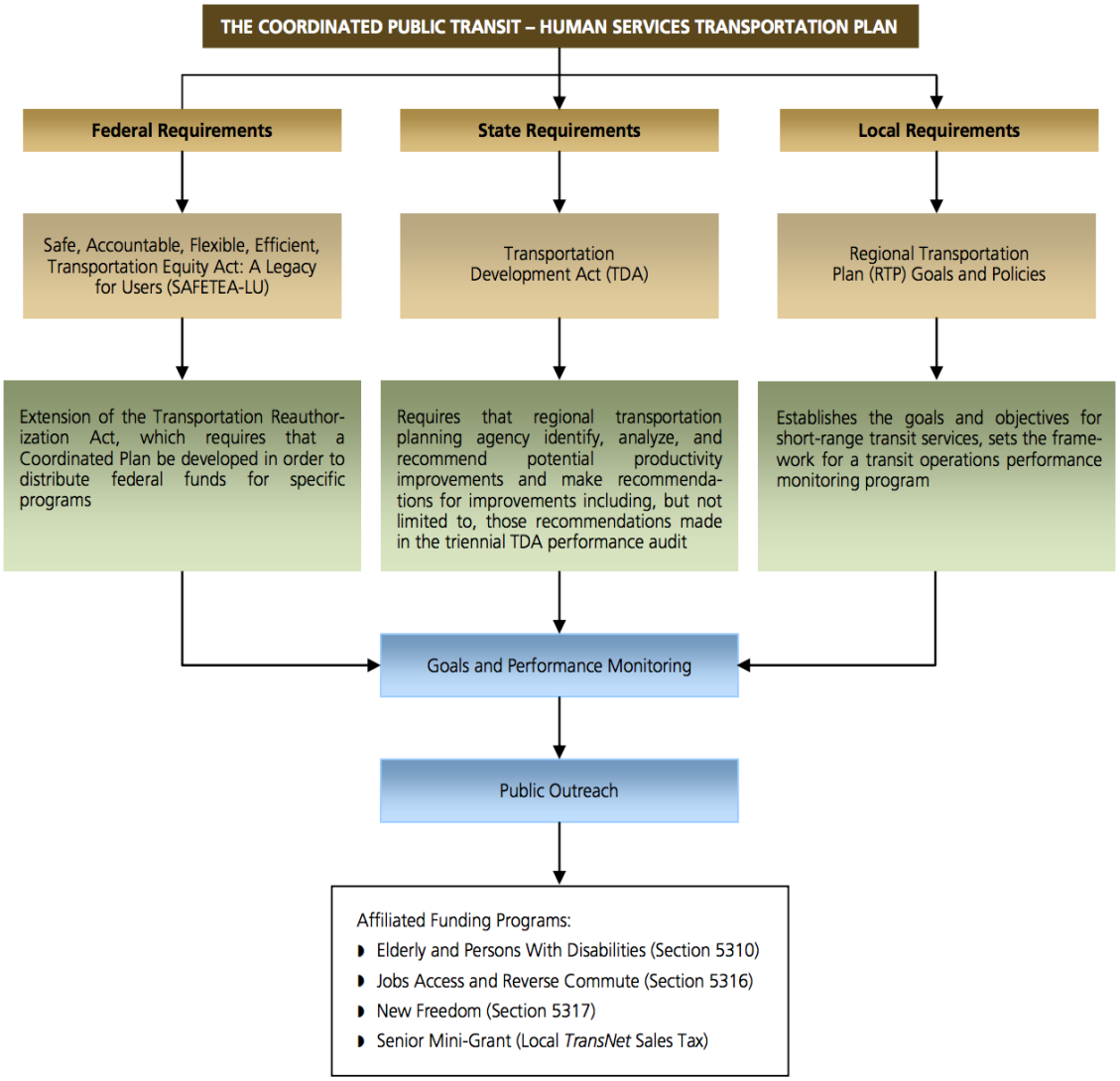
In order for agencies providing human services transportation (for people with disabilities, seniors, and individuals with lower income) to receive grants from various federal programs (such as FTA's Elderly Individuals and Individuals with Disabilities Enhanced Mobility of Seniors and Individuals with Disabilities Program 5310)[27], they must be consistent with their regional Coordinated Public Transit Human Service Transportation Plan (Coordinated Plan).[28] Coordinated Plans are intended to help different providers coordinate their transit resources to minimize duplication of services and improve transportation services for people with disabilities, the elderly, and low-income individuals.

Coordinated Plans can be developed as a part of the metropolitan transportation planning process or separately. Per the 2016 Regional Transportation Guidelines for MPOs, MPOs should check for consistency between the Coordinated Plan and their region's metropolitan transportation planning process.[29] Representatives from public, private, and nonprofit transportation and human services providers as well as the public must be included in the

[26] http://paratransit.org/ctsa/
[27] (Title 49 U.S.C § 5310)
[28] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Available at http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf
[29] (Title 23 CFR Part 450.306(h))

process of developing a Coordinated Plan. The projects selected for funding must also be consistent with the RTP and Federal Transportation Improvement Program (FTIP).[30]

Figure 3-6: Coordinated Plan Requirements and Components[31]



[30] 2016 Final Draft Regional Transportation Guidelines for Metropolitan Planning Organizations, California Transportation Commission. Retrieved from http://www.dot.ca.gov/hq/tpp/offices/orip/rtp/index_files/Nov2016_FinalDraftMPORTPGuidelines.pdf

[31] The Regional Short-Range Transit Plan & Coordinated Public Transit-Human Services Transportation Plan 2016-2020, SANDAG. Available at http://www.sandag.org/uploads/publicationid/publicationid_2056_20920.pdf

Analysis of Specialized Transit and Coordinated Public Transit- Human Services Transportation Plans

A total of 13 Coordinated Public Transit- Human Services Transportation Plans (Coordinated Plans) were randomly selected (by random number generation) and reviewed to compare and contrast goals outlined for paratransit service across the state. The plans were then analyzed by the set of goals mentioned in Table 3-1. The plans assessed are included in Table 3-21 below.

Del Norte Local Transportation Commission (DNLTC) (January 2015)	El Dorado County Transportation Commission (EDCTC) (April 2015)
Fresno Council of Governments (Fresno COG) (February 2015)	Humboldt County Association of Governments (HCAOG) (June 2013, Amended June 2016)
Imperial County Transportation Commission (ICTC) (November 2014)	Los Angeles County Metropolitan Transportation Authority (LACMTA) (July 2015)
Mendocino Council of Governments (MCOG) (October 2008)	Metropolitan Transportation Commission (MTC) (March 2013)
Orange County Transportation Authority (OCTA) (May 2015)	Sacramento Area Council of Governments (SACOG) (October 2014)
San Diego Association of Governments (SANDAG) (July 2016)	San Luis Obispo Council of Governments (SLOCOG) (March 2016)
Ventura County Transportation Commission (VCTC) (July 2012)	

Table 3-21: List of Coordinated Plans Analyzed

Table 3-22 below shows the prevalence of the goals analyzed in the selected Coordinated Plans. The top two ranked goals are social service for disabled people and social service for low-income persons, which align with the intent of these plans. One goal missing from the Coordinated Plans is congestion reduction.

The *2010 Mobility AP Phase I Implementation Study* by Caltrans summarized the resources, needs, gaps, and recommendations identified by 45 coordination plans for various agencies across the state. The study consists of two volumes: the first volume reviewed 21 Urban Coordinated Public Transit/Human Services Transportation Plans and the second volume reviewed 24 Coordination Plans developed by rural counties.

The study found key trends for plans in urban areas and in rural areas, as well as commonalities between all agencies. One finding was that both urban and rural agencies cited a need for more management positions in their organizations, vehicle acquisition or replacement, and the expansion of volunteer programs. Additionally, urban areas cited the need for improved fixed-route services, transit vouchers and/or bus pass programs, travel training and "bus buddy" programs for riders, while rural areas cited the need to establish and support Consolidated Transportation Service Agencies (CTSAs) and to develop Non-Emergency Medical Transportation (NEMT) options.

While this current analysis did not distinguish between urban and rural counties, its findings were mostly consistent with those from the 2010 study. The current Coordinated Plans identified needs such as the improvement to the fixed-route public transit network for both urban and rural areas. For agencies in urban areas like LA Metro, the current Coordinated Plans identified the need for improvements to demand-response services and for improvements to amenities at bus stops and transfer centers. For agencies in rural areas like DNLTC and SLOCOG, the current Coordinated Plans identified needs consistent with the 2010 study such as the need to enhance NEMT and improve coordination with CTSAs. The 2010 study provided a series of recommendations for improvement, some of which have noticeably been implemented in the Coordinated Plans reviewed in this analysis. For example, one recommendation was to develop a standardized plan organizational format in response to the difficulty involved in extracting specific information from various plans. In the most recent plans reviewed for this analysis, the plans are found to be formatted fairly consistently.

Other changes since the 2010 study are the increased emphasis on providing information to riders via online portals and the emergence of transportation network companies (TNCs), such as Lyft or Uber, in the paratransit world. The plans of Fresno COG, SLOCOG, SANDAG, LA Metro, and OCTA discuss the role that TNCs could play in supplementing existing paratransit services, suggesting various forms of implementation such as trip reimbursements, vouchers, subsidies, and encouraging TNCs to operate accessible vehicles.

Overall, in comparing the current findings with those in the 2010 study, the goals and challenges faced by agencies providing paratransit service are generally the same, consisting of needs to improve fixed-route and demand-response services, to improve coordination internally for

operations and externally with partnering organizations, to increase NEMT services, and to provide additional resources for travel training for the users of these services. Funding is cited by many agencies as a limitation in addressing all of the needs outlined in their plans.

Table 3-22 shows the prevalence of goals by Coordinated Plan. The most two most prevalent goals for the Coordinated Plans are social service for disabled and low-income. This is understandable, since these plans strive to provide transit service to these populations. The plans also aim to cater to low-income individuals. This is reflected in the prevalence of the affordable mobility goal is most of the Coordinated Plans reviewed. The goals reflected in the Coordinated Plans are indirectly influenced as a result of transit use.

Table 3-22: Prevalence of Goals in Coordinated Plan

	SANDAG	MTC	ICTC	Fresno COG	HCAOG	MCOG	SACOG	SLOCOG	OCTA	VCTC	LACMTA	DNLTC	EDCTC
Social service for disabled	■	■	■	■	■	■	■	■		■	■	■	
Social service for low-income	■	■	■	■	■	■	■	■	■	■	■		
Affordable mobility	■	■	■	■	■	■	■	■	■		■		
Interagency coordination	■	■	■	■	■	■	■	■		■		■	
Service efficiency (costs)	■	■	■	■			■		■			■	
Improving transportation choices	■	■	■					■	■		■		
Land use integration	■	■			■								
Service effectiveness (ridership, given costs)	■	■	■	■									
State of good repair	■					■							■
Increasing transit ridership	■				■								
Safety									■	■			
Social equity	■	■											
Environmental justice	■												
Environmental sustainability	■												
Congestion reduction													

Table 3-23 shows selected goal statements from the various Coordinated Plans that were reviewed. These goal statements are chosen because they reflect the clear, measurable objectives of the plans.

Table 3-23: Selected Goal Statements for Most Prevalent Goals from Coordinated Plans

GOAL: **SOCIAL SERVICE FOR DISABLED**	
Agency	Goal Statement(s)
SACOG	Improve coordination and community partnerships, and for low cost efforts by transit agencies, human service transportation providers, local governments, community-based organizations, and other to improve mobility for seniors and persons with disabilities and/or low-incomes.
LACMTA	Provide necessary support services to enable access to public and human service transportation services by seniors, persons with disabilities, persons of low-income and the veteran population.
GOAL: **SOCIAL SERVICE FOR LOW-INCOME**	
SLOCOG	Increase transportation options for low-income families and workers.
ICTC	Provide affordable transportation to disadvantaged populations.
GOAL: **AFFORDABLE MOBILITY**	
HCAOG	Affordable Dial-A-Ride: Stakeholders noted that the cost of dial-a-ride is unaffordable, especially for seniors and individuals with disabilities, and/or limited incomes. Stakeholders noted that the cost of dial-a-ride is especially unaffordable for people whose only means of transportation is the dial-a-ride program.
OCTA	Expand affordable transportation.
GOAL: **INTERAGENCY COORDINATION**	
SACOG	Improve coordination and community partnerships, and for low cost efforts by transit agencies, human service transportation providers, local governments, community-based organizations, and other to improve mobility for seniors and persons with disabilities and/or low-incomes.

SLOCOG	Improve communication and coordination among local agencies involved in all levels of coordinating social service and public transportation programs.
ICTC	Continue to build collaborative partnerships to leverage available mobility options for transportation disadvantaged populations mobility options for transportation disadvantaged populations.
GOAL: **SERVICE EFFICIENCY (COSTS)**	
SACOG	Improve coordination and community partnerships, and for low cost efforts by transit agencies, human service transportation providers, local governments, community-based organizations, and other to improve mobility for seniors and persons with disabilities and/or low-incomes.
OCTA	Promote safe, reliable, and cost-effective public transportation that is responsive to the needs of the Coordinated Plan populations.

Conclusion

Table 3-24 below shows the prevalence of goals in all plans by plan type (RTP/SCS, LRTP, SRTP, and Coordinated Plans). As is illustrated, most plan types (except Coordinated Plans) have safety as one of the most prevalent goals. For Coordinated Plans, safety is not as prioritized as other goals such as social service for low-income and disabled people. Unlike the other plans which have a wide-range of goals, Coordinated Plans have the specific role of providing services to populations that have unmet needs as a result of the current transit system in place. Their focus, in other words is narrower; no Coordinated Plan included congestion reduction as a goal, for example, since that is not the focus of the organizations making those plans.

Table 3-24: State Goal Prevalence by Plan Type

	Total (all studied plans)	**RTP/ SCS**	**LRTP**	**SRTP**	**Coordinated Plan**
Number of Plans	85	18	8	46	13
Safety	72%	94%	75%	78%	15%
Service efficiency (costs)	65%	61%	75%	67%	54%
Service effectiveness (ridership, given costs)	58%	50%	38%	72%	31%
Environmental sustainability	55%	94%	63%	52%	8%
Improving transportation choices	51%	94%	63%	33%	46%
Interagency coordination	49%	72%	13%	43%	77%
State of good repair	48%	61%	50%	50%	23%
Social service for disabled	48%	50%	13%	39%	85%
Social service for low-income	46%	78%	13%	28%	85%
Increasing transit ridership	44%	28%	63%	54%	15%
Affordable mobility	41%	56%	25%	28%	77%
Land use integration	36%	78%	63%	24%	23%
Congestion reduction	32%	61%	63%	20%	0%
Social equity	28%	78%	13%	15%	15%
Environmental justice	20%	44%	13%	15%	8%

The most prevalent goals in all the plans combined are safety, service efficiency, service effectiveness, environmental sustainability, and improving transportation choices. SRTPs share

the same first four goals (safety, service efficiency, service effectiveness, and environmental sustainability), but the SRTP goal of increasing transit ridership is referenced slightly more than their goal of improving transportation choices. It is understandable that four of the goals are the same since more SRTPs were reviewed than any of the other plan types. In addition, the SRTPs are created and implemented by transit operators who play the largest role in providing transit service and are influencing the use of transit. The goals emphasized in the SRTPs reflect this. Additionally, SRTPs tend to be more operations oriented.

Though they constitute the smallest sample size, the set of LRTP plans share four of the goals referenced most in all plan types: safety, service efficiency, environmental sustainability, and improving transportation choices. The LRTPs also frequently reference three additional goals: increasing transit ridership, congestion reduction, and land use integration. Overall, SRTPs and LRTPs share similar goals: both the reviewed LRTPs and SRTPs include safety, service efficiency, increasing transit ridership, and environmental sustainability as their most prevalent goals. Their similarity in goals is not surprising since both LRTPs and SRTPs are produced by transit operators. Increasing transit ridership is a unique goal for both LRTPs and SRTPs. They are the only set of plans to have this goal so prevalent in the plans. Likewise, when transit operators also act as transportation planning agencies, LRTPs share similar goals to RTP/SCSs (safety, improving transportation choices, environmental sustainability, and land use integration).

Goals of most plan types appear with less frequency in the RTP/SCSs. For example, the most referenced goals in the RTP/SCSs are improving transportation choices, environmental sustainability, safety, social service for low-income, social equity, and land use integration. The three most referenced goals in the RTP/SCSs are improving transportation choices, environmental sustainability, and safety (94%). Improving transportation choices is only mentioned in 63% of LRTPs, 33% of SRTPs, and 46% of Coordinated Plans. This variation can be explained by the difference in the entities responsible for each plan type and the motivation driving the development of the plans. RTP/SCS are written by MPOs that are regional transportation planning agencies, while SRTPs are authored by transit operators that provide transit service. For transit operators, service efficiency (costs), service effectiveness (ridership, given costs), and increasing transit ridership are more important. For an MPO, improving transportation choices, social service for low-income, social equity, and land use integration are more important. MPOs are responsible for planning beyond transit service and consider other needs such as housing and GHG emissions reductions in the region. As a result, RTP/SCSs reflect more region-oriented goals that span a much larger area than the goals represented in an LRTP, SRTP, or Coordinated Plan.

4

CHAPTER

Use of the California Transit System

Chapter 4: Use of the California Transit System

Introduction

In 2015, 42.2 million hours of public transit service were provided in California, 1.4 billion passenger trips were taken, and 8.5 billion passenger miles were traveled.[1] However, California is a very large state; these 1.4 billion public transit trips account for only 4.1% of all of the person trips made in the state,[2] and the 42.2 million hours of transit service are lower than several other U.S. states' on a per capita basis.[3] California has set a target of doubling transit's statewide mode share by 2020, with additional future increases required to meet the state's greenhouse gas reduction targets.[4] Meeting these targets requires an understanding of the exogenous and endogenous factors influencing transit patronage trends, and endogenous factors and trends are further clarified in this chapter.

Over the 10-year period from 2005 to 2015, the supply of transit service per capita has remained steady, as increases in vehicle revenue hours have (barely) matched population growth.[5] During this period, the number of passenger trips taken each year has remained steady, meaning that per capita trip-taking has fallen, as has the number of trips taken per service hour provided.[6]

Annual data through 2015 reported to the National Transit Database indicate some modal shifts.[7] Local bus has been and continues to be the mode of service most provided, and the one with the most trip-taking since at least 2005. However, a fraction of transit service provision has recently shifted from shorter distance, high-utilization modes such as local bus to longer distance, low-utilization modes such as vanpool, commuter bus and demand response.[8] This change has been matched by an increase in the average length of transit trips and a decrease in the number of trips taken per transit service hour provisioned. Demand response service has grown substantially, although demand response trip-taking has not kept pace with this service expansion, and unlinked passenger trips per demand response vehicle revenue hour have fallen.

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[1] National Transit Database. (2016).
[2] California Household Travel Survey (2012).
[3] National Transit Database. (2016).
[4] Caltrans Strategic Management Plan (2015).
[5] National Transit Database (2016); US Census (2016). American Community Survey Annual Population Estimates.
[6] National Transit Database (2016).
[7] Ibid.
[8] Demand response includes paratransit, dial-a-ride, and may include government-subsidized trips with transportation network company services.

Geographically, the four largest Metropolitan Planning Organization (MPO) areas by population—the planning regions of the Southern California Association of Governments (SCAG), the Bay Area Metropolitan Transportation Commission (MTC), the San Diego Association of Governments (SANDAG) and the Sacramento Area Council of Governments (SACOG)—account for the most of the state's transit service, trip-taking and forecast population growth (NTD 2016; CADOF 2014). The largest two regions by population, by transit service, and by transit usage—overseen by SCAG and MTC—account for most transit activity in the state.

In California, the vast majority of all trips are taken by automobile with county-by-county auto mode shares ranging from approximately 69% to 95%, with the exception of the City and County of San Francisco, which has just a 35% auto mode share.[9] By contrast, public transit accounts for fewer than one in twenty trips taken in the state with county-by-county transit mode shares ranging from <1% to 7%, with the exception again of the City and County of San Francisco, which has a 15% public transit mode share.[10] Compared to other states, California provides a moderate amount of transit service relative to its population, and has correspondingly moderate rates of utilization (trip-taking relative to transit provision) (see Figures 4-30 through 4-32). The correlation between other states' per-capita transit provision and use suggests that meeting the state's mode share targets may require significant expansion of transit service throughout the state, above and beyond California's expected rates of population increase.

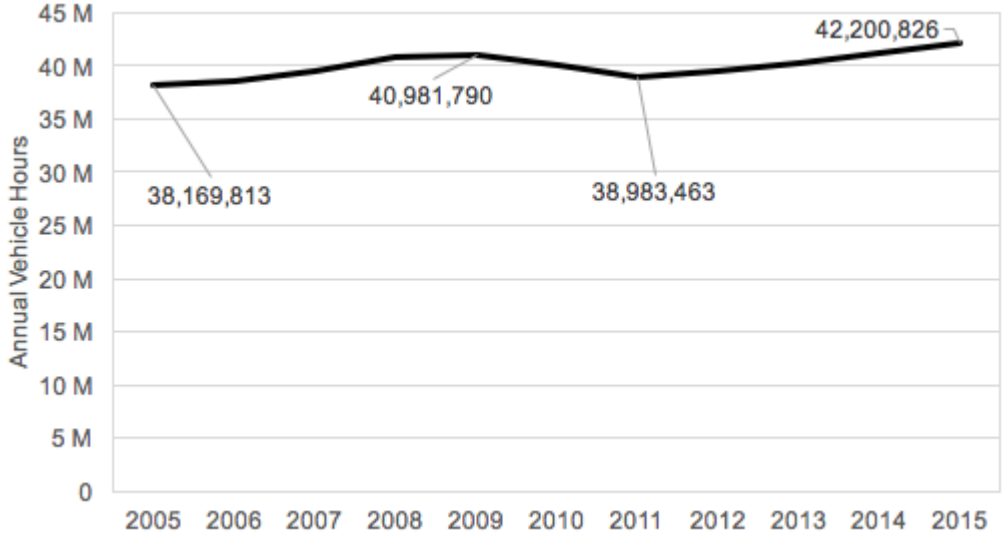
Transit Service Provision in California

Over the ten year period from 2005 to 2015, transit service hours have increased in line with population. On a per capita basis, the MTC oversees the most transit service relative to population, followed by SCAG and SANDAG. While per capita provision of transit service has increased in the SCAG region, it has declined within the SANDAG, SACOG and, especially, MTC regions. On a modal basis, most transit service in California is provided by local bus, though the share of transit trips taken by bus is falling. The absolute number of local bus vehicle revenue hours provisioned also fell between 2010 and 2015 (see Figure 4-9). This decline in local bus service has not been matched by an increase in rapid bus or rail service. Rather, service is shifting to commuter-oriented modes such as commuter bus, commuter rail and vanpool, and to demand response.

[9] CHTS 2012.
[10] Ibid.

Overall, about 42.2 million hours of transit service were provisioned in California in 2015, following a steady increase from 39.0 million transit service hours in 2011, which represented a drop from the previous peak of 41.0 million transit service hours in 2009, as shown in Figure 4-1.[11]

Figure 4-1: California Transit Vehicle Revenue Hours, 2005-2015.

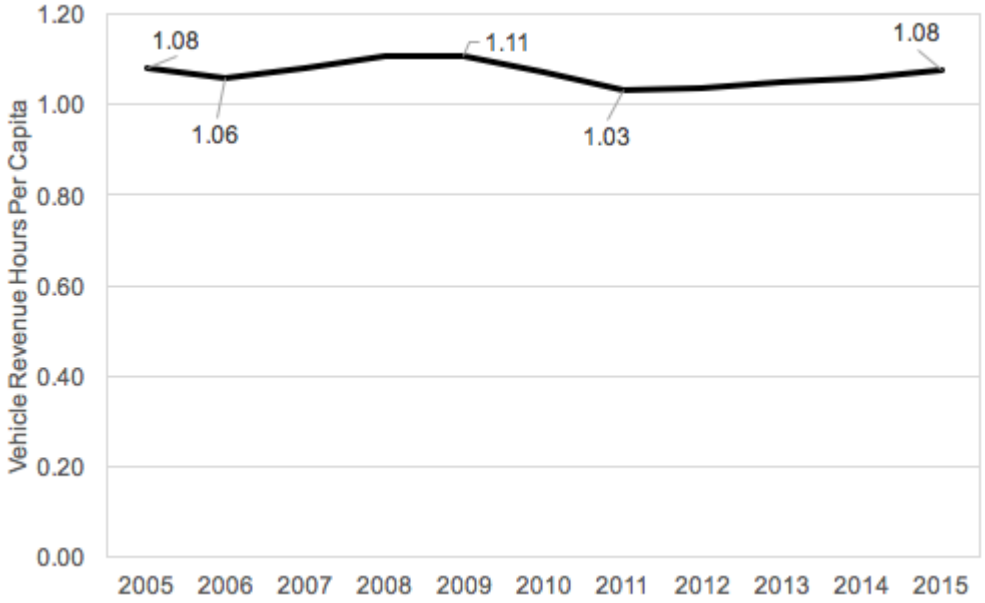


Source: National Transit Database 2016.

Although total 2015 service hours exceed the previous 2009 peak, per capita service hours have not yet recovered. In 2015, 1.08 service hours were provisioned per capita, compared to 1.11 per capita in 2009, as shown in Figure 4-2.

[11] This chapter defines the provision of transit service as quantified in vehicle revenue hours. These are distinct from passenger capacity hours, which are equal to vehicle hours multiplied by the capacity of the vehicles in question.

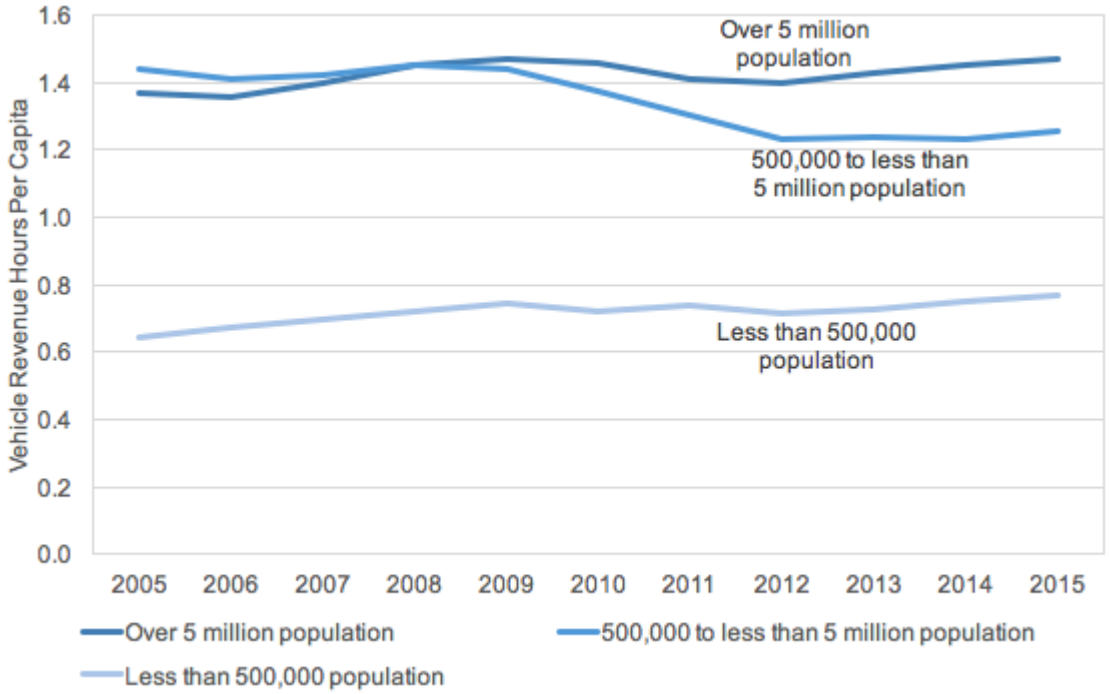
Figure 4-2: California Annual Transit Vehicle Revenue Hours per Capita, 2005-2015.



Source: National Transit Database 2016.

Breaking down the statewide data by size of urbanized area, the largest and smallest urbanized areas with population over 5 million or under 500,000 have recovered their service provision in terms of vehicle revenue hours per capita (Figure 4-3). However, medium-sized urbanized areas have not yet recovered to 2009 levels.

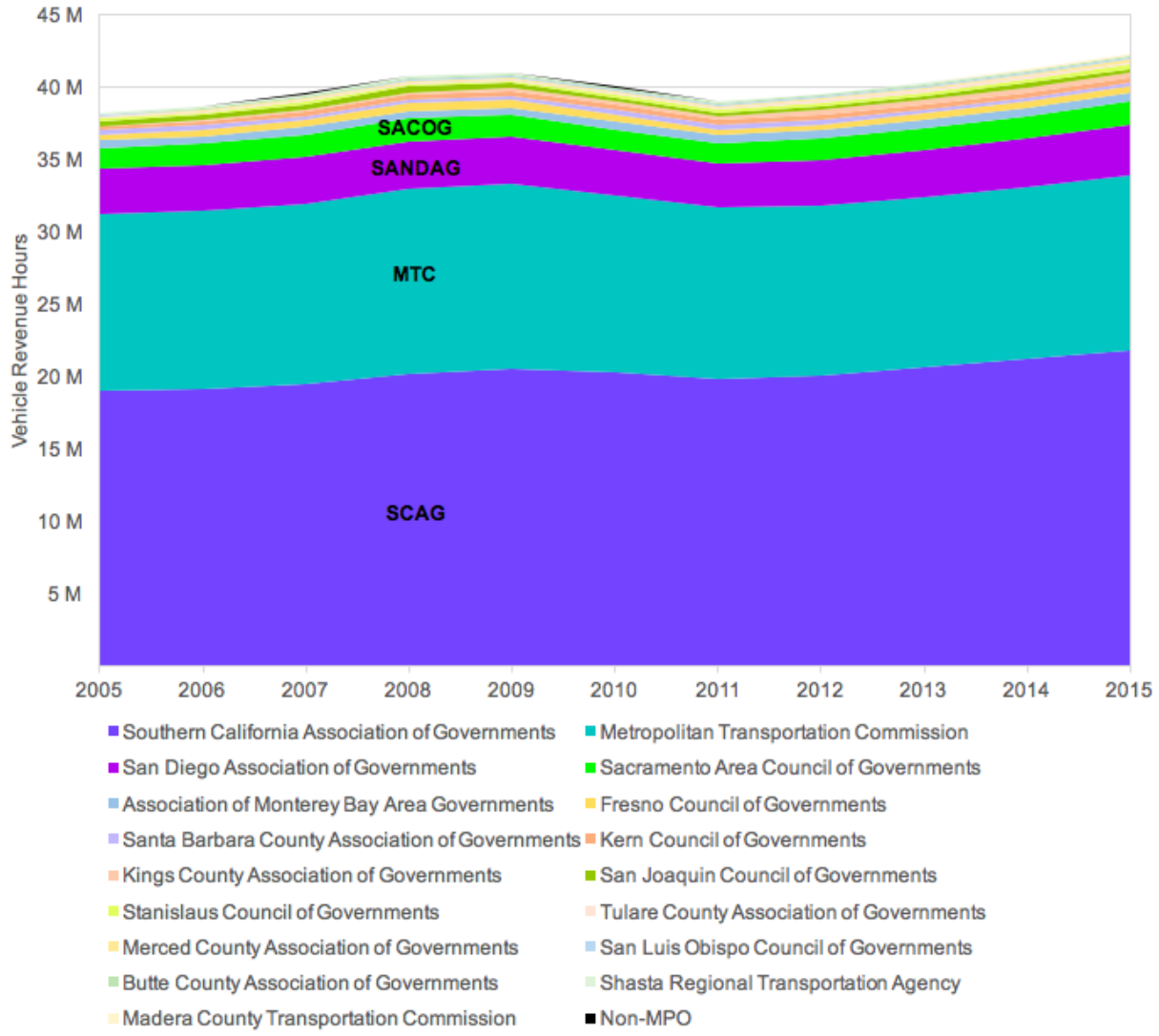
Figure 4-3: Annual Transit Vehicle Revenue Hours per Capita by Size of Urbanized Area, 2005-2015.



Source: National Transit Database 2016.

Figure 4-4 shows the change in the state's transit vehicle revenue hours between 2005 and 2015 by MPO region. In the SCAG and SANDAG planning regions, Vehicle revenue hours increased moderately (15% and 12% respectively). The area served by SACOG saw lower growth (7%), while the area served by the MTC saw a reduction in service hours (-1%). Areas served by other MPOs saw significant growth (37% on average), albeit from a comparatively small base.

Figure 4-4: California Transit Vehicle Revenue Hours by MPO Area, 2005-2015.

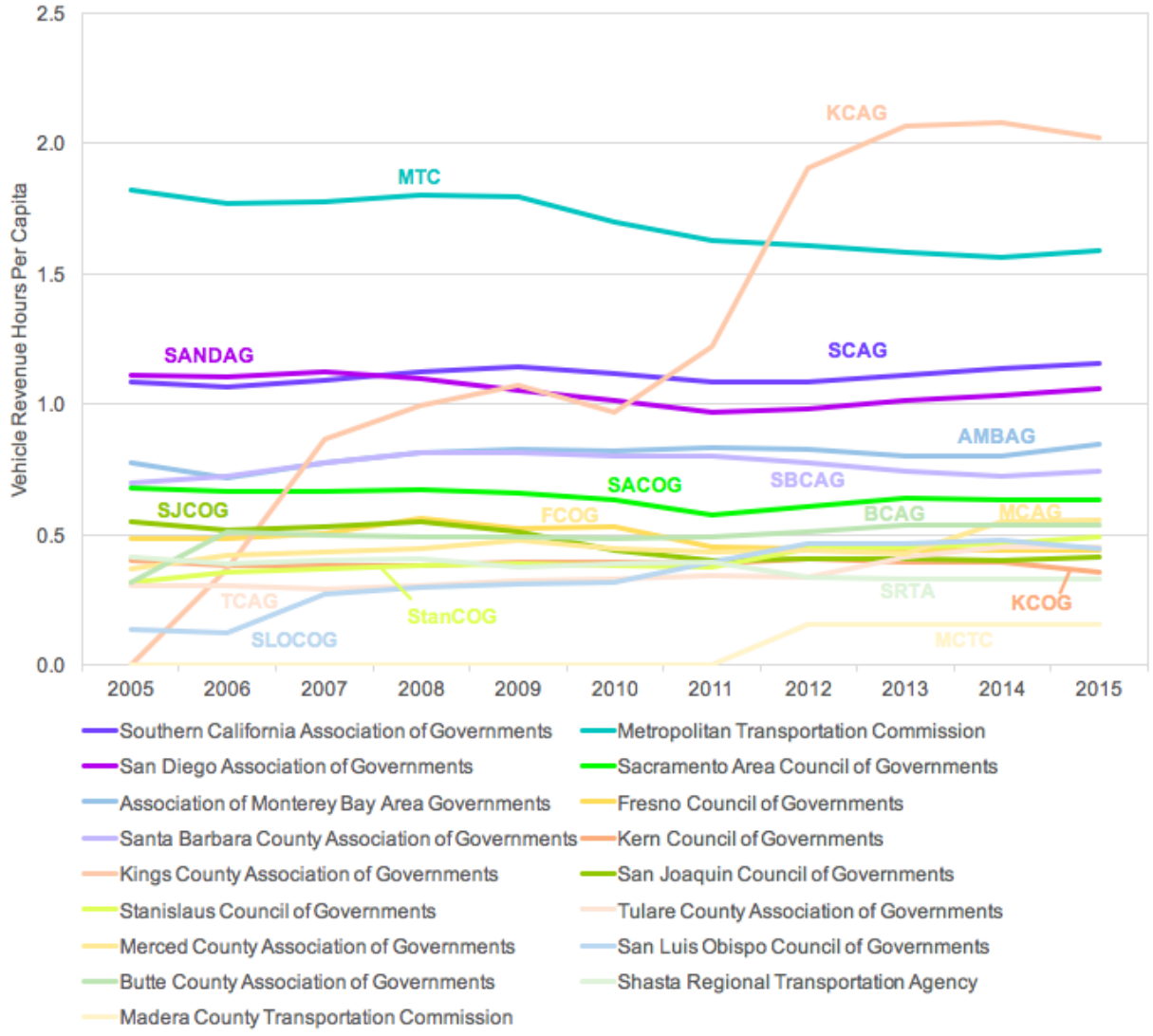


Source: National Transit Database 2016.

Per capita provision of transit service varies greatly between California MPO areas (See Figure 4-5). Note that although the Kings County Association of Governments (KCAG) area provided the most transit service per capita in 2015, with over 2,000 service hours per 1,000 population, much of this service was outside the KCAG area since the California Vanpool Authority JPA is based within the KCAG area but operates in several counties outside of the KCAG region. Excluding the KCAG area, the highest per capita provision of transit service occurred in the MTC planning region (1,587 vehicle revenue hours per 1,000 population), followed by the SCAG

(1,154), SANDAG (1,061), Association of Monterey Bay Area Governments (AMBAG, 849), Santa Barbara County Association of Governments (SBCAG, 744) and SACOG (637) regions.

Figure 4-5: Transit Vehicle Revenue Hours per Capita by MPO Area, 2005-2015.[12]

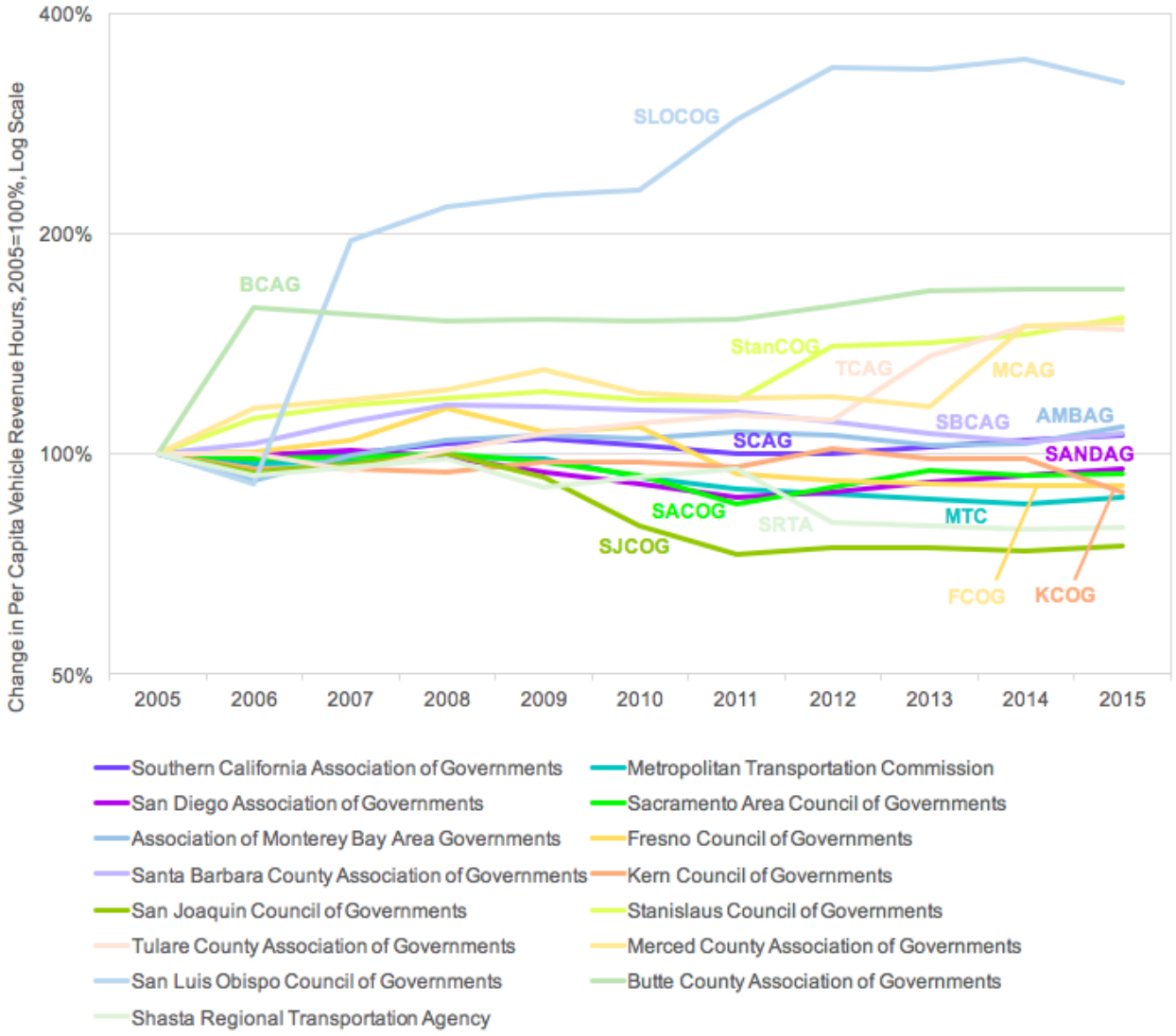


Source: National Transit Database 2016; US Census 2016.

[12] Note: Vehicle Revenue Hours are based on service provisioned by transit agencies headquartered within a given area, while per capita rates are based on residential populations of each area.

Over the ten year period from 2005 to 2015, notable declines in the per capita provision of transit occurred in the MTC, Shasta Regional Transportation Agency (SRTA) and San Joaquin Council of Governments (SJCOG) areas, while the regions served by the San Luis Obispo Council of Governments (SLOCOG) and the Butte County Association of Governments (BCAG) saw a marked increase, albeit from a small base (Figure 4-6).

Figure 4-6: Relative Change in Vehicle Revenue Hours per Capita by MPO area.[13]

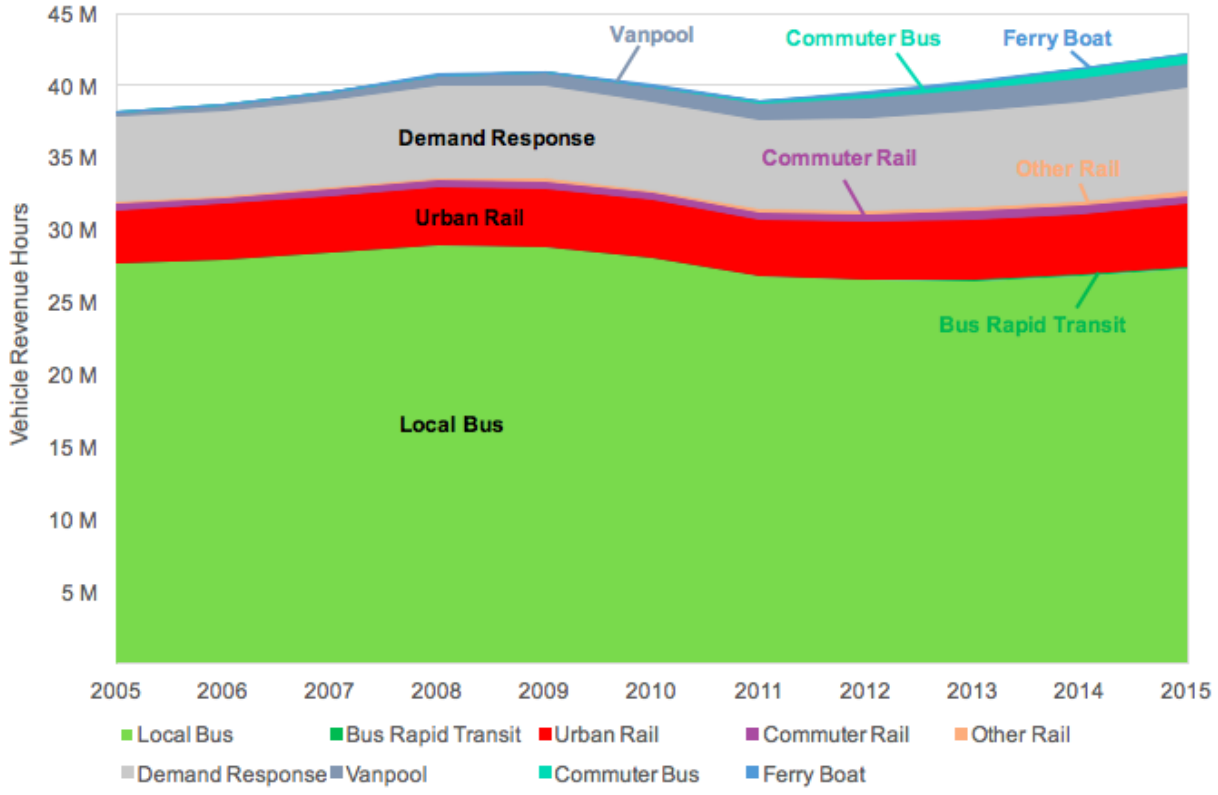


[13] Note: Kings County Association of Governments (KCAG) and Madera County Transportation Commission (MCTC) planning areas are omitted because they had no transit service reported in 2005.

Source: National Transit Database 2016; US Census 2016.

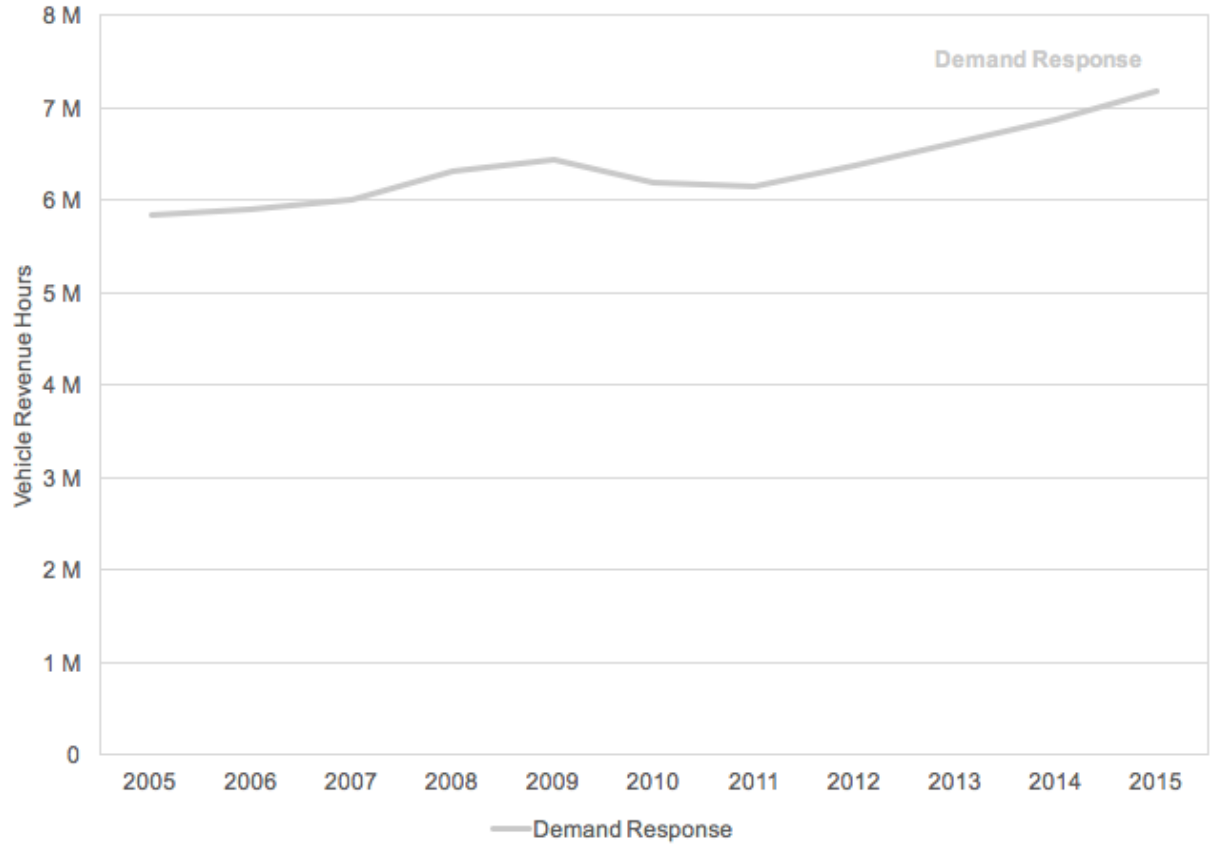
With 27.4 million service hours in 2015, local bus accounts for 65% of all vehicle revenue hours in the state. (NTD 2016; Figure 4-7). The next most-provisioned modes were demand response, with about 7.2 million service hours in 2015, and urban rail, with about 4.4 million service hours (NTD 2016). Other modes (Commuter Bus, Commuter Rail, Other Rail and Ferry Boat) account for small but growing shares of vehicle revenue hours provisioned in California. Bus service hours have increased from 2013-2015 after falling from 2008-2013. Demand response and vanpool service hours have increased notably from 2010, with demand response service hours now exceeding the previous peak from 2009.

Figure 4-7: Transit Vehicle Revenue Hours by Mode, 2005-2015.



As shown in Figure 4-8, the increase in demand response transit service provision is particularly notable. Demand response vehicle revenue hours increased 23% from about 5.8 million in 2005 to about 7.2 million service hours in 2015.

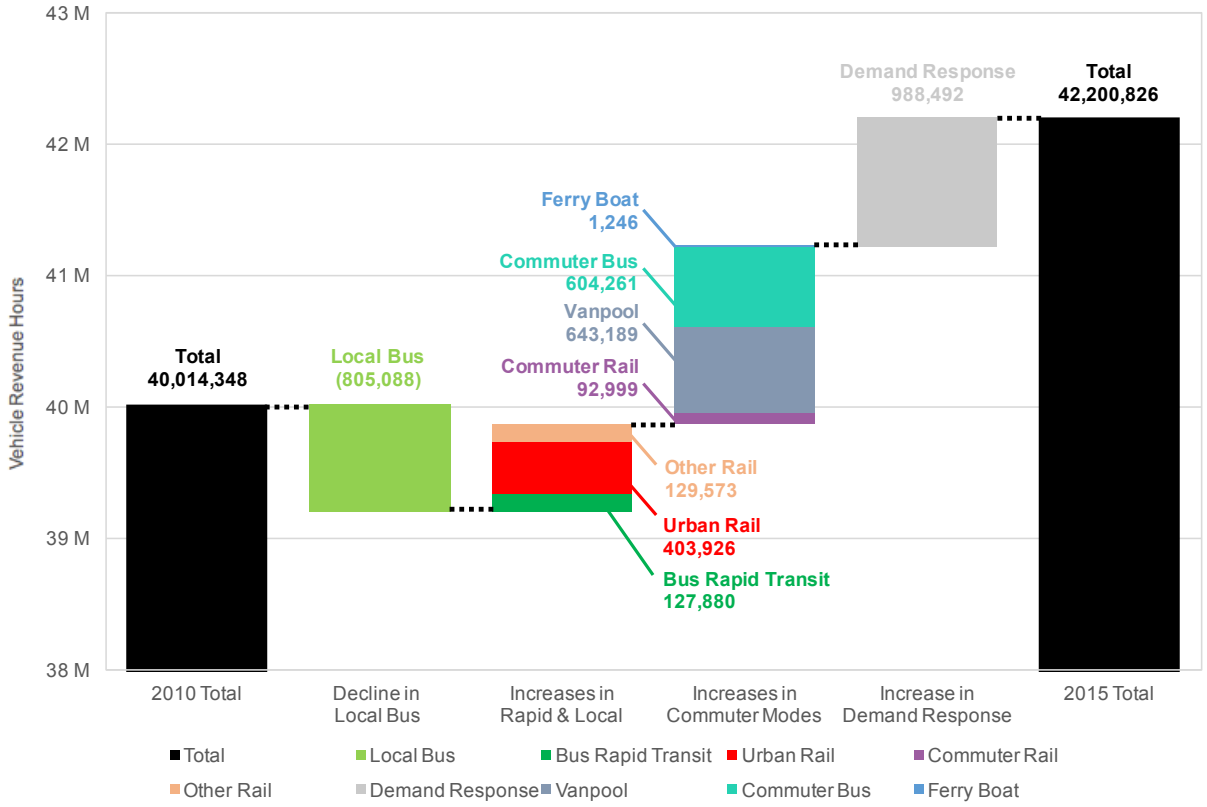
Figure 4-8: Demand Response Vehicle Revenue Hours, 2005-2015.



Over the five-year period from 2010-2015, uneven changes in each mode's revenue hours contributed to a change in both the sum and composition of California transit service hours (See Figure 4-9). Operating agencies have reduced local bus service, and these service cuts have not been fully offset by increases in other services likely to serve the same markets as local bus, such as rapid bus, urban rail, or other rail (such as streetcar service).

On the other hand, the vehicle revenue hours of commuter-oriented services (such as commuter rail, vanpool, commuter bus, and ferry service) have increased notably. Demand response service has also expanded substantially, as discussed above. However, many markets served by the increased commuter and demand response modes are different from those that have experienced diminished or discontinued local bus service.

Figure 4-9: Change in Vehicle Revenue Hours by Mode, 2010-15.[14] [15]



Source: National Transit Database 2016.

Use of Transit in California

Over the 10-year period from 2005 to 2015, per capita transit use has declined, although the total number of trips taken has remained stable. Most transit trips in the state are taken within the SCAG and MTC regions. The SANDAG area is the only one of the four most populous MPO regions to have seen an increase in per capita trip-taking between 2005 and 2015. These three regions have the highest rates of trip-taking (measured in unlinked passenger trips) relative to

[14] Note that the vertical axis range begins at 38 million vehicle revenue hours. The lower portion of the range has been omitted to show detail.

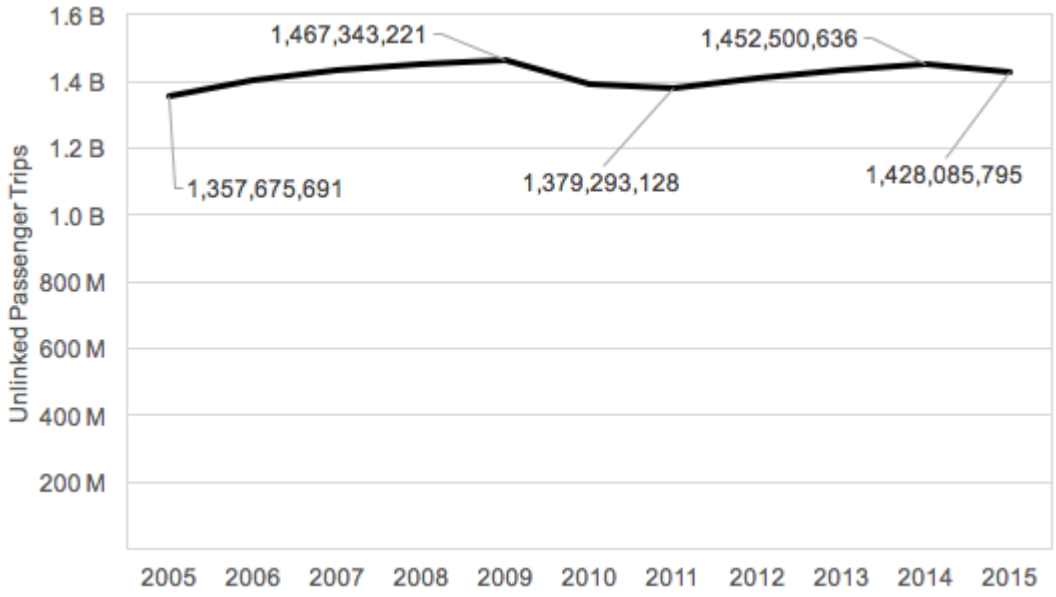
[15] Note that reporting changes between 2010 and 2011 partially obfuscate reductions in local bus service. The –805,088 (–2.9%) cumulative local bus service hour reduction shown is reflected in NTD data but is the maximal possible decline. A lesser decline of –614,898 (–2.2%) local bus service hours is possible if all bus rapid transit and commuter bus service reported in 2011 was already operational and formerly reported as local bus in 2010. In this case, the increase in bus rapid transit from 2010 to 2015 would be +87,345 rather than +127,880, and the increase in commuter bus would be +454,606 rather than +604,261.

service provision (as measured in vehicle revenue hours). On a modal basis, about two-thirds (68%) of trips are taken by bus, in line with the approximately two-thirds (65%) of vehicle service hours provided by bus. On the other hand, disproportionately more trips statewide are made by rail as compared to rail's relatively small share of vehicle revenue hours. By contrast, disproportionately few trips are made by demand response as compared to that mode's substantial share of vehicle revenue hours. This is due to the high capacity and utilization of rail service, and the low capacity and utilization of demand response service. Demand response utilization has declined over time as service provision has increased. Meanwhile, the shift in service hours from local bus to longer distance commuter and demand response modes (Figure 4-9) has been matched by a dramatic increase in passenger miles traveled (Figure 4-24), even as trip-taking has stagnated (Figure 4-10).

Trip-taking

The total number of trips taken on transit in California has remained fairly steady over the 10-year period from 2005 to 2015 (See Figure 4-10). Because the state's population has increased over this period, however, per capita trips have declined (See Figure 4-11). The broad geographic distribution of trip-taking roughly mirrors that of service provision, though it is even more concentrated, with most transit trips taken within the SCAG and MTC regions, a smaller number taken within the SANDAG and SACOG regions, and a very small share of trips taken outside of these four MPO areas. The SANDAG area is the only one of the four most populous MPO regions to have seen an increase in per capita trip-taking between 2005 and 2015. Fine-grained geographic data are unfortunately not available for this period, leaving open the question of whether the decline in per capita trip-taking is driven by population growth in areas with limited transit service. On a modal basis, trip-taking is concentrated in the local bus mode, and the 68% of California transit trips being made by local bus aligns with the 65% of transit vehicle service hours being provided by local bus. In contrast, a disproportionately large share of trips is made by rail (due partly to rail's high capacity). On the other hand, again as compared to modal allocation of service hours, a disproportionately small share of trips is made by demand response.

Figure 4-10: Unlinked Passenger Trips on Public Transit in California, 2005-2015.

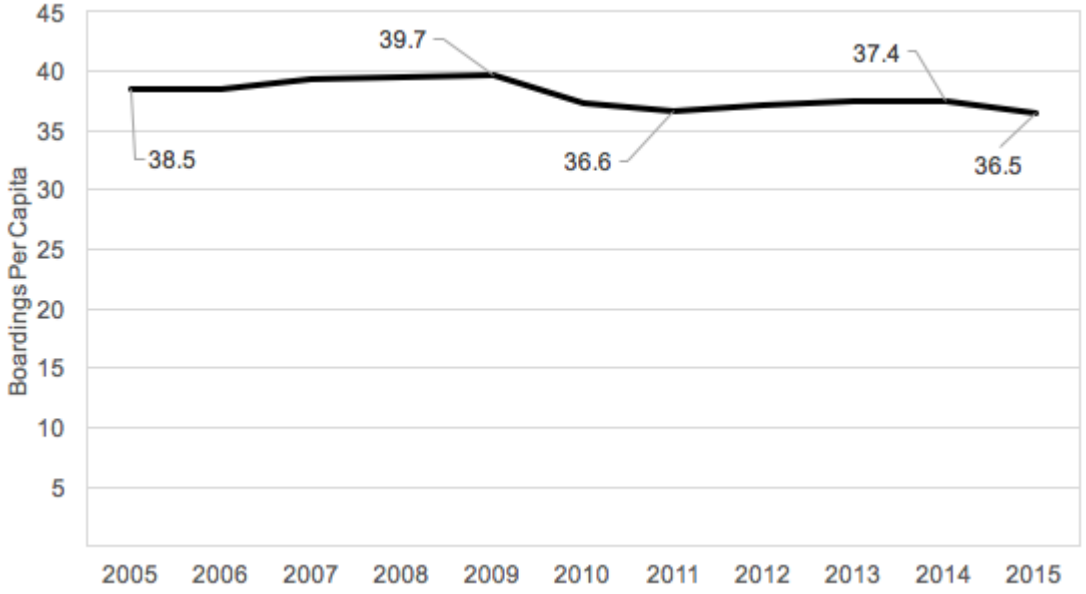


Source: National Transit Database 2016.

As shown in Figure 4-10, unlinked passenger trips increased from 1.36 billion in 2005 to a peak of 1.47 billion in 2009 before declining to 1.38 billion in 2011. Unlinked passenger trips have since recovered to 1.43 billion in 2015.

The decline in per capita use of transit is shown in Figure 4-11. Unlinked passenger trips per capita initially grew from about 38.5 in 2005 to 39.7 in 2009, before declining to 36.6 in 2011 and continuing to slide to 36.5 in 2015.

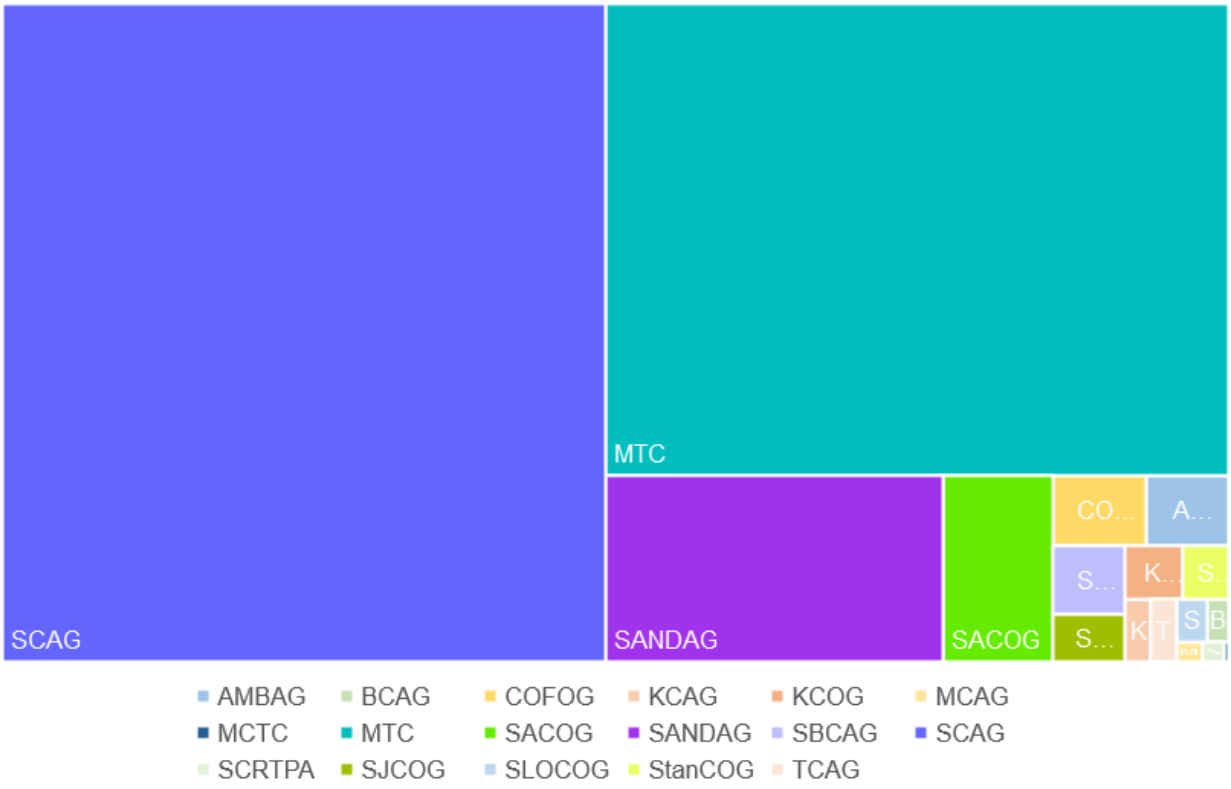
Figure 4-11: Unlinked Passenger Trips per Capita, 2005-2015.



Source: National Transit Database 2016; US Census 2016.

Figure 4-12 illustrates the proportional distribution of the 1.43 billion transit trips taken in 2015 across the state's MPO areas. Nearly half of these trips (49%) were taken within the SCAG region, while 36% were taken within the MTC region, 8% within the SANDAG region, and 3% within the SACOG region. Other MPO areas accounted for just 4% of total trips.

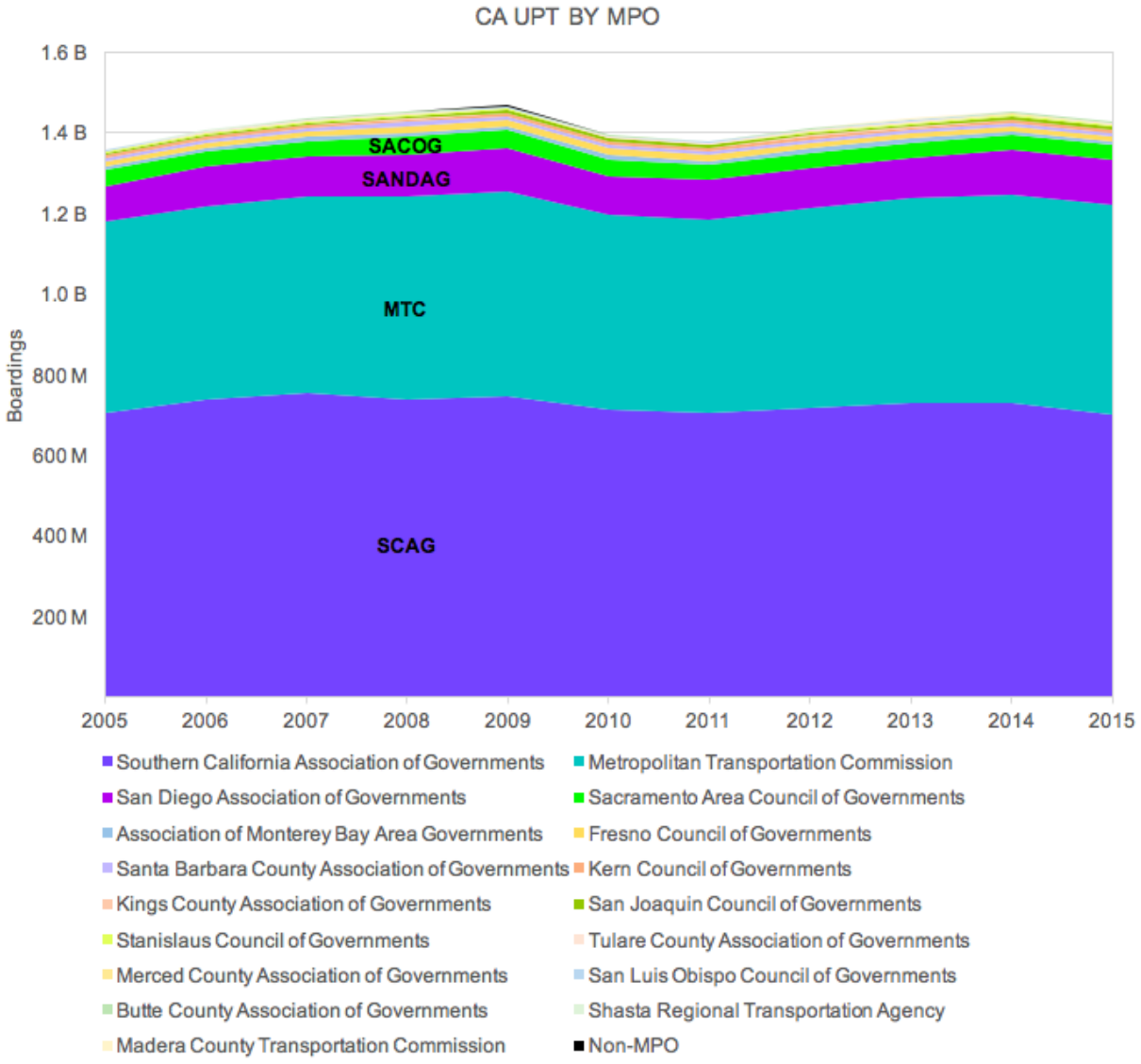
Figure 4-12: Unlinked Passenger Trips by MPO Area, 2015.



Source: National Transit Database 2016.

Figure 4-13 illustrates the statewide trend in transit passenger trips (as illustrated in Figure 4-10) by each MPO area. Unlinked passenger trips remained unchanged (0%) between 2005 and 2015 in the SCAG planning region, and declined in the SACOG region (-5%). However, unlinked passenger trips grew substantially within the MTC (+10%) and SANDAG (+24%) regions. Areas served by other MPOs saw moderate growth (13% on average), albeit from a comparatively small base. Such changes over a ten year period notwithstanding, all MPO regions experienced a similar pattern annual increases and decreases, suggesting the influence of macroeconomic factors. Longer-term discrepancies between regions have resulted from greater or lesser increases or decreases by region, rather than increases in some regions occurring contemporaneously with decreases in others.

Figure 4-13: Unlinked Passenger Trips by MPO Area, 2005-2015.

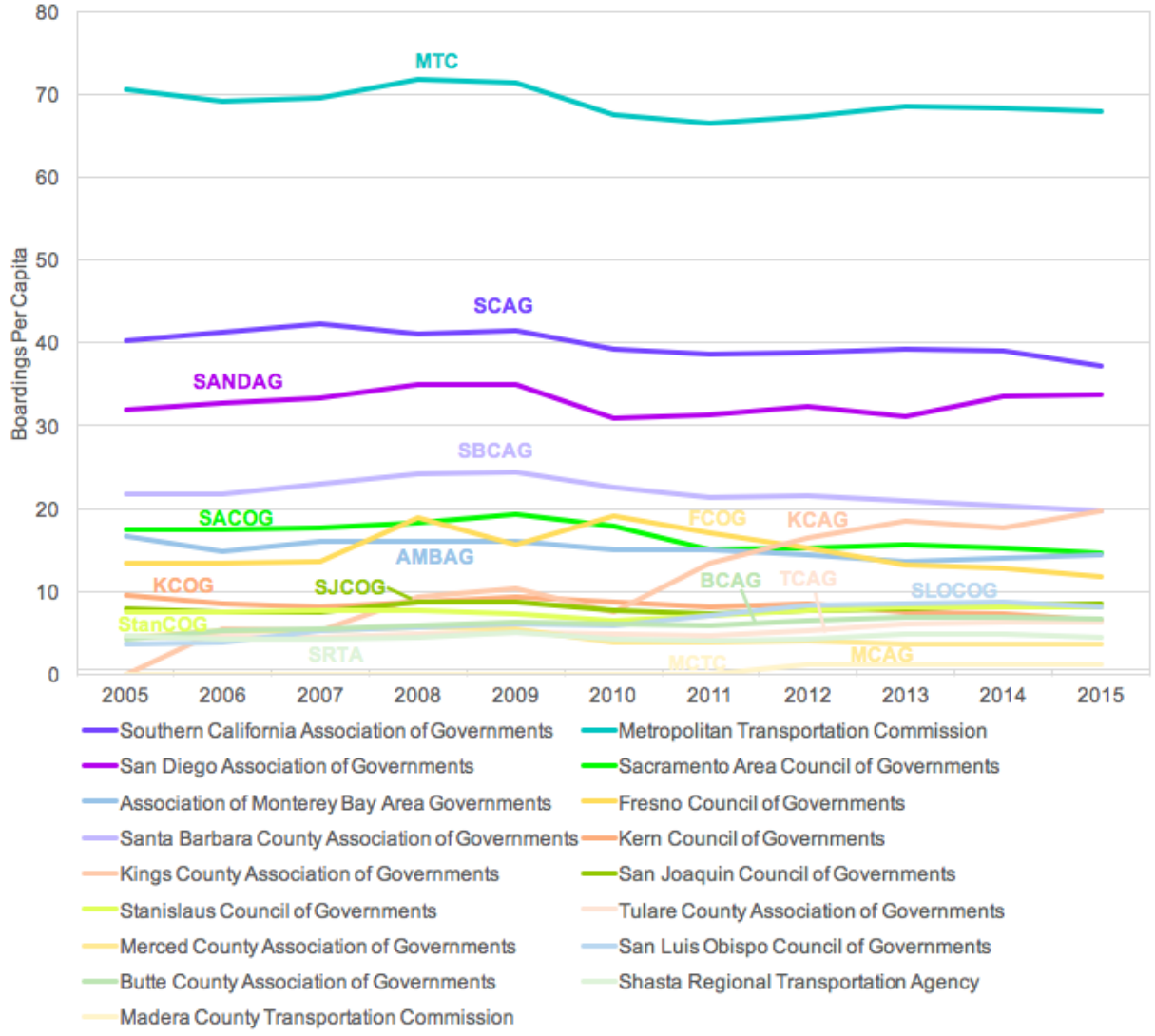


Source: National Transit Database 2016.

As indicated by the statewide decrease in per capita transit trip-taking (Figure 4- 11), per capita unlinked passenger trips fell in many MPO areas during the 2005-2015 period (Figure 4-14). However, the MTC, SCAG and SANDAG regions continued to see relatively high per capita trip-taking compared to other MPO areas. Note that while the Kings County Association of

Governments (KCAG) area saw a significant increase in per capita unlinked passenger trips, much of this trip-taking occurred outside of the KCAG area.[16]

Figure 4-14: Unlinked Passenger Trips per Capita by MPO Area, 2005-2015.[17]



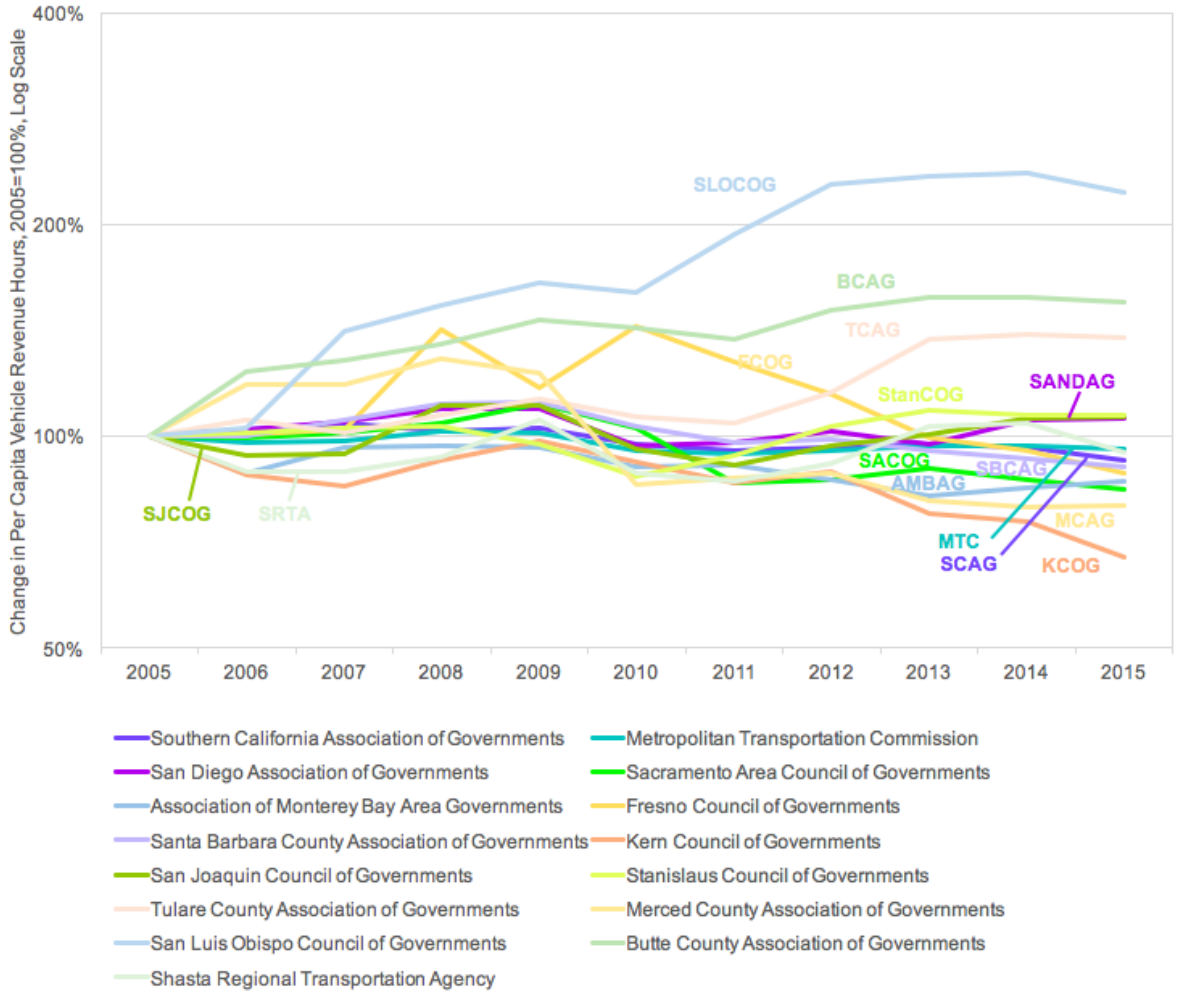
Source: National Transit Database 2016; US Census 2016.

[16] The California Vanpool Authority JPA is based within the KCAG area but operates in several counties outside of the KCAG region.

[17] Note: Unlinked passenger trips are based on trips taken within the service area of each transit agency, while per capita rates are based on residential populations of each area. Data: NTD

Per capita trip-taking slid in most California MPO regions within the 2005-2015 period (Figure 4-15). Among the nine regions experiencing declines were the areas served by MTC (–4%), SCAG (–8%), SBCAG (–9%), SACOG (–16%), AMBAG (–14%) and FCOG (–11%). The only six MPO regions (out of fifteen to have reported transit service in 2005) that have seen increases in per capita unlinked passenger trips are SANDAG (+6%), SJCOG (+7%), StanCOG (+7%), TCAG (+39%), BCAG (+56%) and SLOCOG (+122%). Note that, other than the SANDAG region, such relative growth was from a small base.

Figure 4-15: Relative Change in Unlinked Passenger Trips per Capita by MPO area.[18]

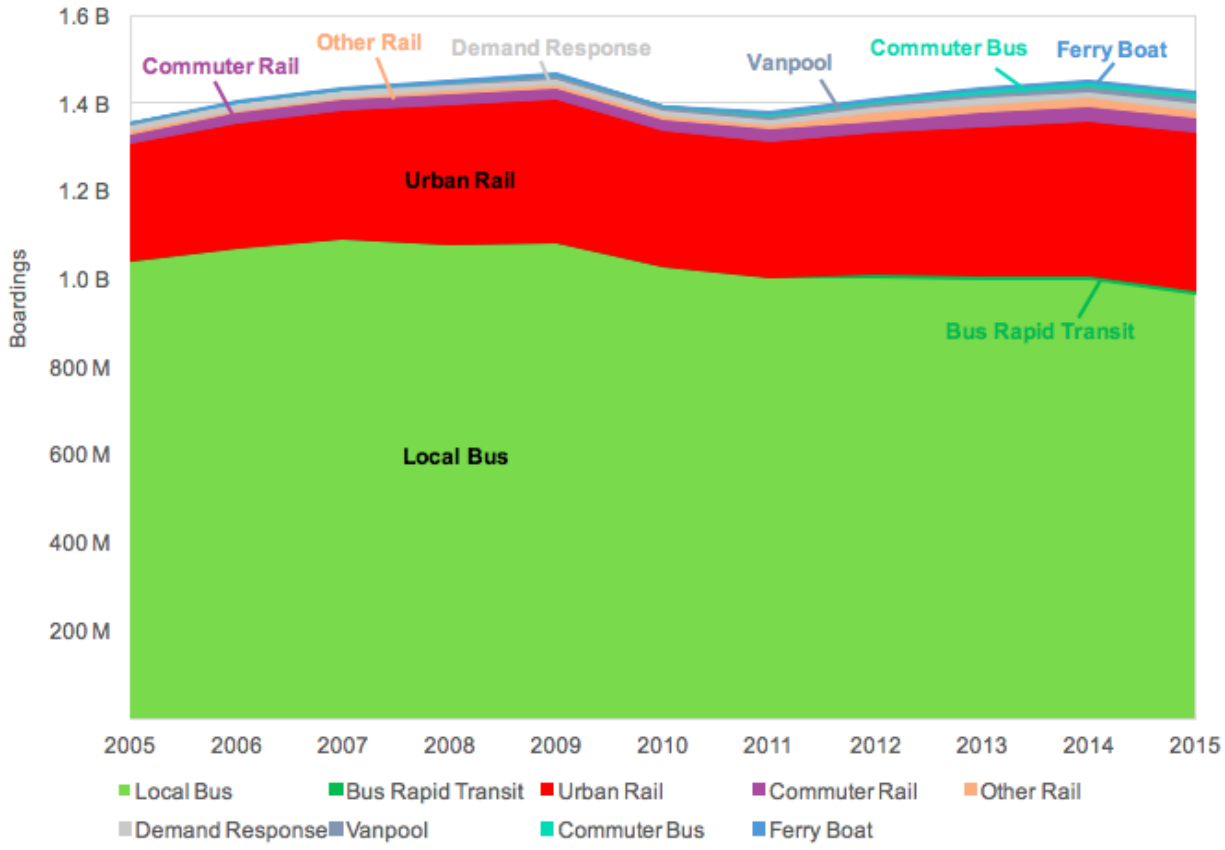


[18] Note that Kings County Association of Governments [KCAG] and Madera County Transportation Commission [MCTC] planning areas are omitted as no transit service provision was reported for these areas in 2005.

Source: National Transit Database 2016; US Census 2016.

As Figure 4-16 shows, most (68%) unlinked passenger transit trips in 2015 occurred on local bus, which comprised 65% of transit service hours (Figure 4-7). However, the share of total transit trips taken by local bus declined from 2005 to 2015. At the same time, the share of transit trips made by urban rail and other modes has increased. As compared to urban rails share of transit service hours provided (10% in 2015), a disproportionately large share of transit passenger boardings occurs on rail (25%). Conversely, as compared to demand response's share of transit service hours provided (17%), a much smaller share of transit trips (1%) are made by demand response.

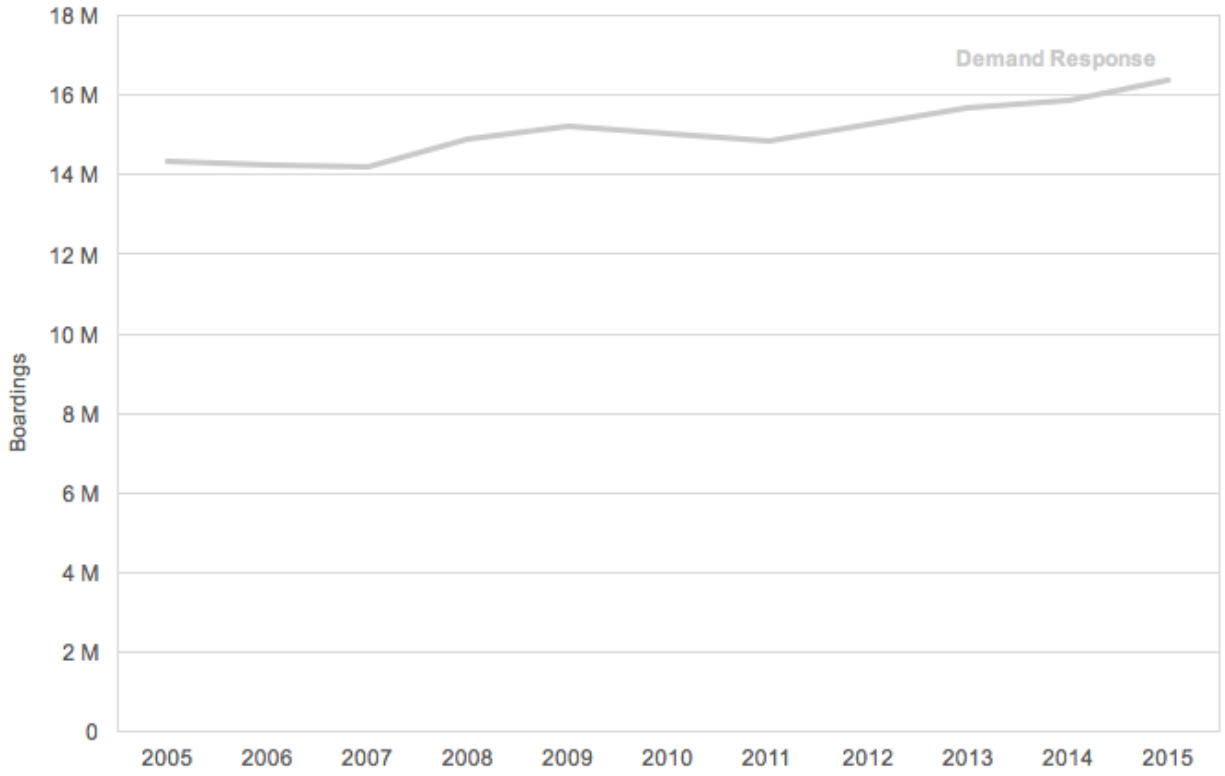
Figure 4-16: Unlinked Passenger Trips by Transit Mode, 2005-2015.



Source: National Transit Database 2016.

The increase in demand response transit trip-taking is of particular interest. As shown in Figure 4-17, demand response unlinked passenger trips increased 14% from about 14 million in 2005 to about 16 million trips in 2015.

Figure 4-17: Demand Response Unlinked Passenger Trips, 2005-2015.



Source: National Transit Database 2016.

2016 Trends in Trip-taking

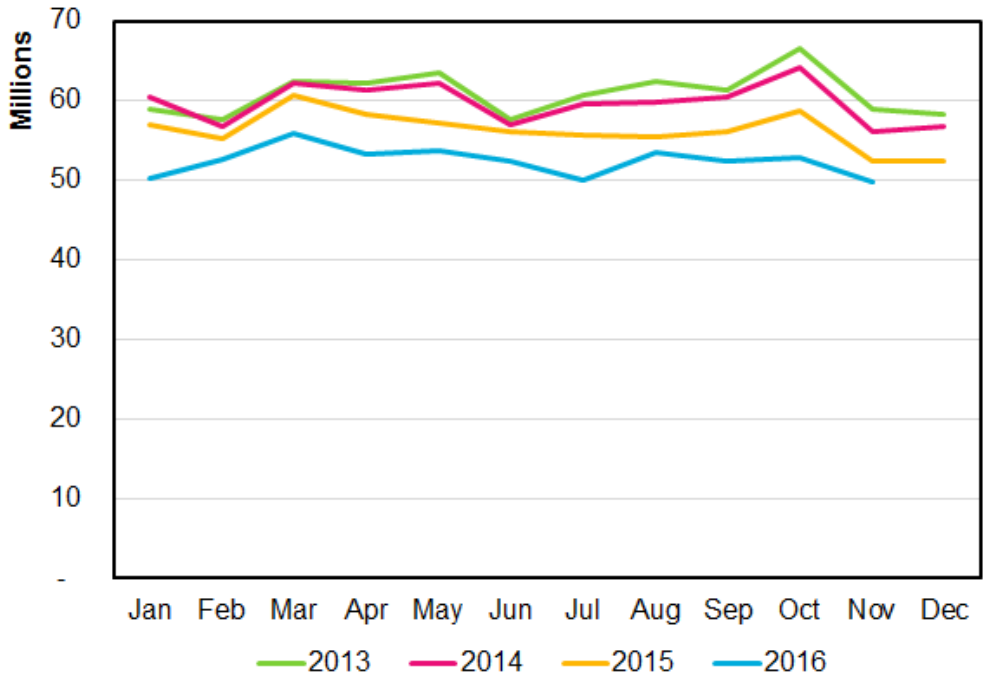
Examining recent monthly reporting data may reveal the latest trends in transit ridership. The preceding analysis relies on annual data from the 165 California transit agencies which report annual data to the National Transit Database. The monthly ridership data presented below is reported by only 95 of those agencies, which in 2015 carried 97% of California's transit trips. Additionally, at the time of publication the monthly data is only available through November of 2016. As shown in Table 4-1 below, the monthly data shows a pronounced decline in transit ridership in all areas of the state outside of MTC.

Table 4-1: Transit Ridership Trend for First 11 Months of 2016 vs 2015

	Change in Jan - Nov Ridership	
Area	**2016 vs 2015**	**2016 vs 2013**
Statewide	-4.62%	6.57%
MTC	-0.51%	3.63%
SCAG	-7.45%	-14.20%
SACOG	-5.78%	-10.89%
SANDAG	-6.08%	0.94%
Other Areas	-5.49%	-7.63%

The decline in ridership is most pronounced in the SCAG region, which has seen ridership decline 14.2% between the first 11 months of 2016 versus the first 11 months of 2016. SCAG's monthly ridership totals are shown in Figure 4-18.

Figure 4-18: SCAG Ridership Trend, 2013-2016

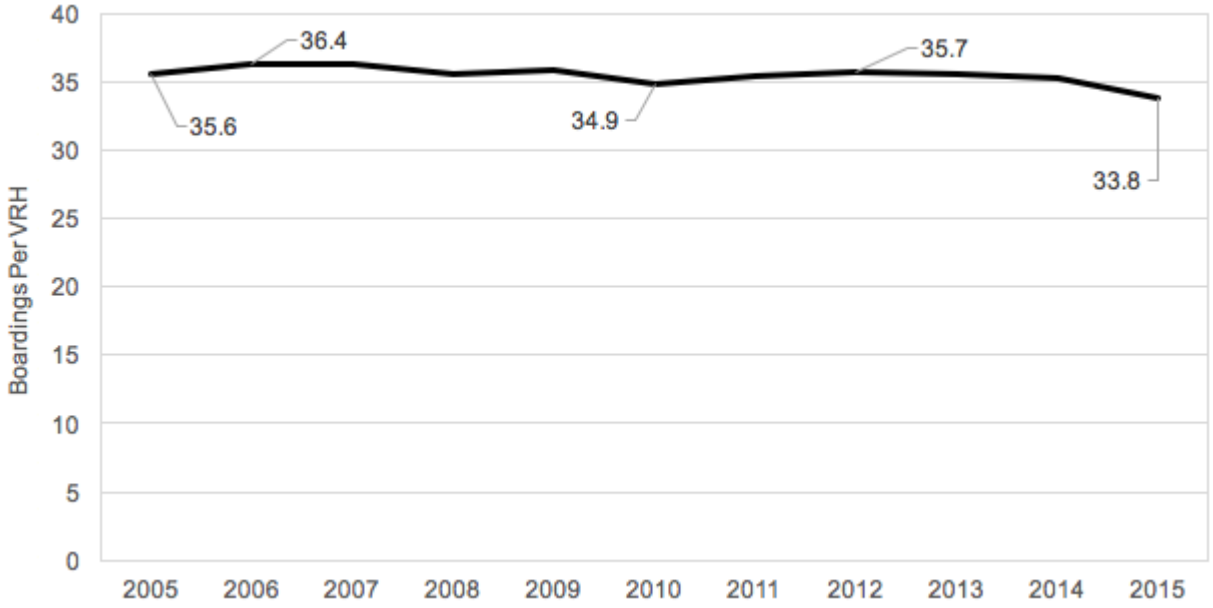


Transit Boardings Relative to Service Provision

Transit utilization (the number of boardings relative to the number of service hours provisioned) has declined over the 10-year period from 2005 to 2015 (NTD 2016; Figure 4-19). The MTC, SCAG and SANDAG regions have the highest rates of transit utilization, although utilization rates in the SCAG region have declined significantly since 2005 (NTD 2016; Figure 4-18). On a modal basis, high-capacity modes such as ferry boat and urban rail have the highest utilization rates (NTD 2016; Figure 4-22). Bus rapid transit also has high utilization rates, while commuter bus service has a lower rate than local bus service. Vanpool and demand response have the lowest number of trips taken relative to the number of service hours provisioned, and demand response utilization has declined over time as service provision has increased.

Given the combination of declining per capita unlinked passenger trips and steady per capita transit vehicle revenue hours, the number of trips taken per service hour has declined between 2005 and 2015 (Figure 4-19). Unlinked passenger trips per service hour increased from 35.6 in 2005 to 36.4 the next year before gradually sliding to 34.9 in 2010. While trip-taking relative to service provision remained relatively steady from 2010-2014, in 2015 unlinked passenger trips fell to just 33.8 per vehicle revenue hour.

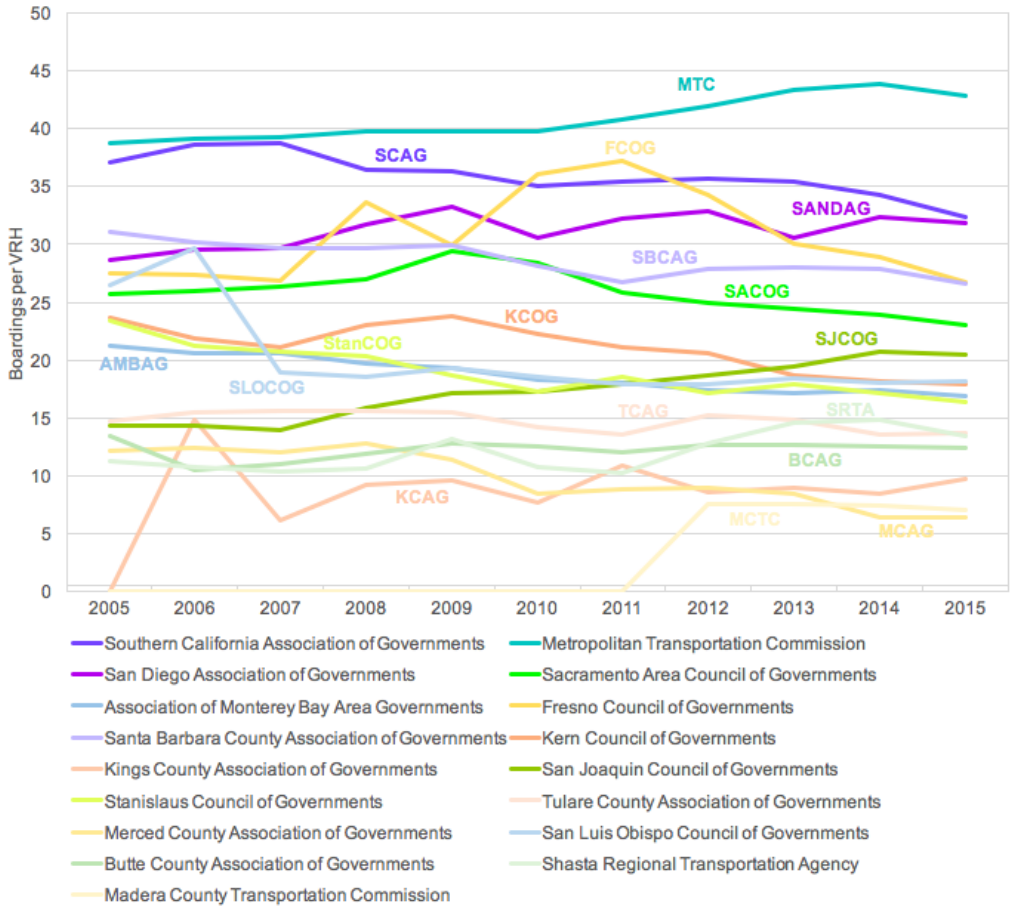
Figure 4-19: Unlinked Passenger Trips per Vehicle Revenue Hour, 2005-2015.



Source: National Transit Database 2016.

The statewide trend in transit trip-taking as compared to service provision may be broken down into the contribution from each MPO area (Figure 4-20). Such a breakdown reveals that the highest numbers of unlinked passenger trips per vehicle revenue hour were observed in the MTC (42.8 unlinked passenger trips per vehicle revenue hour), SCAG (32.3) and SANDAG (31.8) planning areas, of which the MTC and SANDAG regions have observed increases in unlinked passenger trips per vehicle revenue hour while the SCAG region has seen a decrease over the 2005-2015 period. Relative trip-taking in other planning regions ranged from a low of 6.4 unlinked passenger trips per vehicle revenue hour in the MCAG area up to 26.8 in the FCOG region. The SJCOG region has seen a steady and considerable increase from 14.4 boardings per service hour in 2005 to 20.5 boardings per service hour in 2015, while SACOG has slid from 25.8 boardings per service hour in 2005 to 23.0 boardings per service hour in 2015.

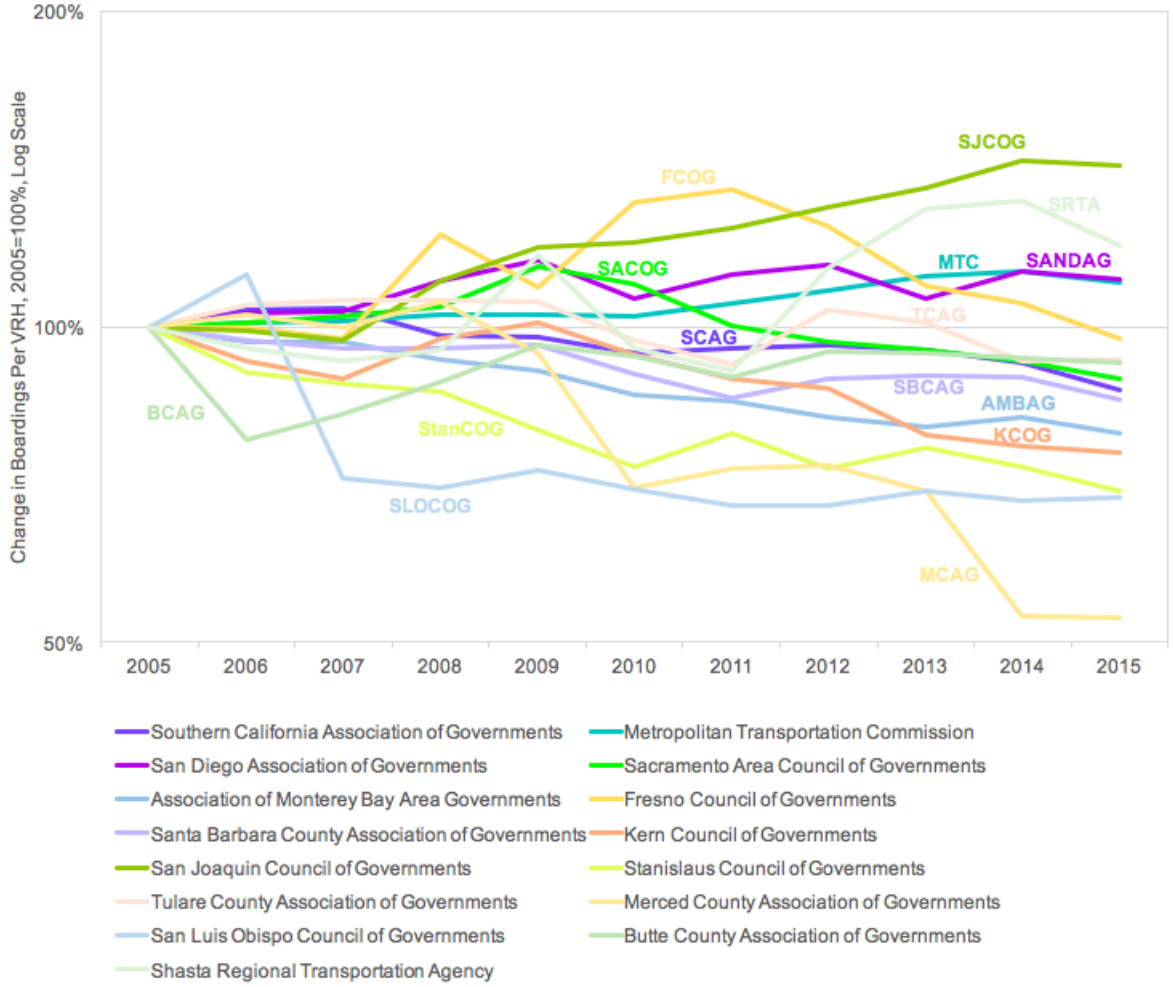
Figure 4-20: Unlinked Passenger Trips per Vehicle Revenue Hour by MPO Area, 2005-2015.



Source: National Transit Database 2016.

By examination of the change since 2005 in trip-taking as compared to service provision by MPO area (Figure 4-21), the greatest increases in relative trip-taking have occurred in the SJCOG, SRTA, SANDAG and MTC planning regions. The greatest decreases have occurred in the MCAG, SLOCOG, StanCOG, KCOG and AMBAG areas.

Figure 4-21: Relative Change in Unlinked Passenger Trips per Vehicle Revenue Hour by MPO Area.[19]



Source: National Transit Database 2016.

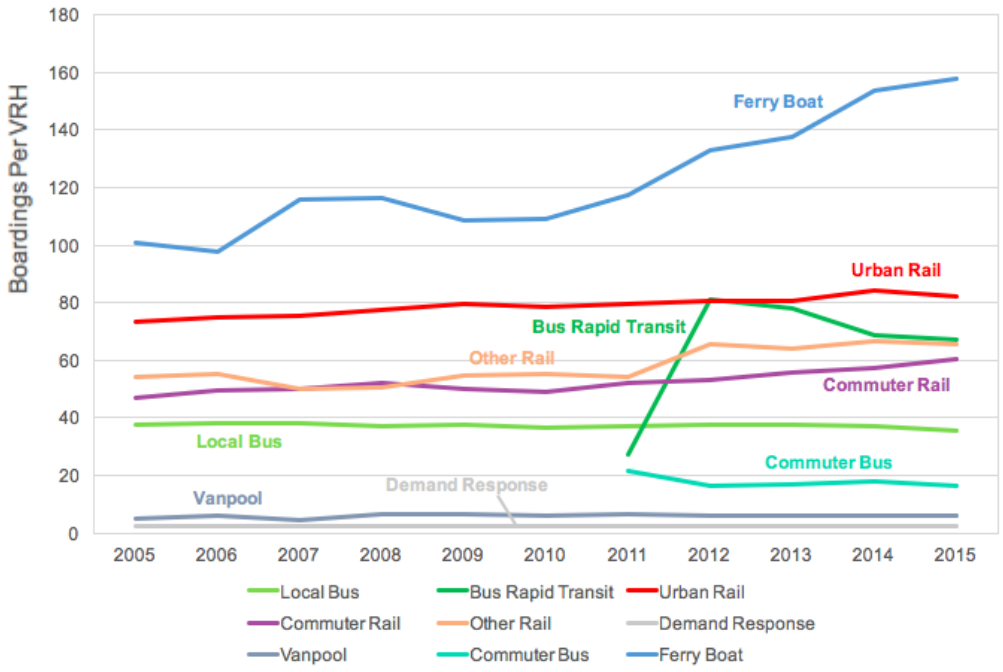
Local bus, the mode accounting for the lion's share of California's transit service provision and trip-taking, attracts a relatively low number of unlinked passenger trips per vehicle revenue hour as compared to other modes—35.3 in 2015 (Figure 4-22).[20] Commuter bus service sees even

[19] Note: Kings County Association of Governments [KCAG] and Madera County Transportation Commission [MCTC] planning areas are omitted as no transit service provision was reported for these areas in 2005.

[20] As mentioned previously, this chapter considers the provision of transit service as quantified in vehicle hours. These are distinct from passenger capacity hours, which are equal to vehicle hours multiplied by

lower trip-taking relative to service provision (16.5 trips per vehicle revenue hour), while vanpool (6.1) and especially demand response (2.3) have very low usage relative to service provision. Bus rapid transit and rail modes, by contrast, have notably higher trip-taking relative to service provision—ranging from 60.2 trips per vehicle revenue hour on commuter rail to 82.1 trips per vehicle revenue hour on urban rail. (Bus rapid transit saw 67.2 boardings per service hour in 2015.) Ferry service has the highest relative trip-taking with 157.8 unlinked passenger trips per vehicle revenue hour. The increase in the share of service hours provisioned through demand response, vanpool and commuter bus (Figure 4-23) has decreased the overall number of trips taken per vehicle revenue hour (Figure 4-19), independent of mode-specific trends in the number of trips taken per service hour.

Figure 4-22: Unlinked Passenger Trips per Vehicle Revenue Hour by Mode, 2005-2015.

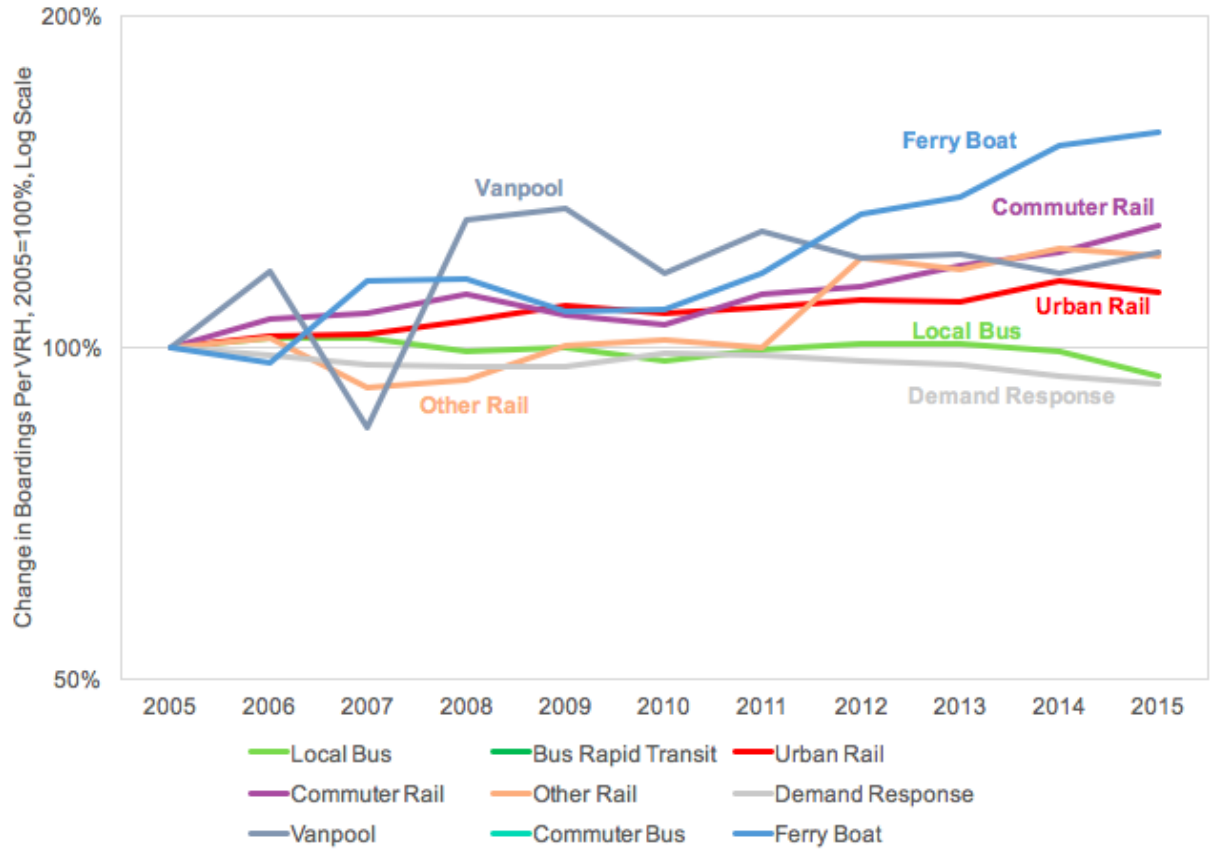


Source: National Transit Database 2016.

the capacity of the vehicles in question. Thus, the number of potential boardings per vehicle hour would be expected to vary greatly by mode, from low-capacity vehicles such as demand response to high-capacity ones such as ferries.

By examination of the change since 2005 in trip-taking as compared to service provision by mode (Figure 4-23), increases in relative trip-taking have occurred on ferry boat, commuter rail, vanpool, other rail, and urban rail modes. Demand response and local bus have seen declines in the number of unlinked passenger trips taken per vehicle revenue hours provisioned.

Figure 4-23: Relative Change in Unlinked Passenger Trips per Vehicle Revenue Hour by Mode.[21]



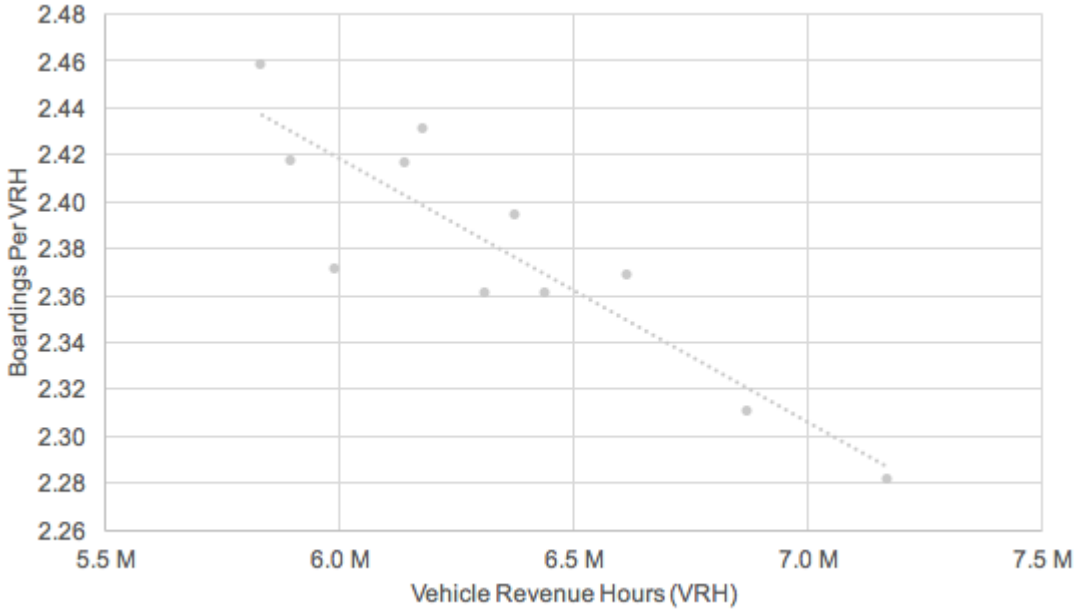
Source: National Transit Database 2016.

Of the two modes to have seen decreases in boardings per vehicle hour between 2005 and 2015 (Figure 4-23), local bus saw a decrease in service hours while demand response saw an increase in service hours (Figures 4-7 through 4-9). Thus, while decreasing service has resulted in decreasing utilization for local bus, increased service has resulted in decreasing utilization for

[21] Note: Bus rapid transit and commuter rail are omitted as no transit service provision was reported for these modes in 2005.

demand response. The correlation between demand response vehicle hours and boardings per vehicle hour is strikingly negative (Figure 4-24).

Figure 4-24: Correlation Between Demand Response Vehicle Hours and Boardings per Vehicle Hour, 2005-2015.



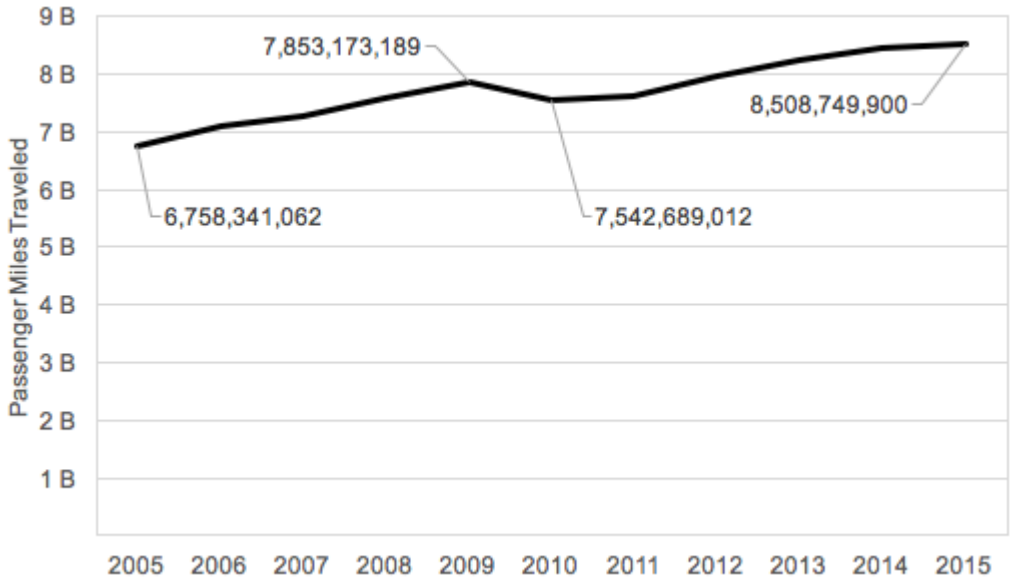
Source: National Transit Database 2016.

Distance traveled

Over the 10-year period from 2005 to 2015, the total distance traveled on transit has increased significantly even as the number of trips taken has stagnated. In other words, a similar number of boardings are occurring, but for longer trips. On a modal basis, a smaller share of distance is traveled by local bus (43%) as compared to share of trips taken (68%) or service hours provided (65%). By contrast, a greater share of distance is traveled by urban rail, commuter rail, and vanpool. This is because of the much longer average trip lengths associated with these modes.

While unlinked passenger trips have remained relatively steady over the 2005-2015 period (Figure 4-10), passenger miles traveled have increased substantially (Figure 4-25). Passenger miles traveled grew from about 6.8 billion in 2005 to a peak of 7.9 billion in 2009 before briefly dipping to 7.5 billion in 2010. By 2015, passenger miles traveled had grown to 8.5 billion.

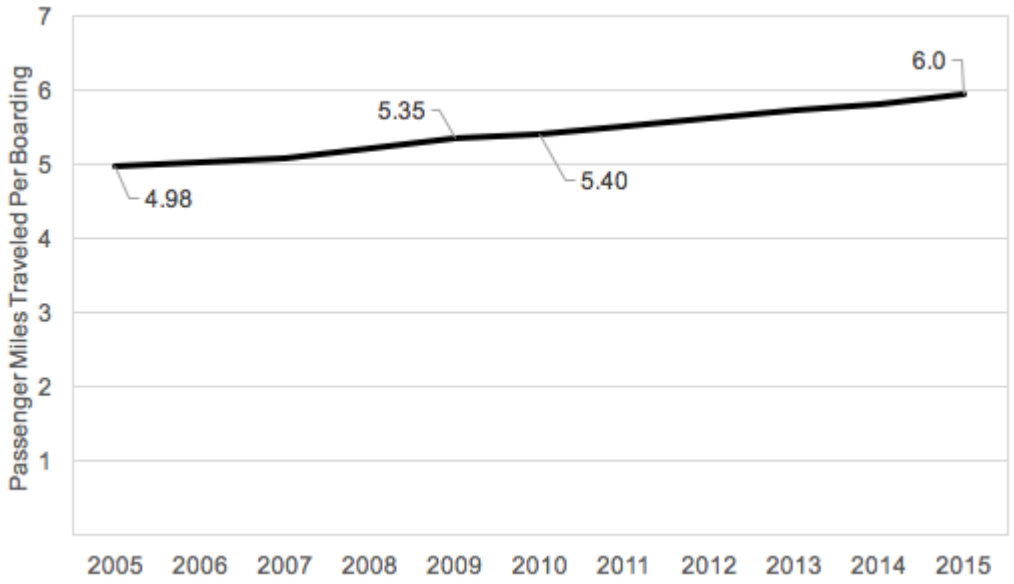
Figure 4-25: Passenger Miles Traveled on Transit in California, 2005-2015.



Source: National Transit Database 2016.

While most California transit ridership metrics experienced a decline between 2009 and 2010, this is not the case with the average distance of unlinked trips (Figure 4-26). The number of passenger miles traveled per passenger boarding has increased monotonically on an annual basis from 2005 to 2015, including during the 2009-2010 period.

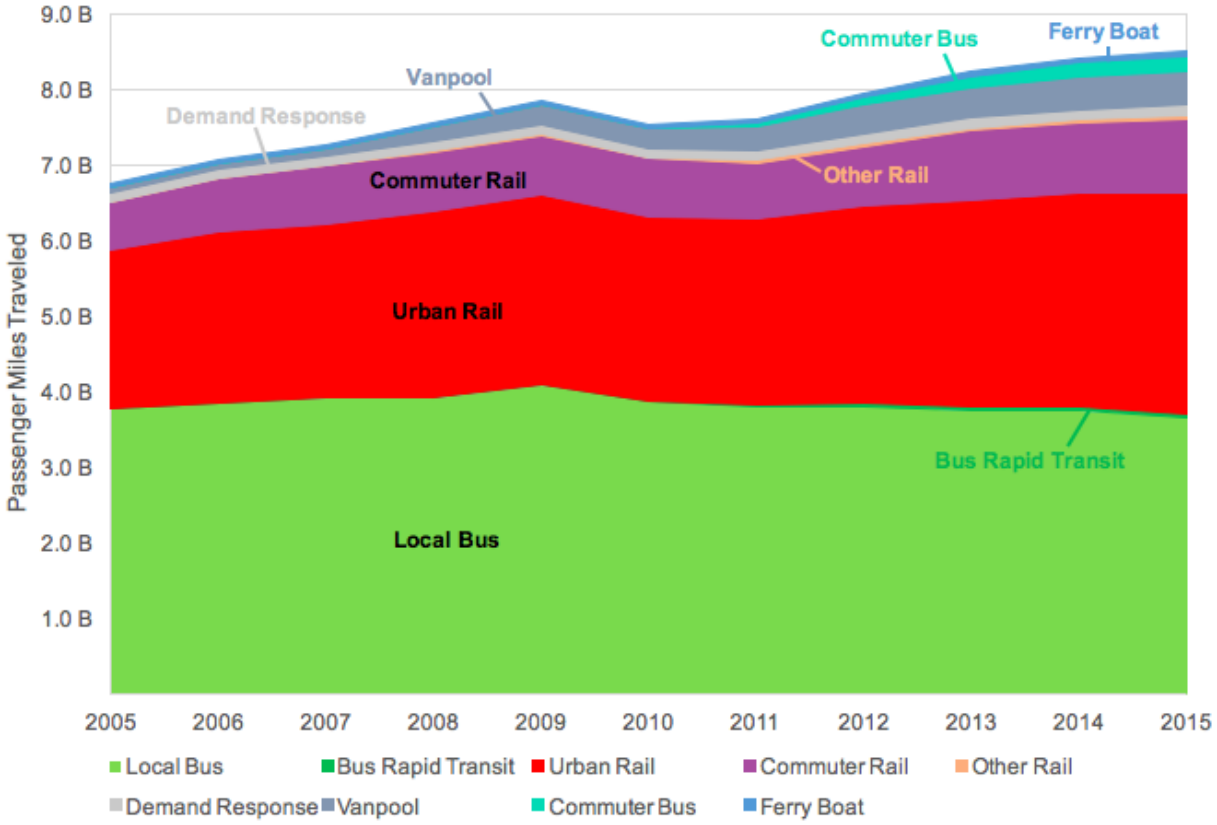
Figure 4-26: Passenger Miles Traveled per Unlinked Passenger Trip, 2005-2015.



Source: National Transit Database 2016.

Figure 4-27 illustrates passenger miles traveled by mode over time. As shown, passenger miles traveled increased on all modes between 2005 and 2015, except on local bus. Considered together, passenger miles traveled and unlinked passenger trip data (Figure 4-26) indicate that local bus is a mode used intensively over short distances: in 2015 it accounted for 43% of total miles traveled but 68% of unlinked passenger trips.

Figure 4-27: Passenger Miles Traveled by Mode, 2005-2015.

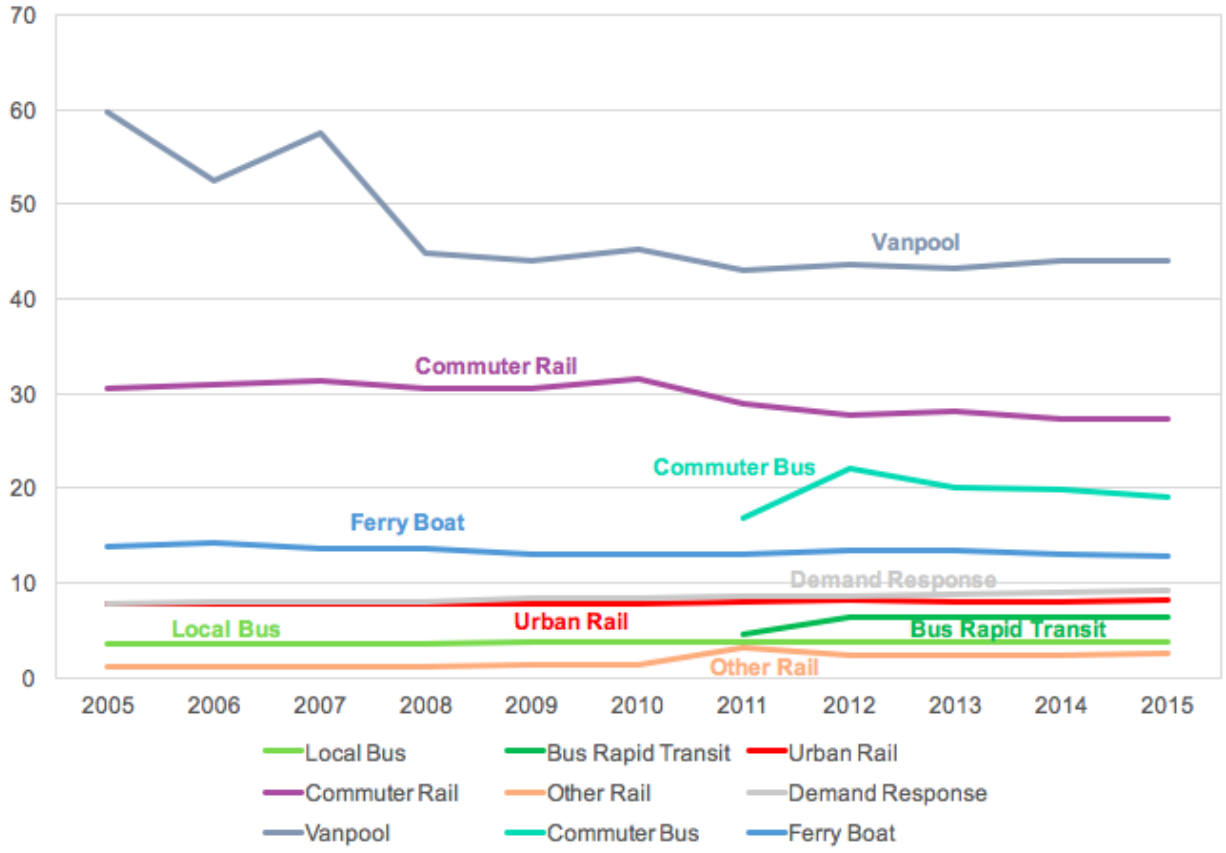


Source: National Transit Database 2016.

The discrepancy in passenger miles traveled per mode as compared to unlinked passenger trips per mode relates to the average distance traveled by passengers when taking each mode (Figure 4-28). Although vanpool trip lengths have decreased since 2005, vanpools continue to have the longest average trips of all modes, accounting for 44.0 passenger miles traveled per unlinked passenger trip. Commuter rail, commuter bus and ferry boat have the next longest average trip lengths—ranging from 27.4 to 12.9 passenger miles traveled per unlinked passenger trip—followed by demand response. Urban rail, bus rapid transit, local bus and other rail have the shortest average unlinked passenger trip lengths, ranging from 8.1 miles for urban rail to 2.6 miles on other rail (predominantly streetcar service). As illustrated in Figure 4-28, the long-distance modes have seen the greatest increase in service provision over the 2010-2015 period. The shift in service from shorter distance modes such as local bus to longer distance modes like commuter bus and vanpool may be a driver both of the increase in average trip length (as more riders take long distance modes; see Figures 4-9 and 4-26 through 4-28) and of

the decrease in boardings per service hour provisioned (as fewer boardings are taken per hour provisioned on long distance modes; see Figure 4-22).

Figure 4-28: Passenger Miles Traveled per Unlinked Passenger Trip by Mode, 2005-2015.



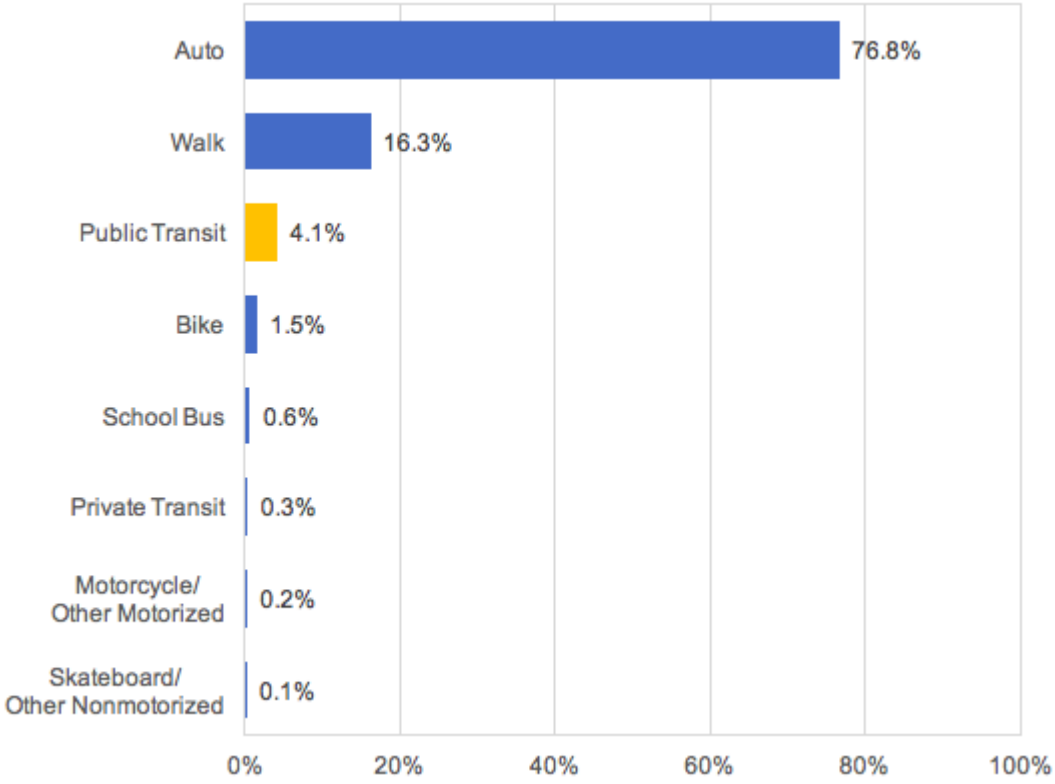
Source: National Transit Database 2016.

Comparison with Other Modes

In California, the vast majority of all trips are taken by automobile. Public transit accounts for less than one in twenty trips taken in the state. However, automobile dependence is not evenly distributed throughout the state. In the City and County of San Francisco, only about a third of trips are taken by auto, while in two other counties (Los Angeles County and Alameda County), about two thirds of trips are taken by auto. In other California counties, at least three quarters of trips are taken by auto. Public transit mode share conversely varies from a high of about 15% of trips in San Francisco, to 7% in Los Angeles County and 6% in Alameda County, to 5% or less in other counties.

According to the 2010-2012 California Household Travel Survey (CHTS), public transit accounts for 4.1% of all trips taken in California (Figure 4-29). Among other modes, automobile travel (including single-occupancy and multiple-occupancy trips) accounts for the largest share—76.8% of all trips taken. Walking (16.3% of trips) and bicycling (1.5%) are the next most commonly-employed modes. California has set a goal of doubling the mode share of public transit in Caltrans' Strategic Management Plan: 2015-2020.

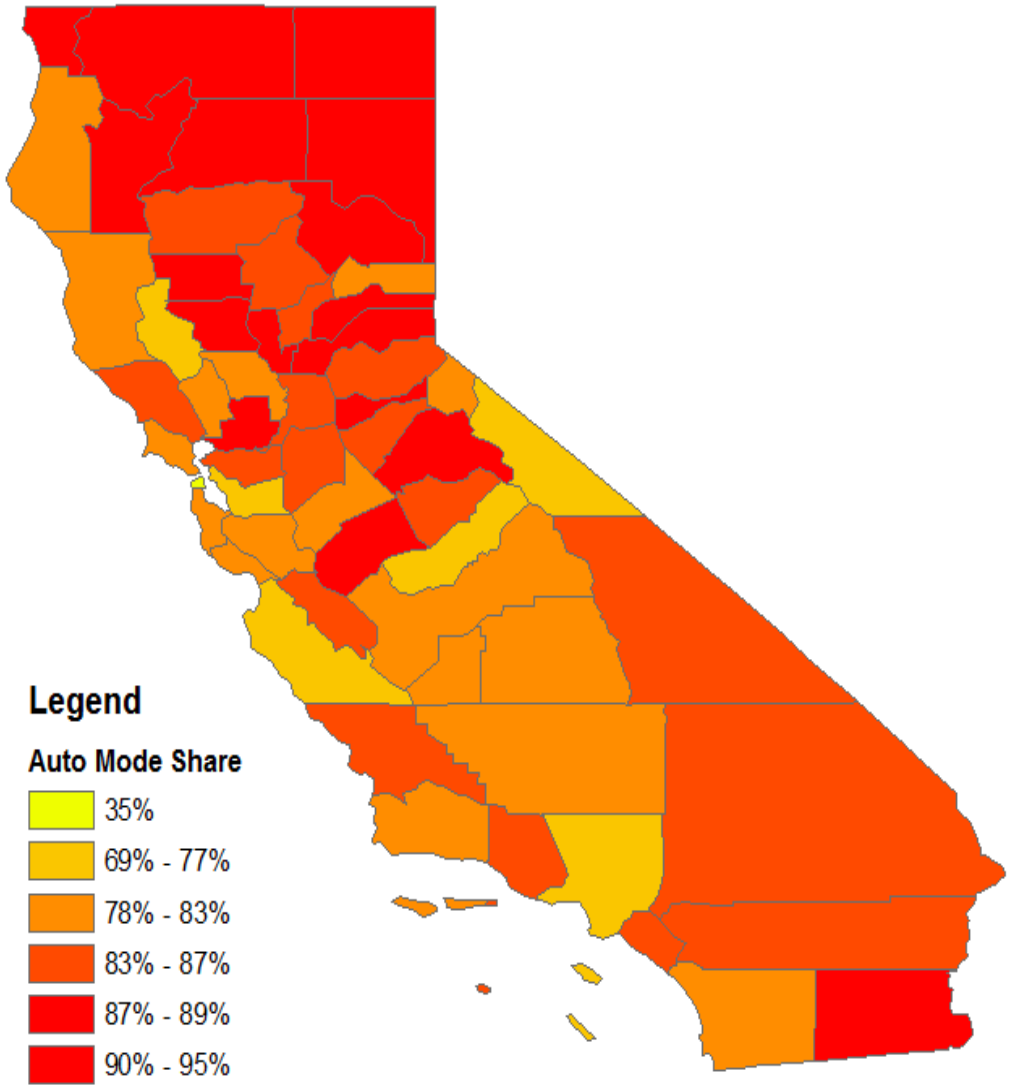
Figure 4-29: Share of All Trips Taken in California by Mode, 2010-2012.



Source: California Household Travel Survey 2012.

The dominance of automobile travel varies by California geography (Figure 4-30). In San Francisco County, 35% of trips are by auto, while in Alameda and Los Angeles counties—the next-least-auto-dependent areas of the state—69% of trips are by auto. In all other California counties, at least 74% of trips are by auto, ranging up to 94% automobile mode share in Shasta County, and 95% in Trinity County. Significant variation in mode share might be expected within counties, and particularly between more densely-populated and more sparsely-populated county areas. However, such analyses are beyond the scope of this chapter.

Figure 4-30: Automobile Mode Share by California County, 2010-2012.

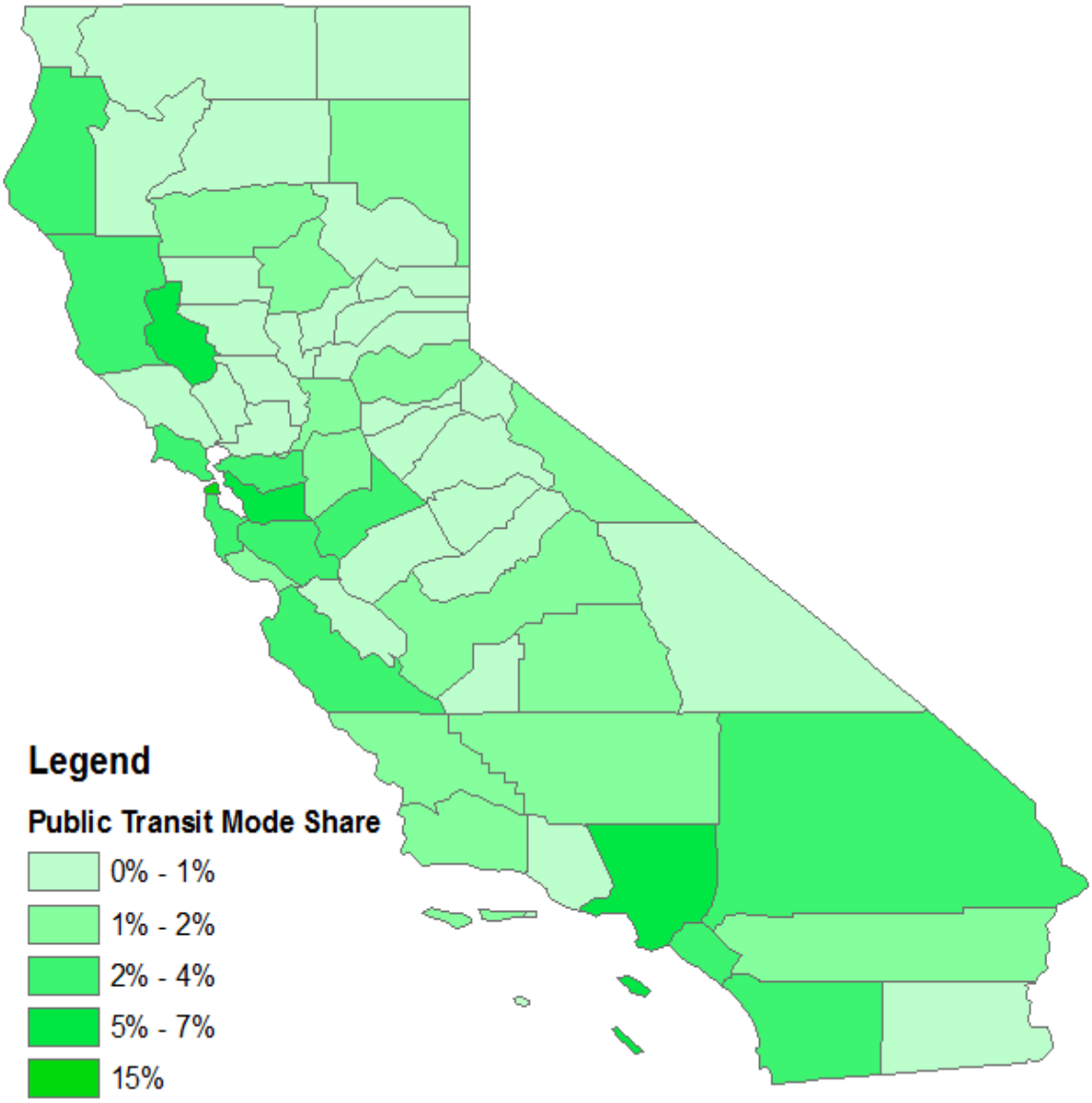


Source: California Household Travel Survey 2012.

Public transit mode share varies somewhat conversely from auto mode share. The highest public transit mode share, at 15% of all trips, is in San Francisco, followed by 7% in Los Angeles County, 6% in Alameda County, 5% in Lake County, and 4% in San Diego and San Mateo

counties. Contra Costa, Santa Clara and Stanislaus counties have public transit mode shares of 3%, while all other California counties have mode shares of 2% or less (Figure 4-31). Note that public transit mode share varies considerably not only between MPO areas, but within MPO areas as well

Figure 4-31: Public Transit Mode Share by California County, 2010-2012.



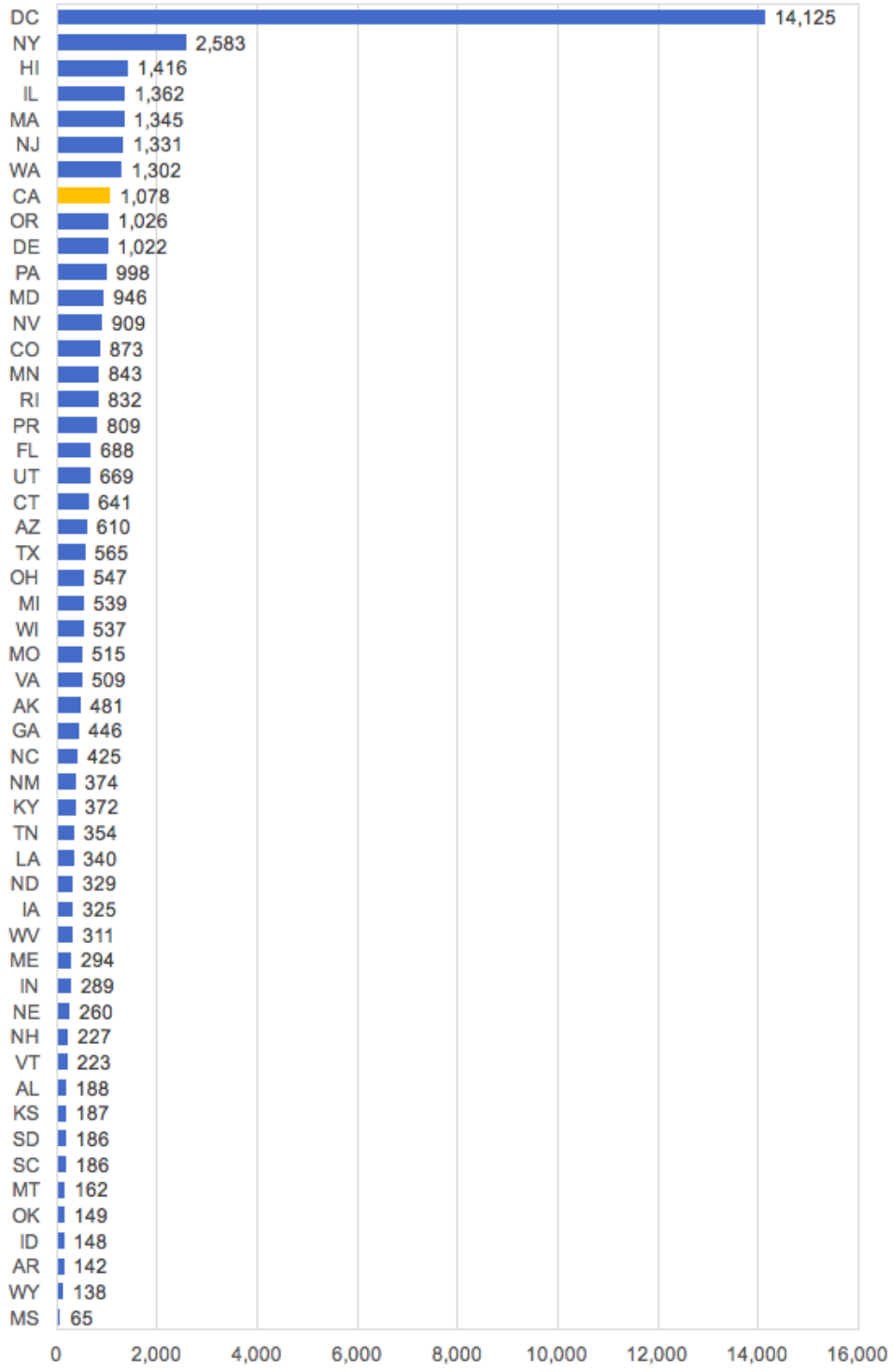
Source: California Household Travel Survey 2012.

Comparison with Other States

California is among the top ten states as ranked by transit service provision (vehicle revenue hours per capita), and as ranked by transit service utilization (unlinked passenger trips per vehicle revenue hour). However, by both metrics, California achieves less than half the level attained by New York. The two metrics are strongly correlated across the 50 states, with many of the states with high provision and utilization providing much of their transit service by rail.

Comparing California's transit provision with other states situates California's performance in the national context (Figure 4-32). With 1,078 vehicle revenue hours provisioned per 1,000 residents, California ranks seventh among the 50 states, or eighth when including the District of Columbia. California's per capita service hours are less than half of New York's, and a small fraction of those of the District of Columbia. The states with the most similar levels of transit service provision per capita are Oregon and Delaware, while the states of Hawaii, Illinois, Massachusetts, New Jersey and Washington have significantly higher transit service provision than California relative to population size.

Figure 4-32: Vehicle Revenue Hours per 1,000 Capita by State, 2015.[22]

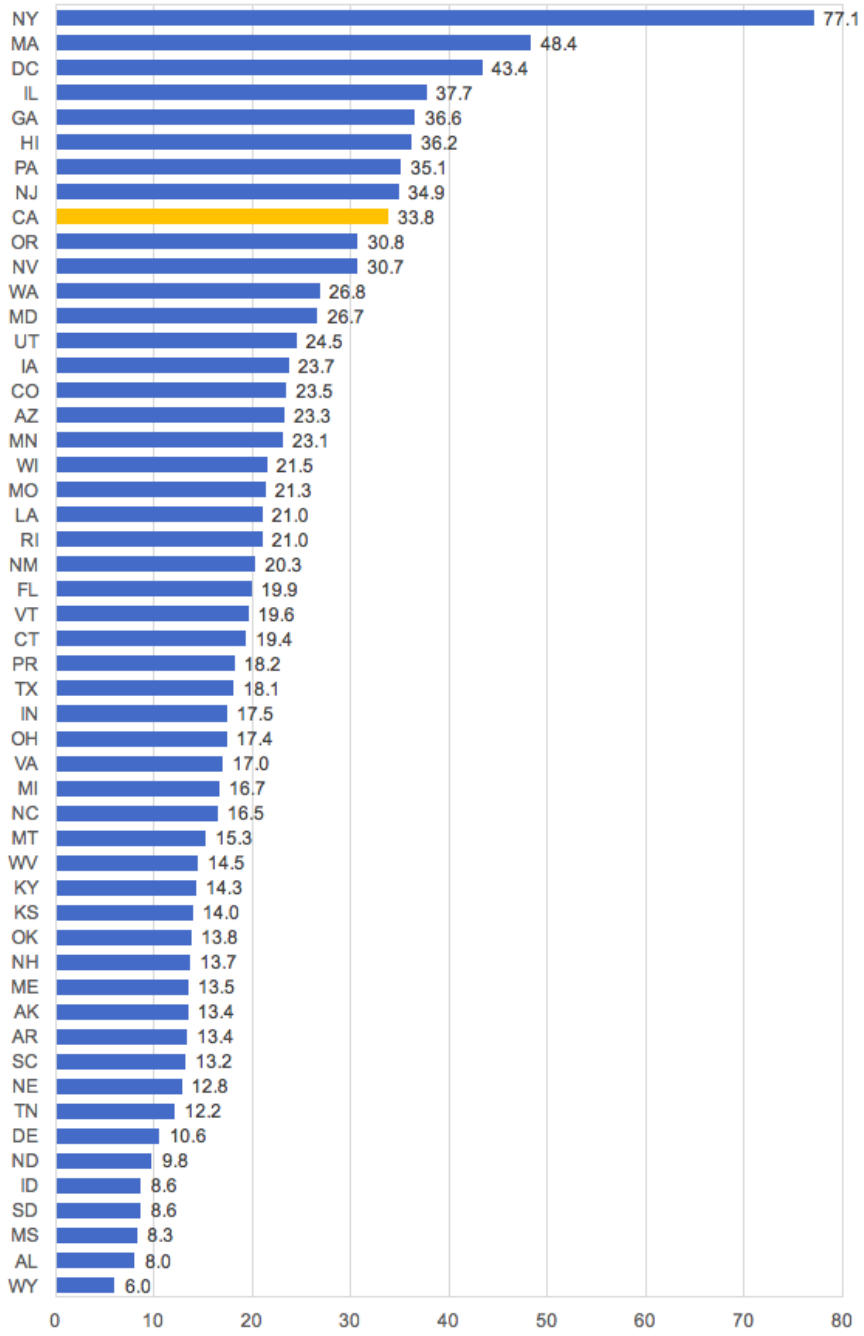


Source: National Transit Database 2016.

Considering the number of boardings relative to vehicle hours of service provided, California ranks eighth among the 50 states or ninth when including the District of Columbia (Figure 4-33). With 33.8 passenger boardings per vehicle revenue hour provisioned, California's transit patronage rates are less than half of New York's, relative to vehicle hours of service provision. The states with the most similar rates of trip-taking relative to service hours are New Jersey and Pennsylvania. Massachusetts, the District of Columbia, Illinois, Georgia and Hawaii all have higher rates of trip-taking relative to vehicle revenue hours.

[22] Note that the District of Columbia and Puerto Rico are included along with the 50 states.

Figure 4-33: Unlinked Passenger Trips per Vehicle Revenue Hour by State, 2015[23]

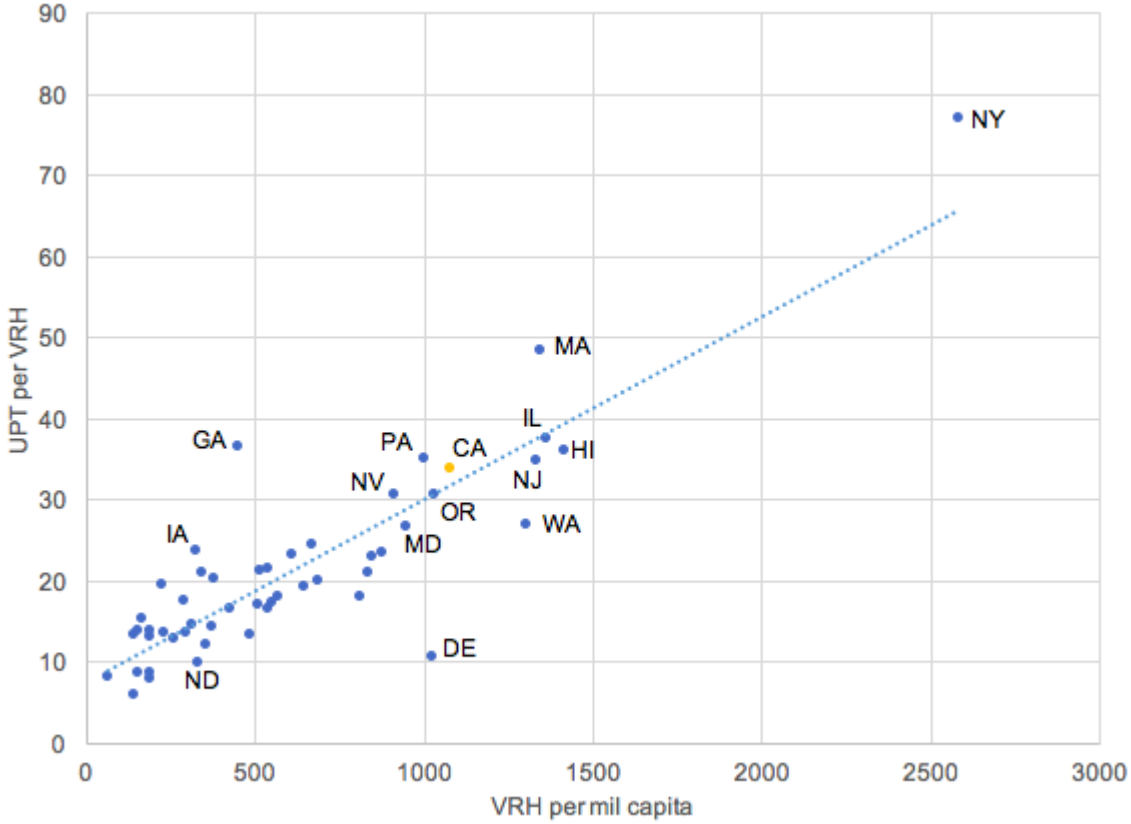


Source: National Transit Database 2016.

[23] Note that the District of Columbia and Puerto Rico are included along with the 50 states.

Many of the states ranking highest by transit service provision (Figure 4-32) also rank among the highest by transit utilization relative to service provision (Figure 4-33). This correlation between transit service provision (many vehicle revenue hours per capita) and utilization (many boardings per vehicle revenue hour) is illustrated in Figure 4-34.

Figure 4-34: Unlinked Passenger Trips (UPT) per Vehicle Revenue Hour (VRH) compared to Vehicle Revenue Hour per 1,000 Capita by State, 2015.[24]



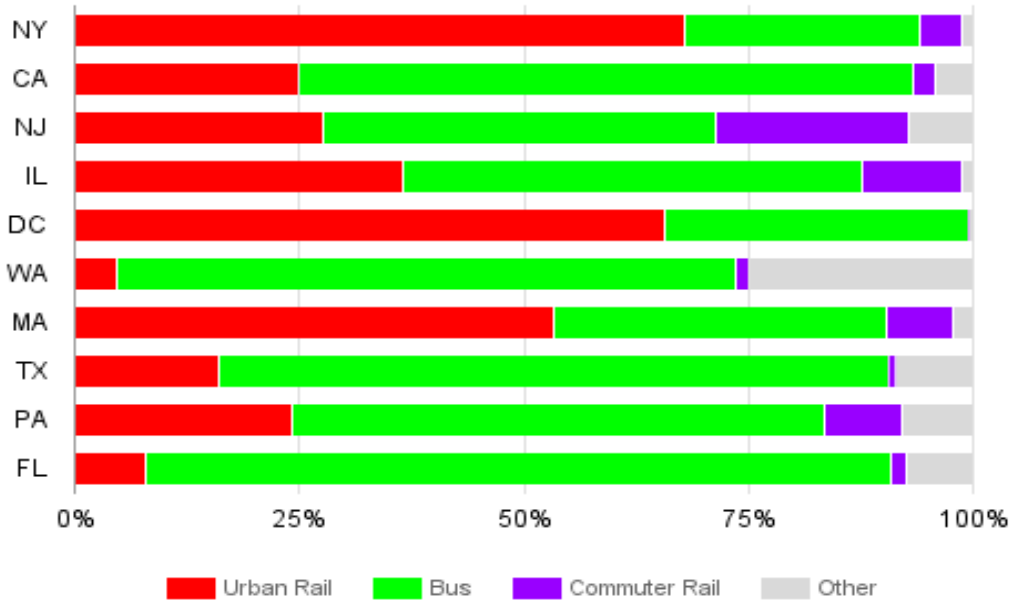
Source: National Transit Database 2016.

The states with the highest transit utilization—New York, the District of Columbia and Massachusetts—also provide the greatest share of transit service by urban rail (Figure 4-35). California's modal mix is bus-heavy, as discussed previously, but it is less bus-heavy than those of other states such as Washington and Florida. Correlation notwithstanding, the provision of urban rail does not necessarily lead to greater utilization. Much transit service in New York, the

[24] The District of Columbia is excluded as an outlier. Puerto Rico is included.

District of Columbia and Massachusetts is provided in densely-populated, walkable cities such as Manhattan, Washington, and Boston. Urban land use patterns and other factors such as frequent headways are also important for increasing transit utilization.

Figure 4-35: Percent of Transit Service by Mode Category in Selected States.



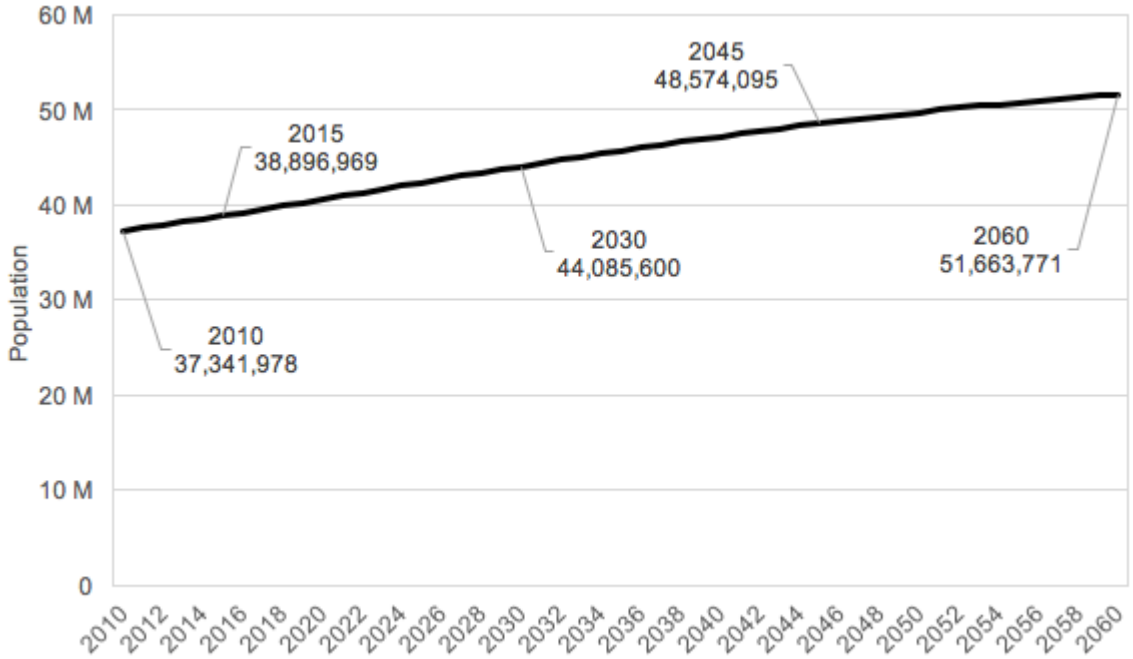
Source: National Transit Database 2016.

Demographic Forecasts

Forecasts by the California Department of Finance suggest that California's population may increase by 17% from 2015 to 2060. Significant population increases will occur in planning regions that already have the largest populations—the areas overseen by SCAG, MTC, SANDAG and SACOG. However, planning regions with smaller populations will see greater relative growth. Similarly, substantial population growth will occur among the under-65 age groups that currently make up the lion's share of the state's population. However, the over-65 age range will see much greater relative growth.

The California Department of Finance has issued annual population forecasts through the year 2060. These forecasts indicate that the state's population will increase by 17% from about 39 million in 2015 to nearly 52 million in 2060 (Figure 4-36). Significant expansion in transit service will be required merely to maintain per capita provision of vehicle revenue hours. Meeting the State's ridership targets will likely require additional investments.

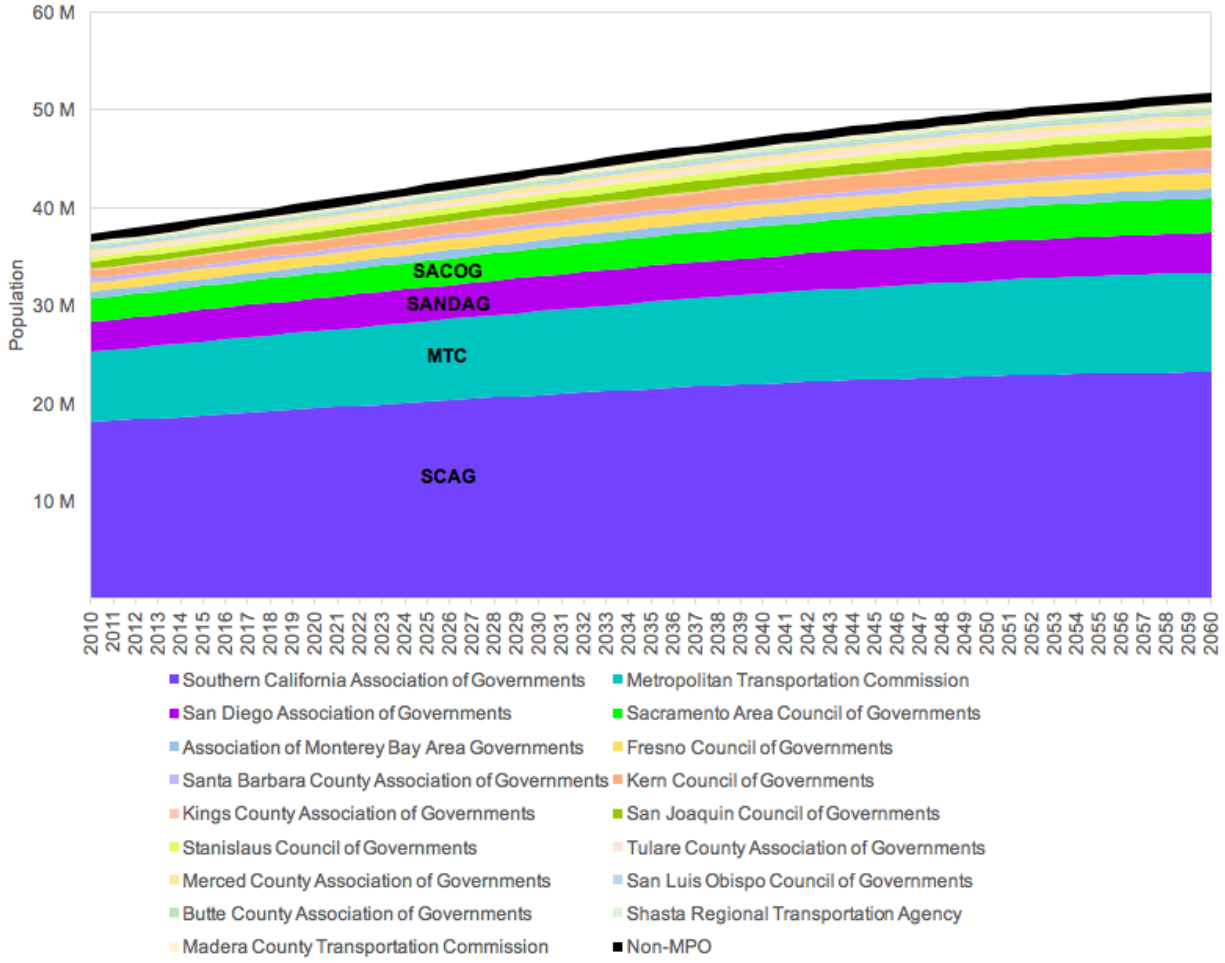
Figure 4-36: California Population Forecast, 2010-2060.



Source: California Department of Finance 2014.

The four MPOs overseeing the most transit service today, SCAG, MTC, SANDAG and SACOG, will continue to oversee the areas with the most population in the future (Figure 4-37). However, MPOs covering smaller populations will see greater relative population growth. Significant investment will be required in all MPO areas to maintain adequate transit service.

Figure 4-37: California Population Forecast by MPO Area, 2010-2060.

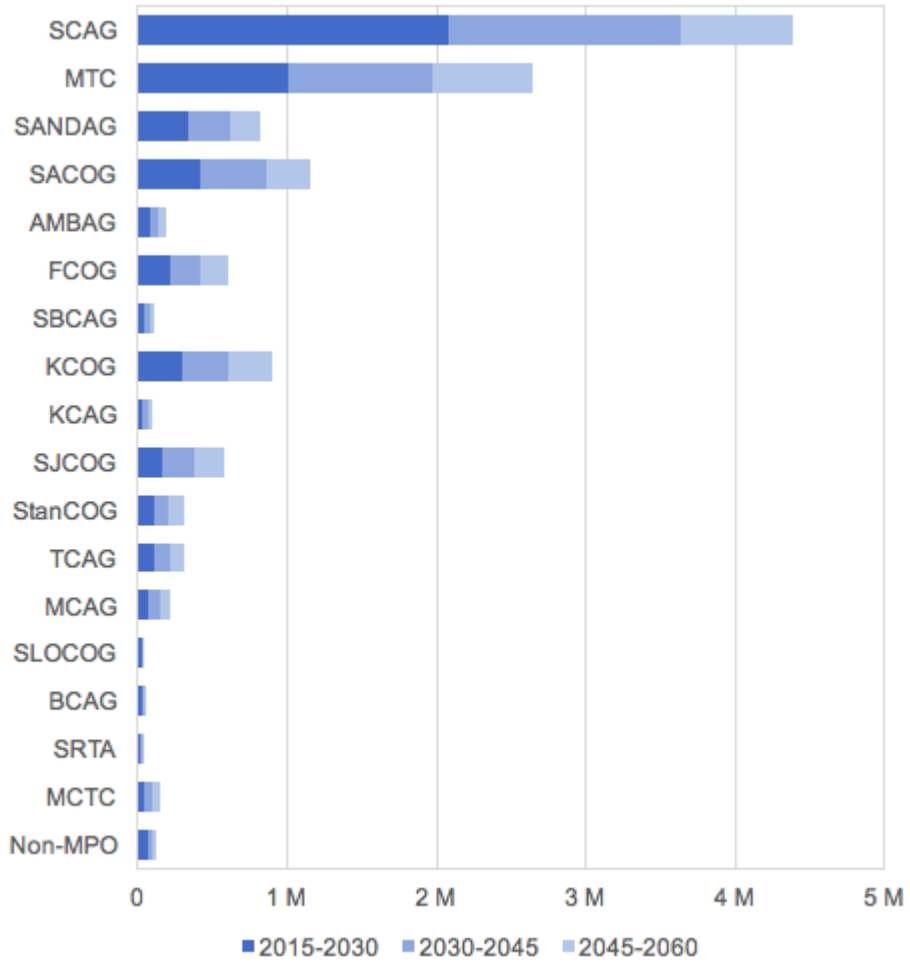


Source: California Department of Finance 2014.

Notwithstanding the large relative population increases projected in sparsely populated areas, the greatest absolute population growth is expected in areas served by a handful of MPOs (Figure 4-38). The two MPOs overseeing the most transit service today, the Southern California Association of Governments and the Metropolitan Transportation Commission, both cover areas forecast to grow by over one million residents between 2015 and 2030. The California Department of Finance also forecasts substantial population increases within the Sacramento Area Council of Governments, Kern Council of Governments and San Diego Association of Governments planning regions. The regions served by Fresno Council of Governments and San

Joaquin Council of Governments are expected to see lesser, but still significant increases, while other areas are expected to see much smaller increases in population.

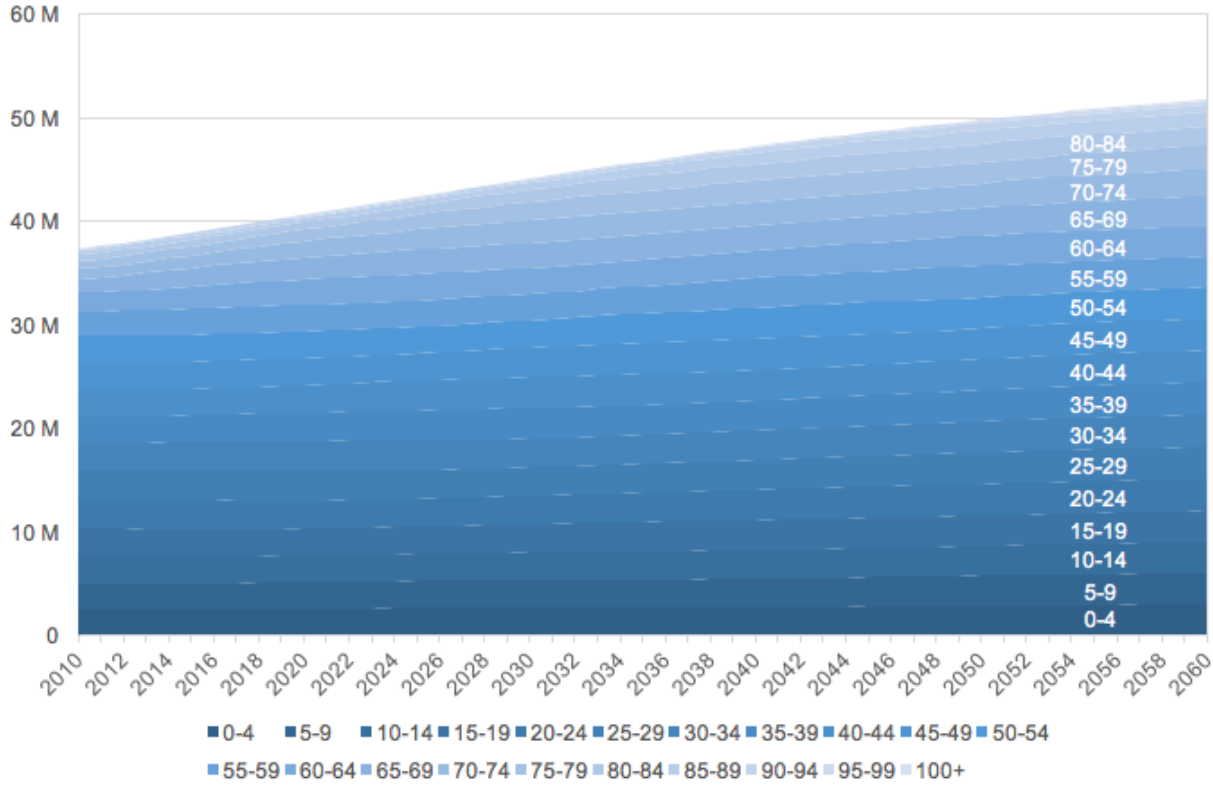
Figure 4-38: Forecast Growth in Population by MPO Area, 2010-2060.



Source: California Department of Finance 2014.

The California Department of Finance forecasts that, while the under-65 population will grow steadily over the next several decades (increasing by 17% between 2015 and 2060), the number of Californians over age 65 will increase rapidly, by 135% from 2015 to 2060 (Figure 4-39). Senior-age Californians are forecasted to make up about 24% of the population by 2060, up from about 13% in 2015. California transit agencies will need to cater to this large elderly population while also serving the needs of growing working-age and child populations.

Figure 4-39: California Population Forecast by Age Group, 2010-2060.



Source: California Department of Finance 2014.

MPO Transit Ridership Forecasts

The four largest MPOs in California, MTC, SACOG, SCAG, and SANDAG, represent areas with 87% of the state's population. Accordingly, it is important to closely examine transit ridership projections in these regions. As Table 4-2 below shows, each of the four MPO's Regional Transportation Plan and Sustainable Community Strategy (RTP/SCS) forecasts a positive linear annual growth rate for transit ridership in their regions. These MPOs-level forecasts are significant since the forecasting that MPOs do in developing the RTP/SCS is the most intensive transportation modeling that is done for transit in California, and MPOs must use them to plan future investments in their transportation systems.

Of the four largest MPOs, the Sacramento region anticipates the largest increase in transit ridership with a positive linear annual growth rate of 11.23% in (weekday) passenger boardings from the 2012 baseline year. SACOG's linear growth rate is more than twice that of SANDAG, which has the second largest forecasted linear annual increase of 5.30% (annual transit

boardings). SCAG and MTC forecast a positive linear annual growth rate for their regions of 3.75% (total annual ridership) and 3.06% (daily transit boardings), respectively. The two units of measure are not completely comparable because regions may use different factors to scale weekday transit trips to annual ridership. In general, more people ride transit on weekdays than weekends, but the ratio is not necessarily consistent across regions.

Table 4-2:Transit Ridership Projections and Linear Annual Growth Rates

MPO/Region	Baseline and Projected Ridership	Unit	Linear Annual Growth Rate
Sacramento Area Council of Governments (SACOG)[25]	2012: 138,340 2036: 511,158	Passenger boardings (weekdays)	+11.23%
San Diego Association of Governments (SANDAG)[26]	2012: 100,500,000 2050: 303,000,000	Annual transit boardings	+5.30%
Southern California Association of Governments (SCAG)[27]	2012: 702,503,159 2040: 1,440,485,602	Total annual ridership	+3.75%
Metropolitan Transportation Commission (MTC)[28]	2010: 1,581,000 2040: 3,032,000	Daily transit boardings	+3.06%

The Transit-Land Use Connection

California law defines a high-quality transit corridor "a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours[29]" and grants certain benefits to proposed land use projects located along high-quality transit corridors or near "major

[25] Sacramento Area Council of Governments. (2016). *Metropolitan Transportation Plan/Sustainable Communities Strategy*. Chapter 5C. Available at http://www.sacog.org/sites/main/files/file-attachments/chapter_5c_transit_bicycling_and_walking_trends_and_performance.pdf page 132

[26] San Diego Association of Governments. (2015). *San Diego Forward: The Regional Plan*. Available at http://www.sdforward.com/pdfs/RP_final/The%20Plan%20-%20combined.pdf page 96

[27] Southern California Association of Governments. (2016). 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy. Transit Appendix. Available at http://scagrtpscs.net/Documents/2016/proposed/pf2016RTPSCS_Transit.pdf page 77

[28] Metropolitan Transportation Commission. (2013). *Plan Bay Area Final Environmental Impact Report.* Chapter 2.2. Available at http://planbayarea.org/pdf/FEIR/FEIR_all_chapters.pdf page 2-84

[29] Public Resources Code § 21155(b)(3)

transit stops," defined as a transit stop at the intersection of two or more high quality transit corridors or that is served by a ferry or rail transit. A goal of laws like SB 375 (2008) and SB 743 (2013) is to encourage development projects that lead to reductions in driving, but such development projects have a side-benefit of supporting the provision or expansion of efficient, high-quality transit services.

The relationship between transit and land use is based in math and geometry. When new jobs and residents are added within existing high quality transit corridors 1) higher existing trip frequencies mean reduced wait times for potential passengers, increasing the proportion of residents, employees, or visitors who will want to use transit; and 2) transit agencies can accommodate additional passenger demand by increasing trip frequencies along established routes rather than establishing new routes or adjusting low-frequency routes.

State of California Actions to Integrate Land Use and Transit

In January 2017, California's Department of Housing and Community Development released the draft 2025 Statewide Housing Assessment[30]. A key finding of the report is that while California needs to produce new homes at a rate of 180,000 per year, the state has only produced 80,000 per year. This deficit impacts both housing affordability and the rate at which new potential transit passengers can be added in areas with high-quality transit service.

A key challenge identified in the Assessment is that "the existing system of land-use planning and regulation creates barriers to development," particularly in established communities where development is accomplished via infill near pre-existing development.

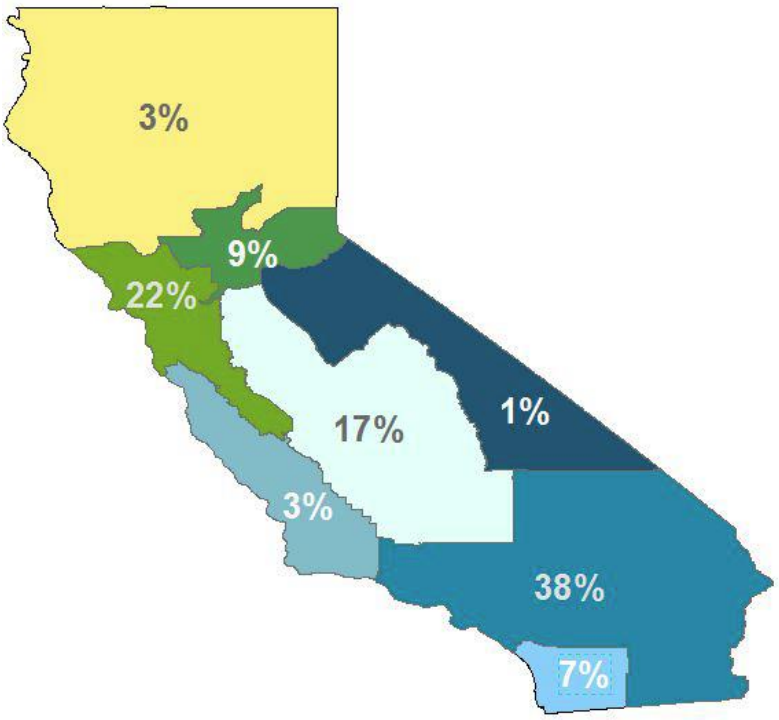
The Assessment states that California's current "population of 39 million is expected to grow to 50 million by 2050. Without intervention, much of the population increase can be expected to occur further from job centers, high-performing schools, and transit, constraining opportunity for future generations."

The report recommended several interventions to support the state's strategy to locate much of the housing growth in already developed areas near existing high-quality transit and recommends "reforming land use policies to advance affordability, sustainability, equity" and continuing "to incorporate strategies in State planning activities to build more homes in job-, transit- and amenity-rich areas of economic opportunity."

[30] California Department of Housing and Community Development. (2017). *California's Housing Future: Challenges and Opportunities* (Public Draft). Available at http://www.hcd.ca.gov/housing-policy-development/statewide-housing-assessment/docs/DraftSHA123016final.pdf

Figure 4-40 (below) shows that less than 10% of California's population growth through 2025 is expected outside of the four major metropolitan regions. Transit's future role in California is tied to the degree to which these interventions can be successful in locating new growth within these regions near existing and planned high-quality transit.

Figure 4-40: Regional Distribution of California's Growth Through 2025



Conclusion

The 42.2 million hours of public transit service provisioned in California in 2015 sustained 1.4 billion passenger trips taken and 8.5 billion passenger miles traveled. The state's target of doubling transit's 2012 statewide mode share by 2020 will require substantial increases in transit usage. Since high utilization (boardings per vehicle hour) is generally correlated with high service provision (vehicle hours per capita), significant increases in transit service provision will likely be required. The data suggest that increases in low-capacity modes such as vanpool will be less effective in driving ridership than increases in higher-ridership modes such as local bus and urban rail. Additional future increases in utilization required to meet the State's greenhouse gas reduction targets will require further expansion of the transit network and service at a rate above California's population growth rates.

The MPO regions with the greatest populations today will continue to account for most of the state's population in the future. Meeting the State's mode share goals will require concerted efforts in these regions to grow transit usage at the expense of automobile use. This will likely require large increases in both service provision (service hours per capita) and service utilization (passenger trips taken per service hour). Shifting service hours from higher-utilization, shorter-distance modes such as local bus to lower-utilization, longer-distance modes such as commuter bus and vanpool is unlikely to further the state's goals. Similarly, if the state is to meet its mode share targets with any efficiency, the provision of niche, low-capacity transit services should not displace the provision of higher-utilization modes such as local bus, bus rapid transit, and urban rail. It will also be necessary to accommodate the majority of the state's increase in population and employment growth through transit-supportive land uses.

5

CHAPTER

Revenues for Transit

Chapter 5: Revenues for Transit

As shown in Table 5-1, California is second only to New York state in transit expenditures, with $11 billion spent in 2015 compared with New York's $17 billion. The state of New York is home to the New York Metropolitan Transportation Authority (NY MTA), which includes New York City Transit. NYCT carried 3.45 billion passenger trips in 2015, *2 billion more* than all of California's transit agencies combined.

Among the ten states that spend the most on transit, California ranks seventh in the percentage of revenues generated from fares, behind New York, New Jersey, Illinois, Washington DC, Pennsylvania, and Massachusetts. States have different levels of urbanization, differing urban and regional form, and a heterogeneous distribution of building and community ages. These factors influence transit ridership and cost-effectiveness as much or more than the provision or management of transit service. Nevertheless, Table 5-1 provides a high-level comparison between California and other states.

Table 5-1: Top Ten States by Transit Expenditures and Source of Revenue, 2015

	Total Transit Expenditures (Capital and Operating)		% of Total Revenues From			
	Overall	**Per Trip**	**Fares**	**Local**	**State**	**Federal**
NY	$17,716,553,108	$4.49	34.9%	26.9%	24.2%	10.2%
CA	$11,184,930,775	$7.83	16.7%	40.1%	17.8%	22.4%
NJ	$3,712,657,338	$8.93	37.0%	15.6%	10.1%	27.1%
IL	$3,544,078,120	$5.37	26.8%	44.1%	12.8%	12.9%
DC	$3,035,790,445	$7.37	25.9%	28.2%	17.7%	24.0%
WA	$2,997,499,276	$11.97	13.7%	55.3%	6.8%	13.1%
MA	$2,896,645,550	$6.55	24.5%	12.0%	45.7%	13.8%
TX	$2,702,607,038	$9.61	9.1%	64.6%	1.8%	20.4%
PA	$2,582,585,599	$5.75	27.1%	7.3%	46.3%	17.5%
FL	$1,892,970,128	$6.82	15.7%	43.9%	14.6%	23.5%

Source: National Transit Database. Local revenues include taxes and fees levied by the transit agency. Tables 5-1 and 5-2 are for different time periods from different data sources.

As shown in Table 5-2, California transit agencies assemble funding from a range of revenue sources. In fiscal year 2014-15, all revenues from sales taxes, including the Local Transportation Fund (LTF) and local option sales taxes, totaled $4.49 billion, or 40% of total transit revenues. After sales taxes, fares provided the largest source of funds, followed by federal grants, state grants, other local support, and finally the State Transit Assistance (STA) fund.

Table 5-2: Sources of California Transit Operating and Capital Revenues

	Fiscal Year 2014-15	Percent of Operating Revenues
Local Sales Tax (Self-Help Counties)[1]	$1,995,889,536	26%
Passenger Fares	$1,810,813,165	24%
Local Transportation Fund (LTF)	$1,268,729,235	17%
Federal Grants	$851,032,099	11%
Other Sources of Funds	$612,092,041	8%
General Operating Assistance	$566,808,922	8%
State Transit Assistance Funds (STA)	$282,638,794	4%
Property Tax	$192,727,050	3%
Total Transit Operating Revenues	**$7,580,730,842**	
	FY 14-15	**Percent of Capital Revenues**
Local Revenues used for Capital	$1,807,311,675	49%
State Capital Grants	$1,143,640,957	31%
Federal Capital Grants	$719,529,780	20%

[1] All but $63,155 of local sales taxes for operations was generated in self-help counties.

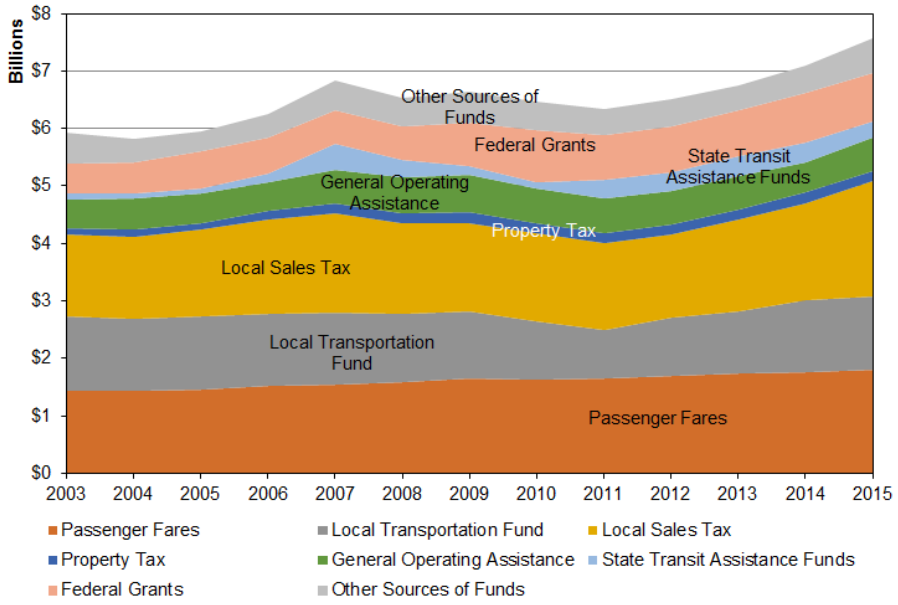
Other Capital Revenues	$4,467,981	0%
Total Capital Revenues	**$3,674,950,393**	

Source: California State Controller's Office. Numbers may not sum due to rounding. Tables 5-1 and 5-2 are for different time periods from different data sources.

California Trends

The sales and use tax as a source of transit revenues has grown in the past decade as most of California's large, urbanized counties have passed new local option sales tax measures and the total volume of taxable sales increases. In addition, the state's efforts to apply the use tax to the growing internet sales market[2] has increased sales tax revenue available to transit. Future efforts to expand the applicability of the sales and use tax to certain services could further augment local transportation sales tax revenues. Fiscal year 2014-15 marked the first year since fiscal year 2006-07 that local option sales tax revenues eclipsed the amount of statewide passenger fare revenues. Figures 5-1 and 5-2 show the growth of funding over time as well as the increase in the proportion of operating revenues derived from local sources.

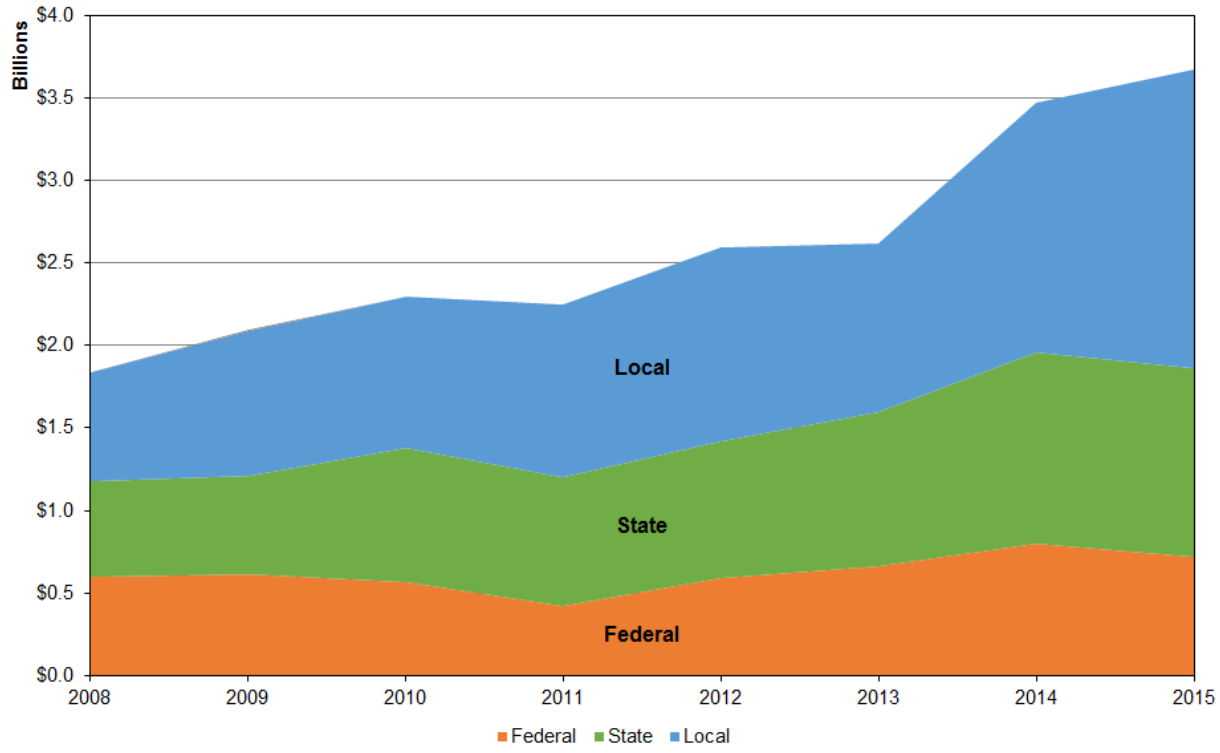
Figure 5-1: Inflation-Adjusted Operating Revenues by Source, 2003-2015[3]



[2] California Legislative Analyst's Office. (2015). "Understanding California's Sales Tax." Retrieved from http://www.lao.ca.gov/reports/2015/finance/sales-tax/understanding-sales-tax-050615.aspx

[3] Data are from the State Controller's Office, adjusted for inflation using U.S. Bureau of Economic Analysis Table 1.5.4: State and Local Consumption Expenditures, 2015 Dollars

Figure 5-2: Inflation-Adjusted Capital Revenues by Source, 2008-2015[4]



State Funding for Transit

State funds for transit assistance are governed by the Transportation Development Act (TDA). Recipients of state TDA funds must meet a farebox recovery ratio of 20% for urban agencies and 10% for rural agencies to receive their full share of funds. Some exemptions exist for new routes, extensions, new transit systems, and other anomalies which affect transit service. The Local Transportation Fund and State Transit Assistance Funds are programs of the TDA.

Local Transportation Fund

The Local Transportation Fund (LTF) receives revenues from a 0.25% of the state sales tax, which must be returned to the county in which it is generated. Created in 1972, the LTF is the longest standing source of statewide dedicated transit funding, though it can be used for local

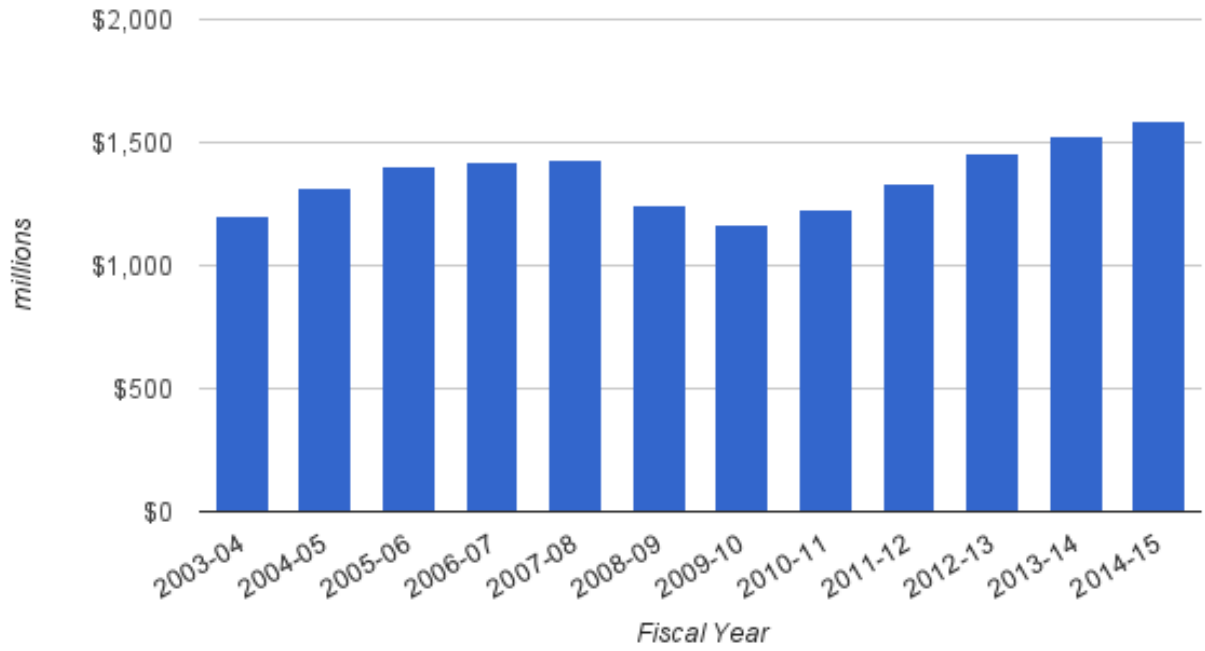
[4] Data are from the State Controller's Office, adjusted for inflation using U.S. Bureau of Economic Analysis Table 1.5.4: State and Local Gross Investment, 2015 Dollars

streets and roads projects in counties with fewer than 500,000 inhabitants if all transit needs are met.

Like local option sales taxes, LTF receipts are subject to macroeconomic activity that affects consumer spending. Figure 5-3 below shows how the 2008-2010 economic downturn affected LTF receipts, which fell 18% between FY 2007-09 and FY 2009-10.

In fiscal year 2014-15, California counties received $1.55 billion in LTF revenues (see Table 5-3 for a county-by-county breakdown). In 2015, 206 entities were primary recipients of LTF funds[5].

Figure 5-3: California Local Transportation Fund Revenues, FY 2003-2015



Note: figures are not adjusted for inflation

Table 5-3: FY 2014-15 LTF Revenues by County

County	Revenue Distributed ($)		County	Revenue Distributed ($)
Alameda	71,343,982		**Placer**	20,544,089
Alpine	85,565		**Plumas**	494,715

[5] Source: State Controller's Office

Amador	1,072,335		**Riverside**	80,925,193
Butte	7,608,840		**Sacramento**	53,194,190
Calaveras	846,305		**San Benito**	1,464,148
Colusa	935,321		**San Bernardino**	84,099,683
Contra Costa	37,840,494		**San Diego**	133,231,349
Del Norte	623,455		**San Francisco**	46,845,446
El Dorado	4,913,322		**San Joaquin**	25,287,142
Fresno	33,613,079		**San Luis Obispo**	12,970,430
Glenn	867,347		**San Mateo**	38,634,093
Humboldt	4,806,958		**Santa Barbara**	16,742,319
Imperial	6,897,960		**Santa Clara**	100,158,990
Inyo	858,249		**Santa Cruz**	8,549,340
Kern	38,704,075		**Shasta**	7,058,412
Kings	4,002,467		**Sierra**	52,157
Lake	1,341,814		**Siskiyou**	1,430,487
Lassen	661,646		**Solano**	17,142,477
Los Angeles	372,061,290		**Sonoma**	21,318,798
Madera	3,841,484		**Stanislaus**	19,925,613
Marin	12,376,972		**Sutter**	3,879,754
Mariposa	475,375		**Tehama**	1,937,054
Mendocino	3,415,864		**Trinity**	262,077
Merced	6,996,845		**Tulare**	15,513,893
Modoc	231,228		**Tuolumne**	1,556,095
Mono	578,825		**Ventura**	33,603,474
Monterey	16,103,185		**Yolo**	9,707,444
Napa	7,877,703		**Yuba**	1,273,333
Nevada	3,081,217			
Orange	150,289,479		**Total**	**$1,552,154,870**

Source: California State Board of Equalization[6]

State Transit Assistance

The State Controller's Office administers State Transit Assistance (STA) formula funds, which are appropriated annually by the legislature. One half of STA funds are allocated to counties based on population[7]. One half of STA funds are allocated based on transit operator revenues from the prior fiscal year[8]. In 2015, 139 entities were direct recipients of STA funds.

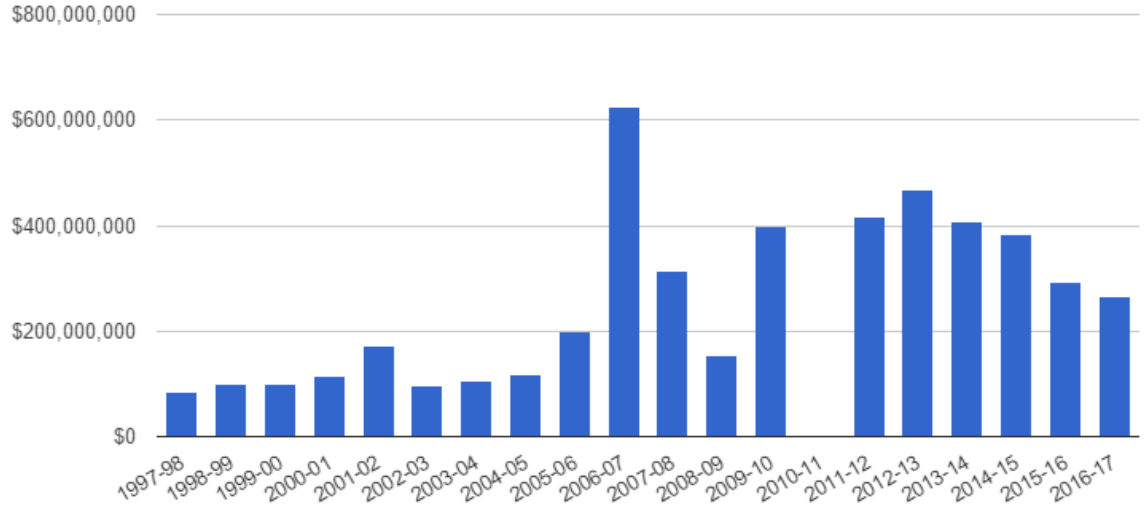
To receive STA funds, the average cost of an operator's vehicle revenue hour must not increase at a rate greater than the urban metropolitan consumer price index.[9]

STA made up less than 3% of total transit funding in fiscal year 2014-15, and in recent years has been most volatile source of transit agency funding in the state.

STA allocations peaked at $623 million in FY 2006-2007, a result of increasing Public Transportation Account revenues from historically high gasoline prices. No allocations were made four years later, in FY 2010-11, as a result of a series of actions collectively known as the Fuel Tax Swap. Revenues have declined since the swap was enacted.

[6]California State Board of Equalization (2016). Table BOE 21B. Retrieved from https://www.boe.ca.gov/annual/table21b.htm
[7] (PUC § 99313)
[8] (PUC § 99314)
[9] (PUC § 99314.6(a))

Figure 5-4: Annual State Transit Assistance Allocations, 1997-2016[10]



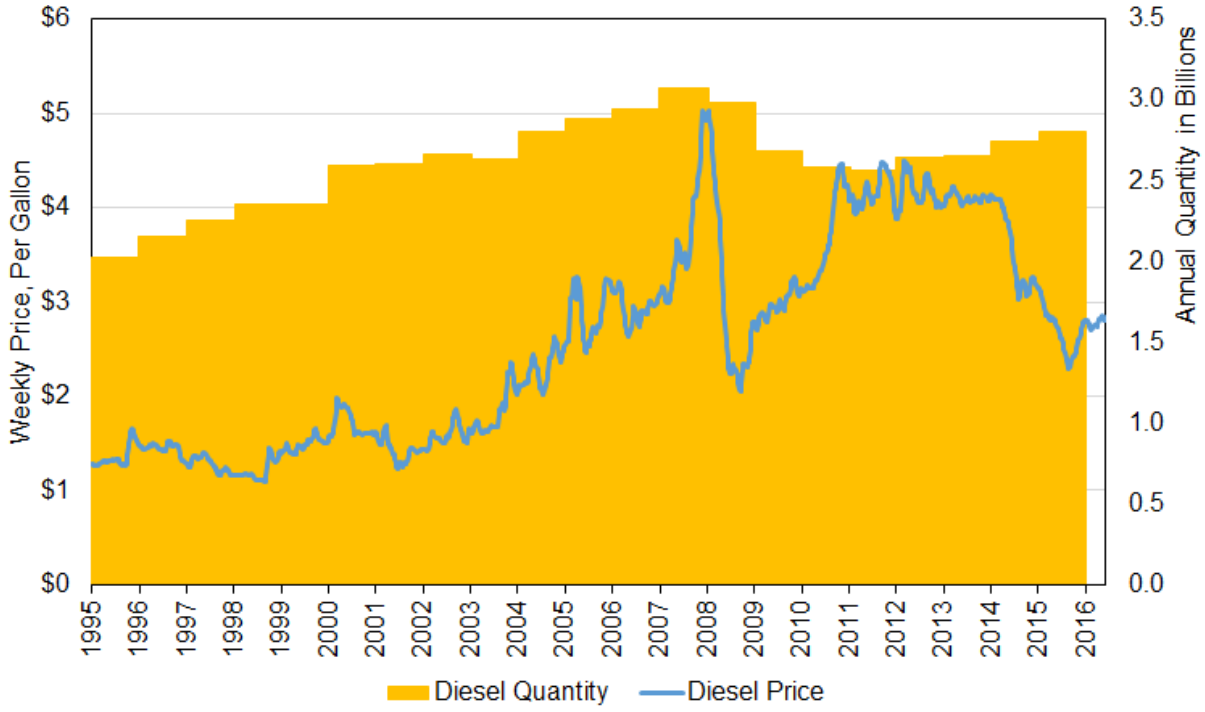
In January 2016, the State Controller's Office changed their approach for calculating revenue-based allocations to include revenues from transit operators that had not previously been deemed eligible under Article 4 of the Transportation Development Act. This led to some changes in funding distribution between agencies within the boundaries of a regional transportation planning agency (RTPA). The legislature is currently considering options to further define eligible claimants under the Transportation Development Act.

Diesel Price Volatility

After the Fuel Tax Swap, the sole source of State Transit Assistance has been a state sales tax on diesel fuel of around 2% (The precise percentage has varied annually, as dictated by the legislature.) Because both the price and quantity of diesel fuel sold affects sales tax revenue, funding is more volatile than when revenues were generated from the previous per-gallon excise tax on gasoline, which was sensitive only to changes in the quantity of fuel, not the price. Figure 5-5 shows the volatility in the price and quantity of diesel fuel sold in California.

[10] Source: State Controller's Office

Figure 5-5: California Diesel Fuel Sales: Weekly Price and Annual Quantity, 1995-2016



Greenhouse Gas Reduction Fund Programs

SB 862 (2014) established the Transit and Intercity Rail Capital Program and the Low-Carbon Transit Operations Program. The two programs currently receive a combined 15% of total revenues from the Greenhouse Gas Reduction Fund, where the state deposits receipts from its cap-and-trade program. Auctions held in May and August of 2016 produced only $18 million in new revenues for the Greenhouse Gas Reduction Fund, raising concerns about the sustainability of program funding.[11] The November 2016 auction produced over $350 million in revenues, bringing the total for the year to $890 million, but not completely alleviating concerns.

Transit and Intercity Rail Capital Program (TIRCP)

The Transit and Intercity Rail Capital Program (TIRCP) is a competitive capital grant administered by the California Department of Transportation in collaboration with the California State Transportation Agency for projects that demonstrate reductions in future greenhouse gas emissions. Eligible expenditures include "bus, or ferry transit project that will significantly reduce

[11] California Air Resources Board. (2016). "Auction Summary Results Reports." Retrieved from https://www.arb.ca.gov/cc/capandtrade/auction/auction_archive.htm

vehicle miles traveled, congestion, and greenhouse gas emissions by creating a new transit system, increasing the capacity of an existing transit system, or otherwise significantly increasing the ridership of a transit system.[12]"

In the first two funding rounds, agencies have been awarded $615.2 million in TIRCP grants towards $4.6 billion worth of projects. Funds were used towards the purchase of buses, rolling stock, core capacity improvements to existing rail facilities, and for the construction of new facilities like the Orange County Streetcar and Metro-LAX Connector station.

Low-Carbon Transit Operations Program (LCTOP)

Funds from the Low Carbon Transit Operations Program support operating or capital expenses that expand or enhance transit service, increase transit modal share, or are related to the purchase of zero-emission buses. Projects must also decrease greenhouse gas emissions. For transit agencies with service areas that include disadvantaged communities, at least 50% of funds must be spent in disadvantaged communities identified by CalEnviroScreen. Each year, the State Controller's Office prepares a list of eligible recipients and the amounts that can be allocated in accordance with the STA revenue-based formula and the STA population-based formula. The program awarded $24.2 million in FY 2014-15 and $74.7 million in FY 2015-16 for a total of $98.9 million.

Other State Capital Sources

Many state sources of funds dedicated to transit capital funding are closing out or have limited resources available.

Table 5-4: Other State Capital Programs

Program	Summary	Status
State Transportation Improvement Program (STIP)	A five-year plan for the allocation of certain state transportation funds for transit and highway improvements. Updated in even-numbered years. n.	Estimated $26.4 million in transit capacity for FY15-16 from Public Transportation Account[13]

[12]SB 9 (2015) Bill Text.

[13] California Transportation Commission. (2016). "Adoption of 2016 STIP. Resolution G-16-19." Retrieved from http://www.catc.ca.gov/programs/STIP/2016_STIP/2016_STIP_Adoption_with_Changes_051816.pdf

Traffic Congestion Relief Program (TCRP)	Approved in 2000 and allocated by the California Transportation Commission, the program funded many urban, commuter, and regional rail projects.	$724.9 million remains for the BART San Jose extension.[14]
Proposition 1B (PTMISEA)	Used for capital transit improvements for rehabilitation, safety, modernization, expansions, or purchases or rehabilitation of rolling stock. Funds were appropriated annually per STA formulas.	Ended. Final appropriation of funds made in the FY 2014-15 budget.

Low Carbon Fuel Standard (LCFS) and Transit Operations

Beginning in 2013, California transit agencies began to consider how to generate LCFS credits to produce revenues for their alternatively-fueled vehicles.

The Air Resources Board's new LCFS Regulatory Guidance for Transit Agencies specifies how transit agencies can opt-in to the LCFS and receive a potential revenue stream based on their vehicle propulsion. LCFS credits are a revenue source that is separate and distinct from the Low Carbon Transit Operations Program, which receives funding from California's Greenhouse Gas Cap-and-Trade Program. From January to October, 2016, LCFS credit values have averaged $105.21[15] and prices have ranged from $46 to $132 per credit. As of May 2016, 15 public mass transit agencies had opted in to report to the Air Resources Board's LCFS Reporting Tool.[16]

Table 5-5: Potential LCFS Revenues for Transit Operations

Bus Fuel Type	**Fuel Efficiency** (dge=diesel gallon equivalent)	**Credit amount**	**Annual Revenue at @ 2016 YTD average per credit ($105.21)**

[14] $111.4 million for BART and $613.5 million for Santa Clara VTA. California Transportation Commission. (2015). "Traffic Congestion Relief Program - Annual Report." Retrieved from http://www.catc.ca.gov/meetings/agenda/2016Agenda/2016-01/25_4.15.pdf

[15] Volume weighted mean of Monthly LCFS Credit Transfer Activity Report for October 2016. Retrieved from https://www.arb.ca.gov/fuels/lcfs/credit/20161108_octcreditreport.pdf

[16] California Air Resources Board (20 May 2016). LCT Regulated Parties Reporting. Retrieved from https://www.arb.ca.gov/fuels/lcfs/regulatedpartiesreporting20160520.xlsx

Diesel	3.8 mile / dge	0	$ -
Renewable Diesel	3.8 mile / dge	83.55	$ 8,790
Average of Conventional LNG & CNG	3.42 mile / dge	24.86	$ 2,616
Renewable NG	3.42 mile / dge	99.29	$ 10,446
Electricity	0.5 mile / kWh	79.31	$ 8,344

**Assumes annual mileage of 35,000. Based on ARB Calculations in Table 2 from Low Carbon Fuel Standard Regulatory Guidance 16-07*

Additionally, existing rail can generate around 2.5 cents per KWh and new rail can generate up to 12 cents per KWh to offset energy costs.

Federal Revenues

The United States Federal Transit Administration (FTA) has been a longtime source of funds for vehicle purchases, rural operations, and social services transportation. More recently, the FTA's competitive "New Starts" Capital Investment Grant has been a significant source of funds for California's rail and bus rapid transit projects.

The primary source of federal funds for transit is been the federal fuel excise tax of $0.184 per gallon on gasoline and $0.244 per gallon on diesel, which have not changed since 1993. These excise tax revenues are collected from producers and remitted to the federal Highway Trust Fund. About 15% of federal fuel excise tax revenues are deposited in the Mass Transit Account for transit funding programs. In recent years, general fund revenues have supplemented shortfalls in the Highway Trust Fund.

Table 5-6 summarizes major federal programs and the amount each contributed to California in 2015. Table 5-7 details the sum federal awards made to California entities in each of the last six years.

Table 5-6: 2015 California Federal Funding Programs Overview [17]

49 USC Section	Details	Program Funding in CA, 2015
5307 Urbanized Area Formula Program	Transit capital and operating assistance for areas over 50,000 persons. Can be used exclusively as operating assistance in urban areas with populations under 200,000. The federal share is not to exceed 80% or 90% for vehicle equipment to comply with American with Disabilities Act and the Clean Air Act.	$1,308,924,042
5339 Bus and Bus Facilities	Funds to replace, rehabilitate, and purchase buses and related equipment. The federal share is not to exceed 80% of project costs.	
5309 Capital Investment Grant	A discretionary capital grant program for expansion of guideway network or service capacity. Includes the New Starts, Small Starts, and Core Capacity programs.	$999,747,502
5337 State of Good Repair	Capital maintenance, replacement, and rehabilitation funds for rail and BRT-like services.	
5311 Rural Program	Capital, planning, and operating assistance to areas with less than 50,000 people and federally recognized tribal governments. Maximum federal share is 80% for capital, 50% for operating assistance.	$32,580,405
Other FTA Funds $89,869,502 (includes retired programs like JARC)		
3005(b) Expedited Project Delivery	Design and construction of 5309-eligible programs. Maximum Federal share of 25%	
5310 Enhanced Mobility of Seniors & Disabled	Federal share is 80% for capital, 50% for operating. 55% of funds must be spent on capital expenses or contracted transportation. Requires Coordinated Human Services Transportation Plan.	$9,038,362 *(State Controller's Office)*
3019 Innovative	Provisions governing state or consortium purchasing	

[17] *Summaries are derived from FTA Program Factsheets. Funding source is the National Transit Database unless otherwise specified*

Procurement & Leasing	and leasing of transit rolling stock.	
5303-05 Metro and Statewide Planning	Funding for multimodal transportation in metropolitan areas and states that meets 3C procedural guidelines. 80% funding with a required 20% local match	

Table 5-7: Recent History of California Revenues from Federal Programs

(Funding in Thousands)

Program	2010	2011	2012	2013	2014	2015	Total
Federal Transit Formula Grants (5307)	$766,826	$918,967	$1,183,985	$273,170	$1,747,550	$858,125	$5,945,219
Federal Transit Capital Investment Grants (5309)	$334,944	$493,174	$552,522	$337,990	$891,166	$582,368	$3,192,166
State of Good Repair Grants Program (5337)				$63,270	$435,275	$210,399	$513,233
Enhanced Mobility of Seniors and Individuals with Disabilities (5310)	$70,247	$57,433	$86,759	$59,400	$75,467	$117,797	$693,882
Metropolitan Transportation Planning (5303-094)	$69,673	$82,925	$33,326	$91,367	$66,431	$63,523	$470,757
Rural Area Formula Grants (5311)	$95,503	$25,149	$25,658	$31,479	$29,700	$5,19266	$240,163
Job Access and Reverse Commute Program (5316)	$20,772	$20,080	$32,335	$11,359	$11,477	$(209,289)	$95,816
Bus and Bus Facilities Formula (5339)					$54,587	$18,842	$83,833
TIGER (ARRA)			$13,903	$10,000	$14,000	$12,800	$50,703
New Freedom Program (5317)	$14,036	$4,446	$19,806	$5,193	$4,455		$47,720
Clean Fuels (5308)	$10,050	$11,350	$2,788		$6,720		$30,908
TIGGER - GHG	$17,486		$11,617				$29,103

Highway Planning and Construction	$3,354	$5,490	$1,460	$856	$5,047		$13,746
Other Programs	$2,446	$13,137	$6,318	$3,507	$387	$11,248	$37,043
Total	**$1,405,342**	**$1,632,155**	**$1,970,482**	**$887,597**	**$3,342,267**	**$1,877,233**	**$11,434,522**

Local Revenues

In California, local sources contribute a larger share of transit funding than do federal and state sources. Local revenues grew from 36.3% of total transit funding in fiscal year 2008-09 to 40.5% in fiscal year 2014-15. Local sources include sales taxes, property taxes, toll revenues, and other sources, which are discussed below.

Sales Taxes: Self-Help Counties

California counties, cities, and transportation districts have the option to levy local sales taxes. Special taxes, levied for a specified purpose such as transportation, require two-thirds voter approval. As of November 2016, 24 of California's 58 counties have a special sales tax for transportation. These counties are known as "self-help counties" because they have voted to voluntarily raise local revenues to fund transportation. Many of these special taxes were passed before Proposition 218 (1996) increased the voter approval threshold from a simple majority to two-thirds.

Not all transportation local option sales taxes for transportation are dedicated to transit. In 2015, these local sales taxes produced an estimated $4.8 billion for transportation. In fiscal year 2014-15, transit agencies reported receiving $3.2 billion in local sales taxes for transit purposes, or approximately two-thirds of local option transportation sales tax receipts.

Table 5-8: County and District Transportation Sales Tax and Estimated FY 2015 Revenues

County	Tax Amount	Duration	Est. 2015 Rev. (Millions)
Alameda (BART)	0.5%	permanent	$151
Alameda (Measure BB)	1%	2015-2045	$301
Contra Costa (BART)	0.5%	permanent	
Contra Costa	0.5%	1989-2034	$81
Fresno	0.5%	1987-2027	$72
Imperial	0.5%	1990-2050	$14

Los Angeles (Props A&C)	1%	permanent	$1,538
Los Angeles (Measure R)	0.5%	2009-extended to permanent	$769
Los Angeles (Measure M)	0.5%	2017-permanent	
Madera	0.5%	1990-2027	$8
Marin	0.5%	2005-2025	$27
Merced (Measure L)	0.5%	2017-2047	
Monterey (Measure X)	0.38%	2017-2047	
Napa (Measure T)	0.5%	2018-2043 (Est.)	
Orange	0.5%	1991-2041	$326
Riverside	0.5%	1989-2039	$172
Sacramento	0.5%	1989-2039	$111
San Bernardino	0.5%	1990-2040	$175
San Diego	0.5%	1988-2048	$278
San Francisco (BART)	0.5%	permanent	$95
San Francisco	0.5%	1990-2034	$95
San Joaquin	0.5%	1991-2041	$57
San Mateo	0.5%	permanent	$85
San Mateo	0.5%	1989-2033	$85
Santa Barbara	0.5%	1990-2040	$37
Santa Clara (Measure B)	0.5%	2017-2047	
Santa Clara	0.5%	permanent	$221
Santa Clara	0.5%	1996-2036	$221
Santa Clara (BART Ext)	0.125%	2013-2043 (Est.)	$55
Santa Cruz	0.5%	permanent	$17
Santa Cruz (Measure D)	0.5%	2017-2047	
Sonoma	0.25%	2005-2025	$23
Sonoma-Marin (SMART 0.25%)	0.25%	2009-2029	$36

Stanislaus	0.5%	2017-2042	
Tulare	0.5%	2007-2037	$32
Total			$4,831

Source: Caltrans. (2015). "Transportation Funding in California." With authors' additions of 2016 ballot measures.

Property Taxes

Property taxes in California can be levied as a percentage of assessed value (ad valorem) or based on some attribute such as linear feet of curb frontage, or a set per-parcel fee. Property taxes increases for transportation are subject to a two-thirds voter approval threshold. In fiscal year 2014-15, nine agencies used $192.7 million in property taxes for operations. AC Transit, BART, and Orange County each spent over $10 million in funds from property taxes.

2016 Transportation Revenues Ballot Measure Summary

The importance of local voter approval for new revenues is growing over time. In November 2016, Californians passed eight of 15 county or district ballot measures to generate revenues for transit. Six of 13 sales tax increases and both property tax measures passed.

Table 5-9: November 2016 Ballot Measure Summary

Measure	Summary	Outcome
Alameda-Contra Costa Transit District 1 (Measure C1) Property tax	Extends the existing Alameda-Contra Costa Transit District's $96/year parcel tax 20 years past the previous expiration in 2019. Current revenues are about $28 million per year.	**Passed**
Contra Costa County (Measure X) Sales tax	The Contra Costa Transportation Authority would have increased the sales tax by one half-cent for 30 years. The measure would have generated about $2.3 billion to repair streets, introduce complete streets treatments, and expand freeways, with roughly 30% of funding to transit.	**Failed**
Humboldt County (Measure U) Sales tax	A 20-year, half-cent countywide sales tax to finance road maintenance and repairs, and improve existing transit operations.	**Failed**

Los Angeles County (Measure M) Sales tax	A half-cent sales tax increase to expand rail and rapid transit system, make public transit more accessible, convenient, and affordable for all people, and ease congestion. The measure will generate an estimated $120 billion over 40 years for transportation improvements.	**Passed**
Monterey County (Measure X) Sales tax	A 30-year+, 3/8-percent countywide sales tax increase for the Transportation Agency for Monterey County to fund roads and congestion relief projects, including public transportation projects. The measure will generate an estimated $600 million over 30 years, with roughly 40% dedicated to regional safety and mobility projects.	**Passed**
Placer County (Measure M) Sales tax	A half-cent, 30-year sales tax to maintain and improve Placer County's transportation infrastructure. 12% of the fund would have gone to transit, 5% would have gone to bike and pedestrian infrastructure, and the rest would to roads.	**Failed**
Sacramento County (Measure B) Sales tax	A countywide half-cent sales tax to improve regional transit and road projects. The measure would have raised an estimated $3.6 billion for road work and transit improvements, with 30% to transit, especially Sacramento Regional Transit.	**Failed**
San Diego County (Measure A) Sales tax	A half-cent sales tax to fund highway improvements, surface rail, a sky-way gondola system, and bike/ped projects. The measure would have generated an estimated $18.2 billion over 40 years, with 40% of funding to public transit.	**Failed**
San Francisco, Alameda, and Contra Costa (Measure RR) Property tax	A $3.5-billion property-tax backed bond measure to update, repair, and replace BART's deteriorating infrastructure to make the existing service safer and more reliable.	**Passed**
San Francisco (Proposition J & K) Sales tax	A 0.75% sales tax increase on goods and services excluding rent, utilities, groceries health care and prescriptions to ensure that funds (from Measure K) are dedicated exclusively to two of the issues facing the city: 1/3 of the revenue will help fight homelessness and the remaining 2/3 will help fix transportation	**Passed**

	systems. The measure will raise an estimated $154 million per year.	
San Luis Obispo County (Measure J) Sales tax	A countywide 9-year, half-cent sales tax to raise fund for local roads and infrastructure. The measure would have raised an estimated $255 million over 9 years, with 20% of funding to public transportation and bike/ped infrastructure, including the Bob Jones Trail.	**Failed**
Santa Clara County (Measure B) Sales tax	A 30-year, half-cent sales tax to fund the final leg of the BART extension to Silicon Valley, Caltrain grade separations and capacity improvements, and high-priority local street and road repairs. Recently, city leaders decided to scale back a plan to add toll lanes to CA-85 and instead to put the $350 million to transit.	**Passed**
Santa Cruz County (Measure D) Sales tax	A 30-year, half-cent sales tax for transportation improvements. The measure will maintain mobility for seniors and those with disabilities, invest in bicycle and pedestrian infrastructures, provide safer routes to schools for local students, and invest in transportation projects that reduce pollution.	**Passed**
Stanislaus County (Measure L) Sales tax	A countywide 25-year, half-cent sales tax to pay for countywide local street and road improvements, arterial street widening, signalization, pedestrian, bicyclist, and driver safety. The measure will raise an estimated $960 million over the 25-year period, with 7% of funding for services for seniors, youth, veterans and to connect people to rail and transit.	**Passed**
Ventura County (Measure AA) Sales tax	A 30-year, half-cent sales tax that could have raised $3.3 billion, with roughly 23% of funding to rail and bus service improvements, transportation technology management, environmental mitigation and bike/ped infrastructure improvements.	**Failed**

Sources [18]

[18] Center for Transportation Excellence. (2016). Transportation Ballot Measures. Retrieved from http://www.cfte.org/elections
Transportation for America (2016). Transportation Vote 2016. Retrieved from http://t4america.org/maps-tools/state-policy-funding/2016-votes/
Linton, J., Curry, M., & Rudick, R. (2016). Transit Vote 2016: California's Transportation Funding Ballot Initiatives. *Streetsblog California.* Retrieved from http://usa.streetsblog.org/2016/11/07/transit-vote-2016-californias-transportation-funding-\ballot-initiatives/

Toll Revenues

In its 2015 fiscal year, MTC raised $694,954,852 in toll revenue from bridges and HOT lanes, of which it transferred $67,156,109 (9.7%) for transit operations.[19]

A portion of the revenue from Los Angeles County's I-10 and I-110 High-Occupancy Toll (HOT) Express Lanes is dedicated to transit service in the corridor. Los Angeles Metro reported $58 million in toll revenues in 2015.

The Golden Gate Bridge Highway and Transit District reported $49 million in toll revenues in 2015.

Establishing new tolls or increasing existing tolls does not require voter approval.

Other Local Sources

Other local sources include local government payments, park and ride revenues, advertising, fines, fees, and other charges.

Sixty-four California transit agencies reported $566.8 million in general operating assistance from local government payments to help cover the costs of providing transit service. This figure includes purchase of service payments from local government units. For example, $401.4 million in general operating assistance comes in the form of a general fund transfer from the City and County of San Francisco to San Francisco Muni. General operating assistance can also come from cities to provide free shuttle services or expanded service into a neighboring city.

California agency park and ride revenues totaled $39.4 million in 2015, with BART topping the list at $28.4 million, followed by Anaheim Resort Transportation at $5.3 million and Caltrain at $3.9 million.

California agencies reported $70.9 million in revenues from advertising on vehicles, agency property, and agency publications

California agencies reported $190 million in revenues from other sources, including fare evasion fines, use of commuter rail facilities by Amtrak and freight railroads, fees paid by cellular networks to provide service on transit agency facilities. In fiscal year 2014-15, BART generated

[19] Metropolitan Transportation Commission. (2015). Comprehensive Annual Financial Report For Fiscal Years Ended June 30, 2015 and June 30, 2014. Retrieved from http://mtc.ca.gov/sites/default/files/FY_15_MTC_CAFR.pdf

$42.1 million, Santa Clara VTA brought in $29.1 million, Metrolink received $24.0 million (mostly from track fees), and San Francisco Muni saw $20.1 million.

Debt Financing

Public agencies have the authority to use debt to finance capital projects: by issuing bonds against future revenues or by entering into capital leases to acquire facilities or rolling stock and pay for them over time. As of fiscal year 2014-15, California agencies had issued $10 billion in debt against $10.3 billion in authorized bonding capacity. This includes $6.8 billion in revenue bonds, $1.7 billion in general obligation bonds, and $1.6 billion in other long-term indebtedness. LA Metro has over half the bond authorizations in the state, as shown in Table 5-19 below.

Table 5-10: Top 5 Agencies by Fiscal Year 2014-16 Debt Financing

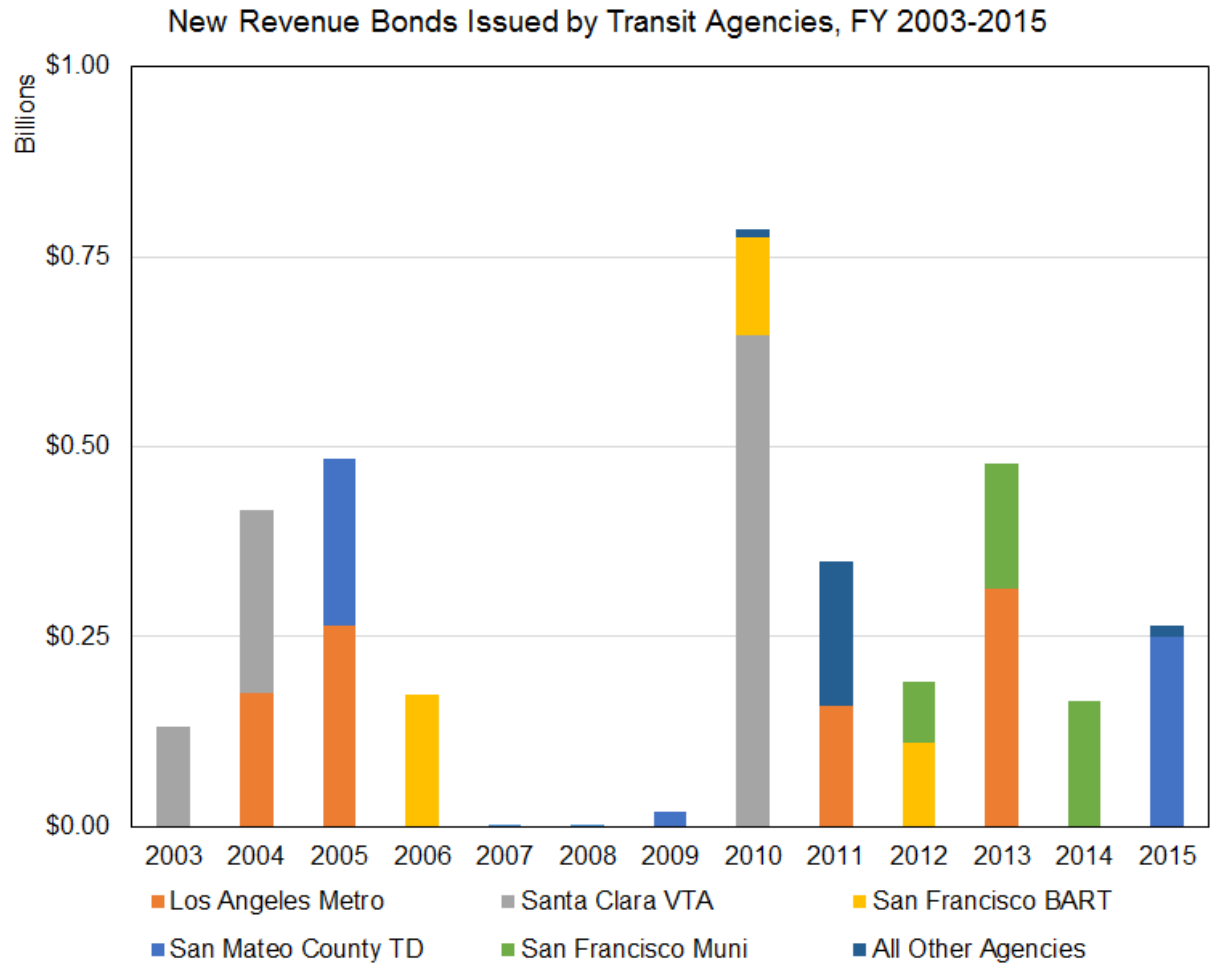
Transit Agency Name	Principal Amount Authorized
Los Angeles Metro	$5,333,428,224
San Francisco BART	$1,636,275,000
Santa Clara VTA	$1,335,040,000
San Mateo County Transit District	$638,830,000
San Francisco Muni (City/County)	$410,000,000
All Other Agencies	$968,032,377
Total Transit Agency Debt Outstanding	**$10,321,605,601**

As more transit agencies pass local sales tax measures, they have new revenues they can bond against. Bond proceeds are not new revenues, but rather a source of financing that can bring expected future revenues forward in time. A revenue bond is secured by a specific source of revenue identified by the transit agency, such as future grants, tax revenue, or other income. Revenue bonds can be issued at favorable terms since they are considered lower risk than general obligation bonds, which are not backed by a specific source of revenues but rather a general obligation to pay. The State Controller's Office does not track the specific source of revenues used to secure revenue bonds.

Figure 5-18 below shows the agencies which issued the $3.5 billion in new revenue bonds between fiscal years 2003 and 2015. During this period, Santa Clara VTA issued $1.017 billion

and Metro Los Angeles issued $913 million in new revenue bonds. Both agencies had local option sales taxes for transportation in effect[20] for the period, estimated to generate $450 million in Santa Clara County and $2.232 billion in Los Angeles County for fiscal year 2014-15.[21]

Figure 5-18: New Revenue Bonds Issued by Transit Agencies, FY 2003-2015



Source: State Controller's Office. Excludes any bonds classified as refunding or refinance

[20] As of 2014, VTA had 1.25% and Metro had 1.5% in local option sales taxes. Both agencies have since passed new 0.5% sales tax measures.
[21] Author's calculations based on reported LTF revenues and active sales tax measures.

Unmet Transit Funding Needs

While capital expenditures are booming, the California Transit Association still projects a sizeable capital funding gap. In 2013, the Association's consultant, CH2M Hill[22], estimated this gap at $50B over the 10-year period between 2011 and 2010 (See Table 5-20 below). Transit capital spending has increased more than was forecast in that study. In the first half of the decade (2011-2015), California transit agencies spent 65% of the forecast available capital funding for the decade. Roughly 47% of the projected transit capital funding need would contribute to the preservation of the existing system. Another 53% of the projected need would go to expanding the transit network and offering more transit service.

Table 5-11: Statewide Unmet Capital Needs, FY 2011 to FY 2020 Period

Capital Expense Category	Amount (Year of Expenditure)
Preservation - cost to rehabilitate existing infrastructure and replace vehicles as needed	$35.10B
Service Expansion - capital cost for vehicles and other assets to meet projected growth in ridership using existing networks.	$5.63B
Major New Service - capital cost to expand the transit network	$34.03B
Total Capital Funding Need	$74.76B
Available Capital Funding	$24.64B
Capital Funding Gap	$50.12B

In 2016, CH2M Hill updated the operating funding needs from a previous operating funding needs study performed by Booz Allen Hamilton, which projected a $21.7 billion funding gap between 2011 and 2020.[23]

Table 5-12: Statewide Unmet Operating Needs, FY 2011 to FY 2020 Period

[22] CH2M Hill. (2013). "California's Unmet Transit Funding Needs: Fiscal Years 2011-2020." [Report prepared for the California Transit Association. Provided by the California Transit Association.]
[23] Pimentel, Michael. (2016 Oct. 12). Memorandum to Josh Shaw. [Provided by the California Transit Association.]

Operating Expense Category	Amount (Year of Expenditure)
Preservation - cost to operate and maintain assets at existing service levels	$90.33B
Service Expansion - cost to operate and maintain assets for expanded service levels on existing networks based on projected growth in ridership	$12.52B
Major New Service - cost to operate and maintain expanded transit networks	$4.22B
Total Operating Funding Need	$107.07B
Available Operating Funding	$85.38B
Operating Funding Gap	$21.69B

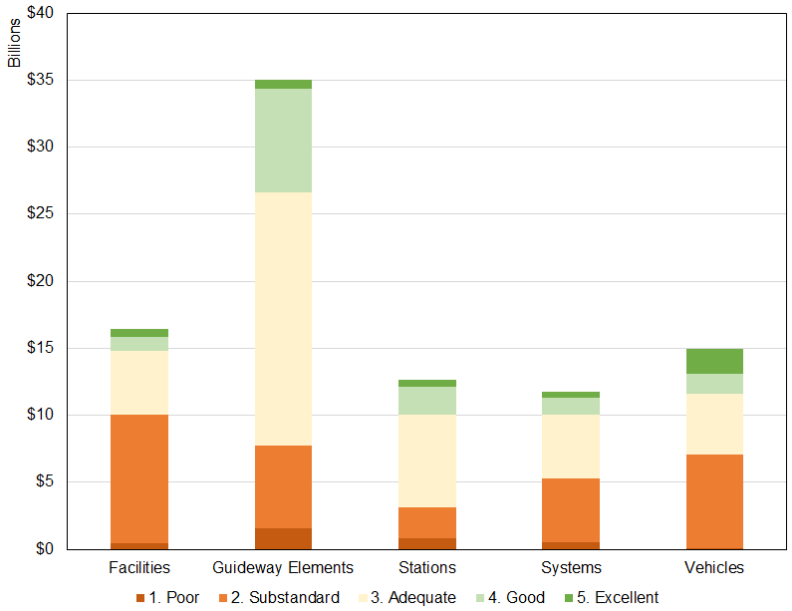
California Transit Asset Condition Study

As California's transit systems age and expand, the amount of funding required to keep the system in a state of good repair will increase. The Federal Transit Administration is devoting more attention to keeping transit assets in a state of good repair following several notable instances of service outages and safety incidents in major east coast cities. In 2016 the FTA promulgated the Transit Asset Management Rule[24] and Public Transportation Safety Program[25] and updated guidance on asset management measurement and planning. Beginning in 2017, larger transit agencies will report asset condition metrics through their annual National Transit Database reporting. Additionally, the FTA Administrator may now conduct safety audits of transit systems which receive federal funds.

In 2016, CH2M Hill prepared a study of the condition of transit assets by the replacement value of those assets (see Figure 5-19) below.

[24] 49 CFR Parts 625 and 630
[25] 49 CFR Part 670

Figure 5-19: Distribution of Asset Condition by Type



California's transit agencies regularly replace buses, vanpool vehicles, and demand response vehicles in accordance with Federal Transit Administration's useful life guidelines. The longer lifespan of rail vehicles (Table 5-22), combined with the clustered age of California's rail transit systems (Table 5-23), and the close concentration average rail vehicle age (Figure 5-20), means that many of the state's rail vehicles will be due for replacement in a narrow timespan. The second oldest of these systems, BART, is currently making investments to rehabilitate facilities and replace rolling stock.

Table 5-13: California's Rail Vehicle Fleet is Aging

Mode	Total Number of Vehicles in California	FTA Useful Life Benchmark[26] (years)	California Trend
Bus	11,524	14	Steady around 7.
Light Rail	649	31	Increasing as newer systems

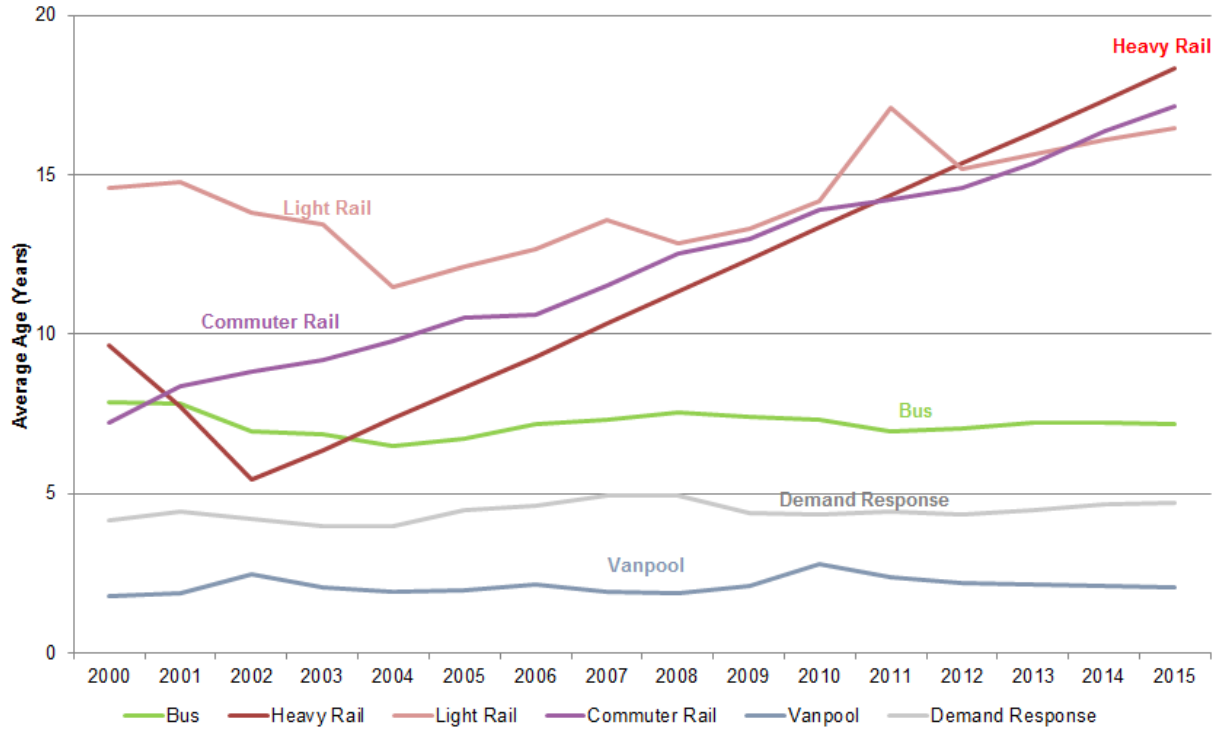
[26] Federal Transit Administration. (2016). "Default Useful Life Benchmark (ULB) Cheat Sheet)." Retrieved from https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA%20TAM%20ULB%20Cheat%20Sheet%20201 6-08-30.pdf

			mature, currently 16.5
Heavy Rail	773	31	Increasing as newer systems mature, currently 18.4
Commuter Rail	97 locomotives 454 passenger cars	39	Increasing slower as newer systems mature, some replacement, currently 17.1
Demand Response (Van)	1,810	8	Steady around 4.5
Vanpool (Van)	4,217	8	Steady around 2

Table 5-14: Rail System Birth Years

Altamont Corridor Express	1998
San Diego Coaster	1995
Metrolink	1992
Los Angeles Metro Rail	1990
Caltrain	1987
Sacramento RT	1987
Santa Clara VTA	1987
San Diego Trolley	1981
San Francisco BART	1972
San Francisco Muni	1912

Figure 5-20: Historic Trend of Vehicle Fleet Age by Mode



Conclusion

While federal discretionary capital grant programs garner plentiful attention and effort because they can bring new resources to bear with little increase in state, regional, or local costs, this program makes up only a small fraction of all transit funding. As with changes in federal transit policy and regulations, changes in funding programs can be an opportunity to rethink the state's role in local and regional transit.

While California's legislature and voters have authority to influence over half of California's transit funding, the recent trend to fund transit with more local sources does signal a waning ability of the state government to influence the mobility and environmental outcomes it seeks. Changing how the state funds transit could have a profound impact on the goals and implementation measures pursued by California's disparate local and regional agencies. This could lead to more cost-effective service, a greater focus on increasing ridership per unit of service, and a new focus for agencies seeking discretionary capital grants.

6

CHAPTER

Cost Effectiveness of Transit Service

Chapter 6: Cost-Effectiveness of Transit Service

With few exceptions for transit systems globally and transit routes in California, transit expenditures exceed transit operating income. As such, public transit is universally subsidized from the sources outlined in Chapter 5. Virtually all capital costs are fully subsidized, and a majority of operating costs are subsidized as well, with income from fares, leases, joint development, and advertising making up the balance. Stretching this income and these subsidies as far as possible requires cost-effective service that increases the number of places and times where subsidized transit service can meet public mobility needs that would not otherwise be met. Quantifying how expenditures are used, with metrics such as the number of passenger trips or the number of vehicle revenue hours made available to the public, provides a measurement of cost-effectiveness, i.e., what benefits the public is receiving for funds and subsidies expended. Metrics presented in this section are derived from best practices from Florida and nationally.[1]

Statewide Provision of Transit Service

In 2015, California's 165 transit agencies reporting to the National Transit Database used nearly 18,000 peak vehicles to provide over 42.2 million hours of transit service, traveling 1,414 round trips to the moon. Passengers used the service to travel 8.5 billion miles around the state, or 47 round trips to the sun and back.

Table 6-1: Measures of Vehicle Service and Use, by Mode, 2015

	Vehicle Revenue Hours	Vehicle Revenue Miles	Vehicles in Service	Passenger Miles Traveled	Passenger Trips
Local Bus	27,374,737	311,892,111	8,173	3,668,717,888	966,935,340
Demand Response	7,169,466	110,543,007	4,386	150,077,105	16,358,125
Urban Rail	4,352,071	108,854,114	1,096	2,908,781,715	357,503,345
Vanpool	1,673,442	71,108,126	3,270	450,819,589	10,256,171
Commuter Bus	604,261	15,578,334	513	188,769,018	9,940,396

[1] Florida Department of Transportation. (2014). "Best Practices in Evaluating Transit Performance." Transit Cooperative Research Program. (2003). "Report 88: A Guidebook for Developing a Transit Performance-Measurement System."

Commuter Rail	594,752	22,320,507	347	979,923,167	35,821,800
Bus Rapid Transit	274,858	1,641,565	63	46,427,557	18,040,984
Other Rail	127,880	1,969,431	33	55,529,182	8,597,667
Ferry Boat	29,359	495,283	14	59,704,679	4,631,967
Total	**42,200,826**	**644,402,478**	**17,895**	**8,508,749,900**	**1,428,085,795**

The local bus is by far the workhorse of the California transit system, carrying two-thirds of passenger trips in about two-thirds of service miles. Demand response services are second in service hours, followed by urban rail, which carries many more passengers.

Cost-Effectiveness Metrics

Among the many ways of measuring the results of spending on transit, passenger trips, farebox recovery, and operating expense per trip are the most common metrics. These metrics measure the efficiency of the agency in converting subsidies into mobility outcomes.

Table 6-2 below compares these metrics among the top ten states by passenger trip. As the table shows, there is a generally inverse relationship between the number of passenger trips and operating expense per trip: as befits the nature and mission of public transit, the more it is used, the more effective it can be. New Jersey, Texas, and Washington stand out as having disproportionately high operating expenses per trip, likely due to high operating cost (in the case of New Jersey), low passenger trips (in Texas), or both (in Washington).

California ranks second in number of passenger trips (trailing only New York) and ranks fifth in operating expense per vehicle ($158.40) and sixth for operating expense per trip ($4.68). California's fares per trip put the state in seventh place for farebox recovery and in eighth for fares per trip. Relative to other states in the list, California has high passenger trips, moderate operating expenses, and low fares.

Table 6-2: Comparison of Cost-Effectiveness Metrics, Top 10 States by Passenger Trip

	Passenger Trips	**Farebox Recovery**	**Fares per Trip**	**Operating Expense per Vehicle Revenue Hour**	**Operating Expense per Trip**

NY	3,942,246,467	44.7%	$ 1.56	$ 269.86	$3.50
CA	1,428,085,795	27.9%	$ 1.31	$ 158.40	$4.68
IL	660,051,264	34.0%	$ 1.41	$ 156.49	$4.15
PA	448,788,812	35.2%	$ 1.56	$ 155.60	$4.43
MA	441,928,134	32.8%	$ 1.53	$ 225.24	$4.66
NJ	415,936,766	47.2%	$ 3.31	$ 244.43	$7.01
DC	411,779,999	44.2%	$ 1.91	$ 187.08	$4.31
TX	281,113,817	11.8%	$ 0.87	$ 133.88	$7.39
FL	277,719,544	19.5%	$ 1.07	$ 108.66	$5.45
WA	250,469,511	23.5%	$ 1.62	$ 185.37	$6.91

Table 6-3 breaks out the cost-effectiveness of service use and supply by mode and Figure 6-1 depicts the trend in cost-effectiveness of service use by mode since 1991. Across all modes, there's a weak increase in the cost of providing a transit trip of 0.244 cents per year (R^2=0.63). Figure 6-2 shows the trend in the inflation-adjusted cost of providing an hour of transit service by mode grouping. Inflation-adjusted costs are mostly steady, with a statistically weak decreasing trend of about -$0.0.80 per service hour per year (R^2=0.62).

Table 6-3: Cost-Effectiveness of Use and Service Supply, by Mode, 2015

Operating Expense	Per Trip	Per Vehicle Revenue Mile	Per Vehicle Revenue Hour
Local Bus	$3.74	$ 11.58	$131.98
Demand Response	$32.72	$4.84	$74.66
Urban Rail	$3.81	$12.53	$313.30
Vanpool	$4.74	$0.68	$29.03

Commuter Bus	$9.26	$ 5.91	$152.34
Commuter Rail	$10.03	$16.10	$604.34
Bus Rapid Transit	$3.00	$13.11	$201.94
Other Rail	$5.61	$61.62	$368.04
Ferry Boat	$12.04	$ 112.57	$1,899.04
Average across modes	$4.34	$ 9.61	$146.79

Figure 6-1: Trend in Inflation Adjusted Operating Expenditures per Passenger Trip

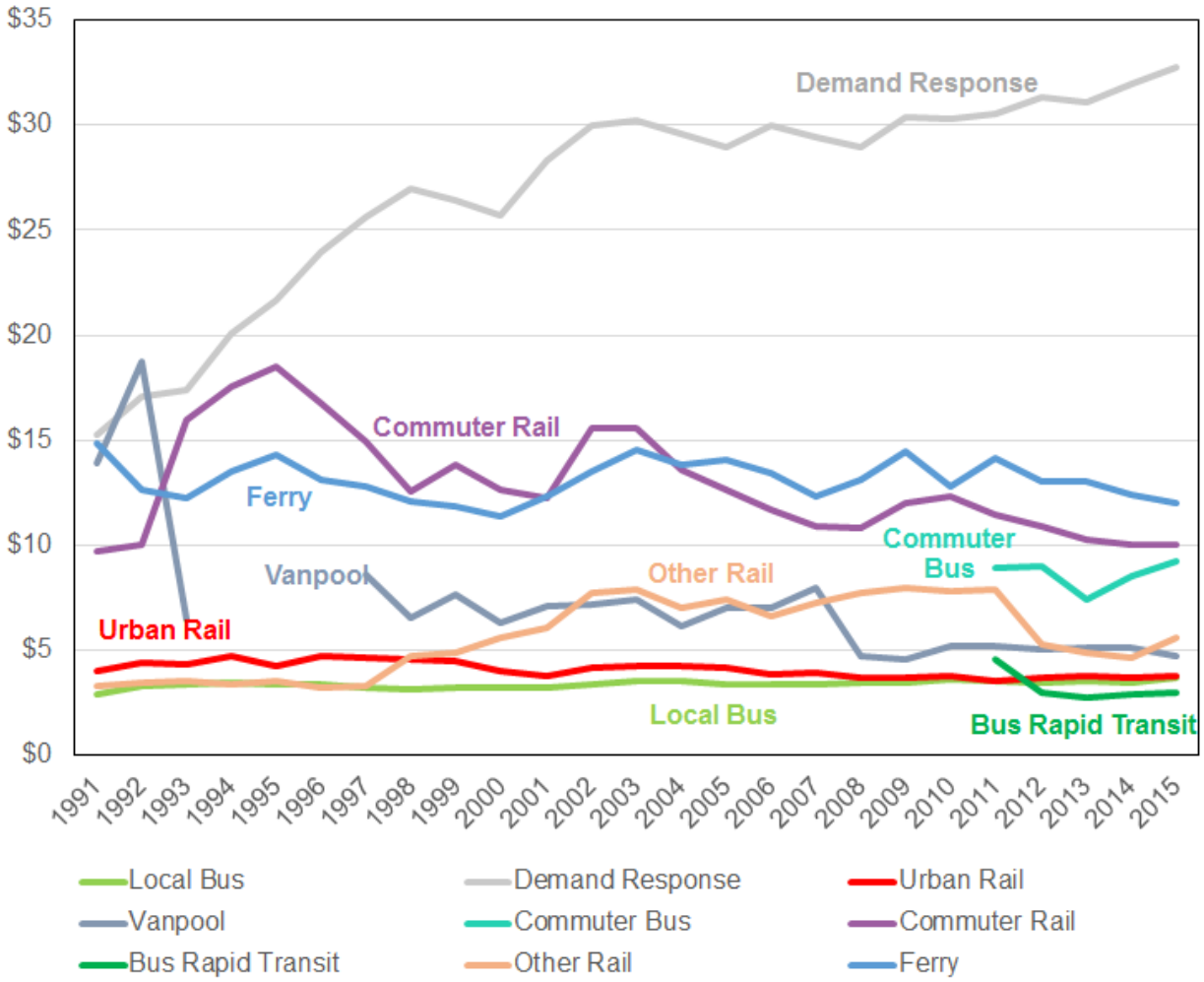
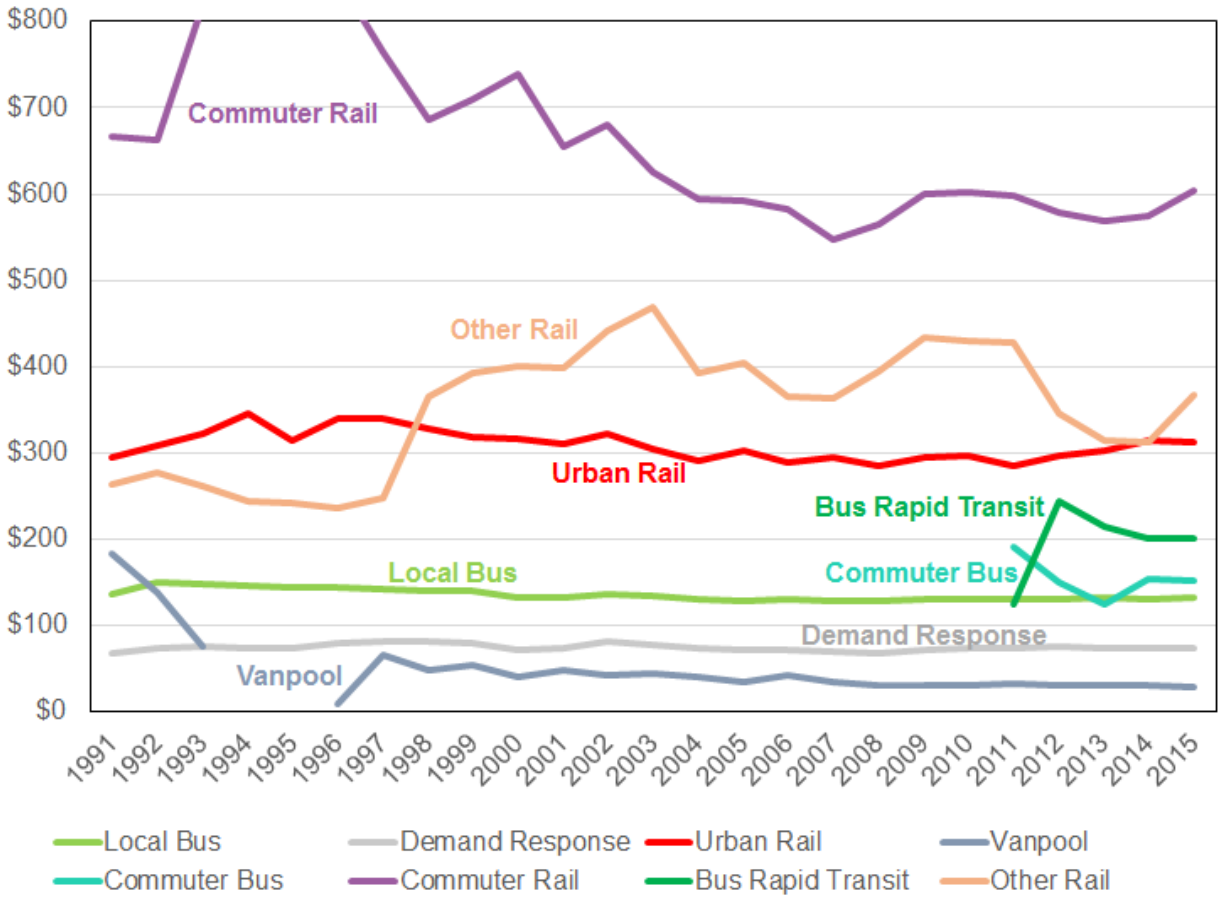


Figure 6-2: Trend in Inflation Adjusted Operating Expenditures per Vehicle Revenue Hour



Key Metrics by Planning Area

Substantial variations in the cost to provide transit service exist within California's transportation planning areas. Table 6-4 summarizes key cost metrics for local bus services between planning areas. The cost of providing local bus service ranges from $56.67 in northeastern Modoc County (MCTC) to $176.70 in the San Francisco Bay Area (MTC), which also has the highest fare revenues per local bus passenger mile, at $1.47. The lowest hourly vehicle cost for a large region is $88.45 in San Diego (SANDAG).

Table 6-4: Comparison of Key Cost Metrics for Local Bus by Planning Area[2]

	2015 Operating Expenditures per				Farebox Recovery	Fares per PMT
	VRM	PMT	UPT	VRH		
AMBAG	$10.03	$1.17	$6.45	$141.11	22.8%	$0.27
BCAG	$ 5.36	$0.76	$4.38	$83.01	22.5%	$0.17
COFOG	$ 8.81	$1.17	$3.02	$103.54	24.9%	$0.29
KCAG	$ 4.23	$0.65	$3.61	$70.56	22.4%	$0.15
KCOG	$ 6.45	$1.17	$4.12	$83.21	18.1%	$0.21
MCAG	$ 3.54	$1.26	$8.08	$57.73	11.9%	$0.15
MCTC	$ 4.36	N/A	$5.42	$56.67	12.8%	N/A
MTC	$16.71	$1.47	$4.63	$176.70	20.6%	$0.30
SACOG	$ 9.53	$1.31	$5.20	$122.10	19.8%	$0.26
SANDAG	$ 7.86	$0.79	$3.05	$88.45	32.2%	$0.26
SBCAG	$ 7.61	$0.70	$3.24	$98.83	33.3%	$0.23
SCAG	$10.73	$0.80	$3.24	$121.66	24.2%	$0.19
SCRTPA	$ 5.79	$0.80	$5.06	$88.73	19.1%	$0.15
SJCOG	$10.58	$1.99	$6.34	$133.29	11.9%	$0.24
SLOCOG	$ 5.34	$0.53	$4.11	$106.34	23.0%	$0.12
StanCOG	$ 5.83	$1.35	$4.22	$84.64	19.2%	$0.26
TCAG	$ 4.20	$1.13	$4.30	$ 63.34	19.9%	$0.22
California	$11.58		$3.74	$131.98		

[2] VRM: Vehicle Revenue Miles; PMT: Passenger Miles Traveled; UPT: Unlinked Passenger Trips; VRH: Vehicle Revenue Hours

Average						

Urban rail costs also vary within large regions, from $147.48 per vehicle revenue hour for light rail service in the San Diego region (SANDAG) to $318.58 for BART, San Francisco Muni, and San Jose VTA service in the San Francisco Bay Area (MTC). Despite its higher costs of providing urban rail service, the operators in the MTC region collectively have the highest urban rail farebox recovery ratio in the state. Sacramento RT, the light rail operator in SACOG, has moderate costs but low farebox recovery. Table 6-5 shows the rail metrics for California's four largest urban regions.

Table 6-5: Comparison of Key Metrics for Urban Rail by Planning Area

	2015 Operating Expenditures per				Farebox Recovery	Fares per PMT
	VRM	**PMT**	**UPT**	**VRH**		
MTC	$11.11	$0.42	$4.31	$318.58	60.9%	$0.26
SACOG	$14.46	$0.83	$4.72	$260.88	23.4%	$0.19
SANDAG	$8.50	$0.33	$1.82	$147.48	56.3%	$0.18
SCAG	$19.00	$0.63	$3.56	$393.05	21.4%	$0.14

Figure 6-3 below shows less interregional variation in per-service hour costs for commuter rail versus urban rail.

Figure 6-3: Commuter Rail and Urban Rail Costs per Vehicle Revenue Hour, by Planning Area, 2015

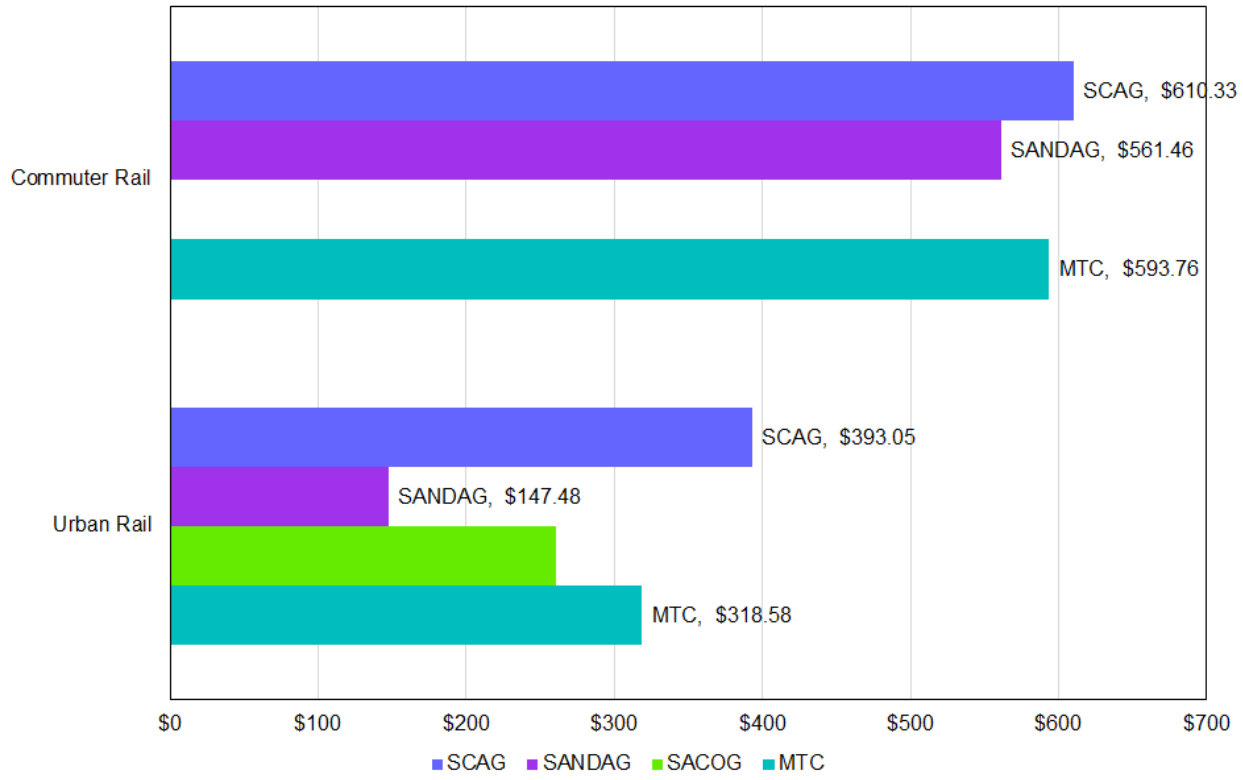
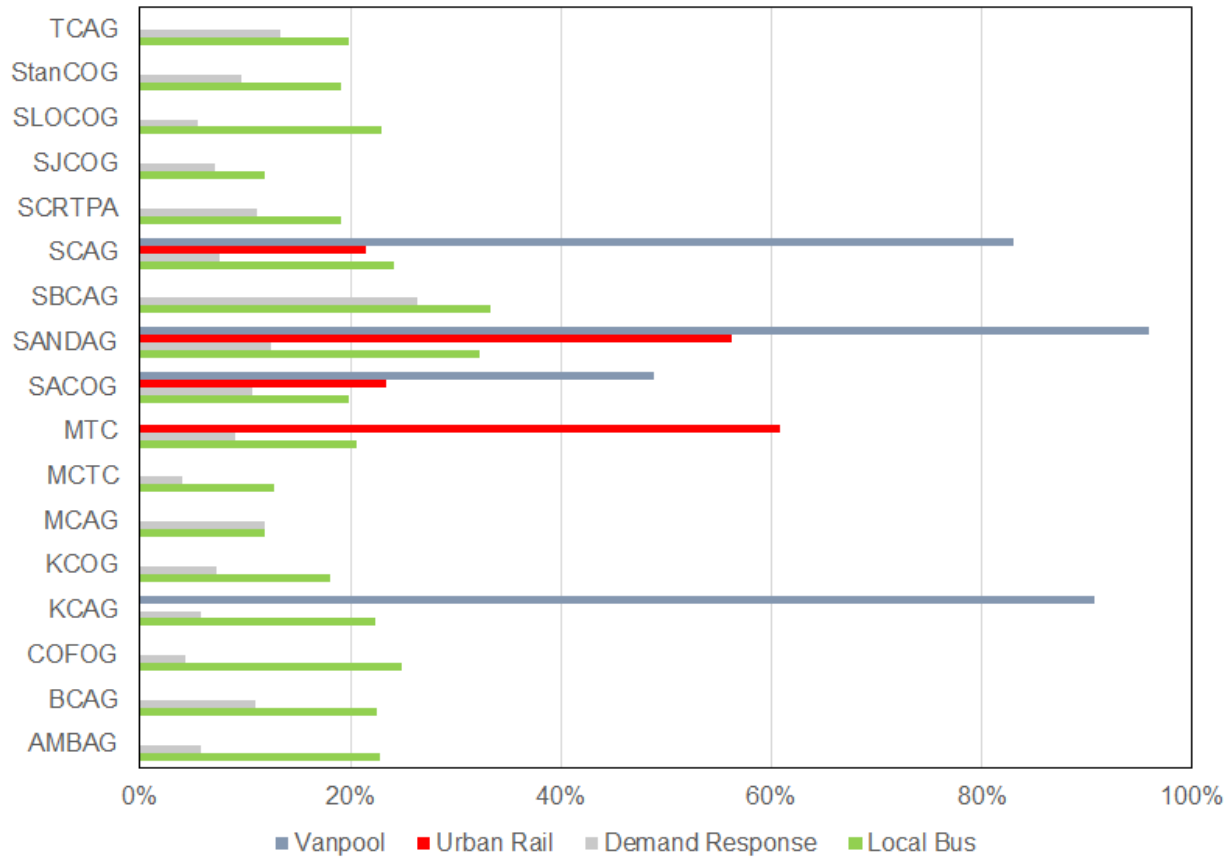


Figure 6-4 below summarizes farebox recovery ratios for vanpool, urban rail, demand response, and local bus service for each planning area in California. Vanpool service recovers the highest portion of its operating costs, followed by urban rail. All large MPOs achieve at least 20% farebox recovery for local bus service.

Figure 6-4: Farebox Recovery for Selected Modes by Planning Area, 2015



Service Productivity & Efficiency

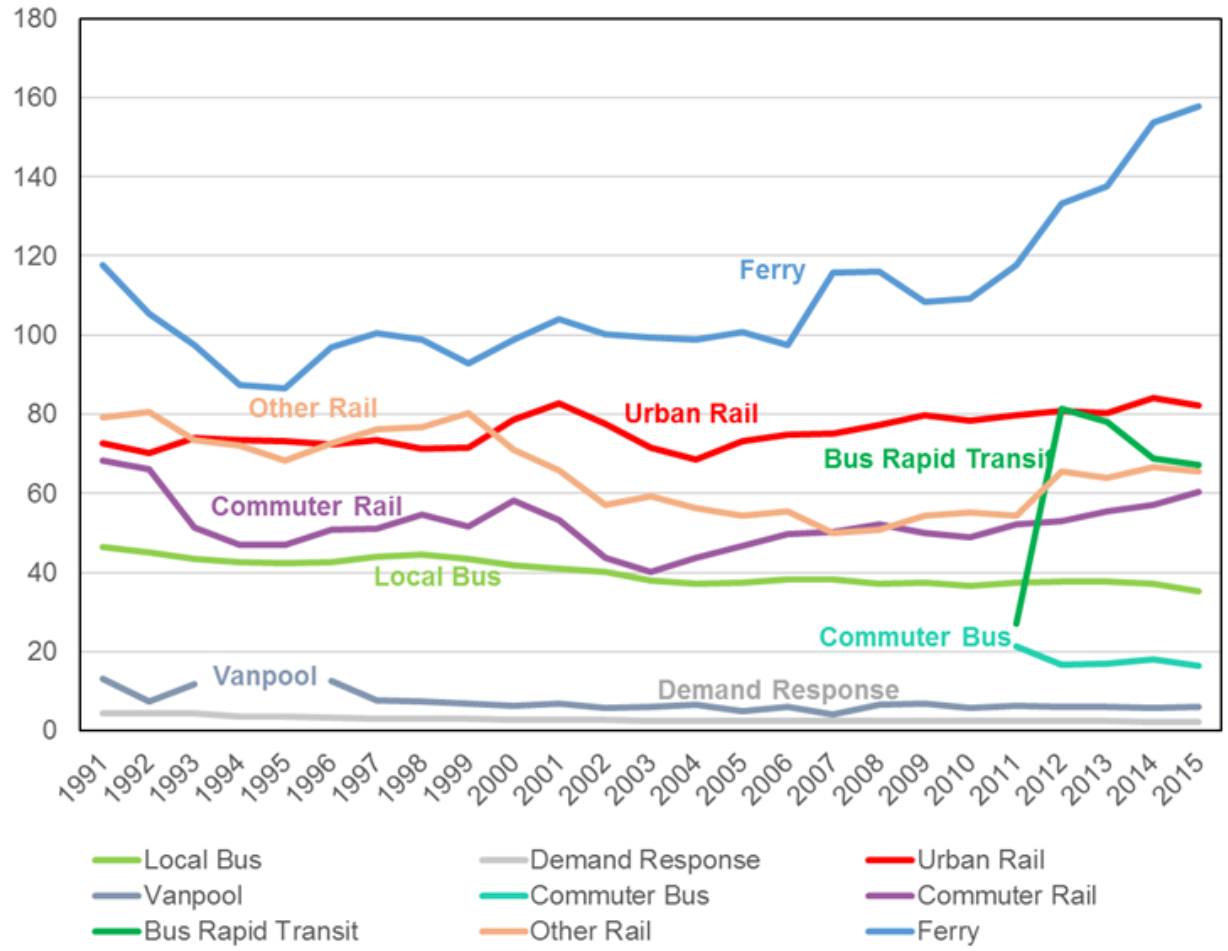
These metrics measure the efficiency of the agency in converting the provision of transit services, irrespective of costs, into mobility outcomes.

The primary metric of service efficiency is the number of passenger trips per vehicle revenue hour because revenue hours have an opportunity cost. A bus being used in low-productivity service is not available for higher-productivity service. The number of trips per revenue hour varies substantially between areas and agencies and is influenced by many factors outside of the control of transit agencies.

The overall productivity of transit service in California is declining slightly over time, driven primarily by declining ridership of local bus service. On average, each hour of service California transit agencies put on the road, rails, or water results in -0.45 fewer passenger trips with each

passing year (R^2 = 0.86). However, ferry, bus rapid transit, urban rail, commuter rail, and other rail service are all attracting more passenger trips per hour of service than in the early 2010s.

Figure 6-5: Trend in Passenger Trips per Revenue Vehicle Hour, by Mode



A key influencer of the amount of service required to provide a transit trip is the length of that transit trip. Agencies can serve more passengers per hour on a single vehicle if they are using the system for shorter trips. This can lead in turn to better performance on the trips per vehicle revenue hour. If trip distances are getting longer, then serving a single passenger requires more service.

Overall, the average length of a transit passenger trip in California is increasing by about 0.0585 miles per year across all modes (R^2 = 0.97, Figures 6-6 and 6-7). This does not mean that the average length of a local bus or urban rail trip is increasing, but rather that more passengers are

moving to vanpool, commuter bus, and commuter rail which have longer than average trip lengths. Additionally, the average length of a demand response trip is increasing significantly over time.

Figure 6-6: Trend in Passenger Miles Traveled per Unlinked Passenger Trip

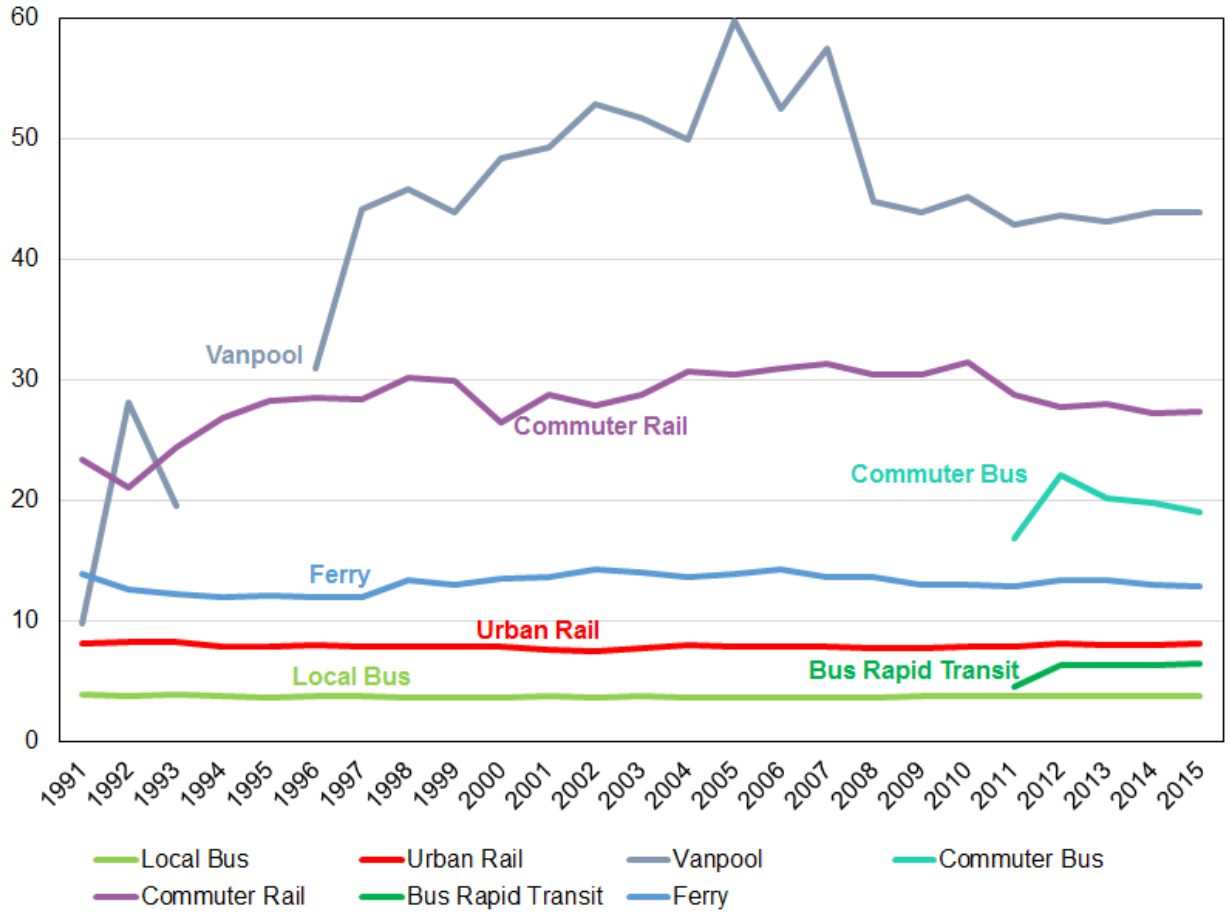
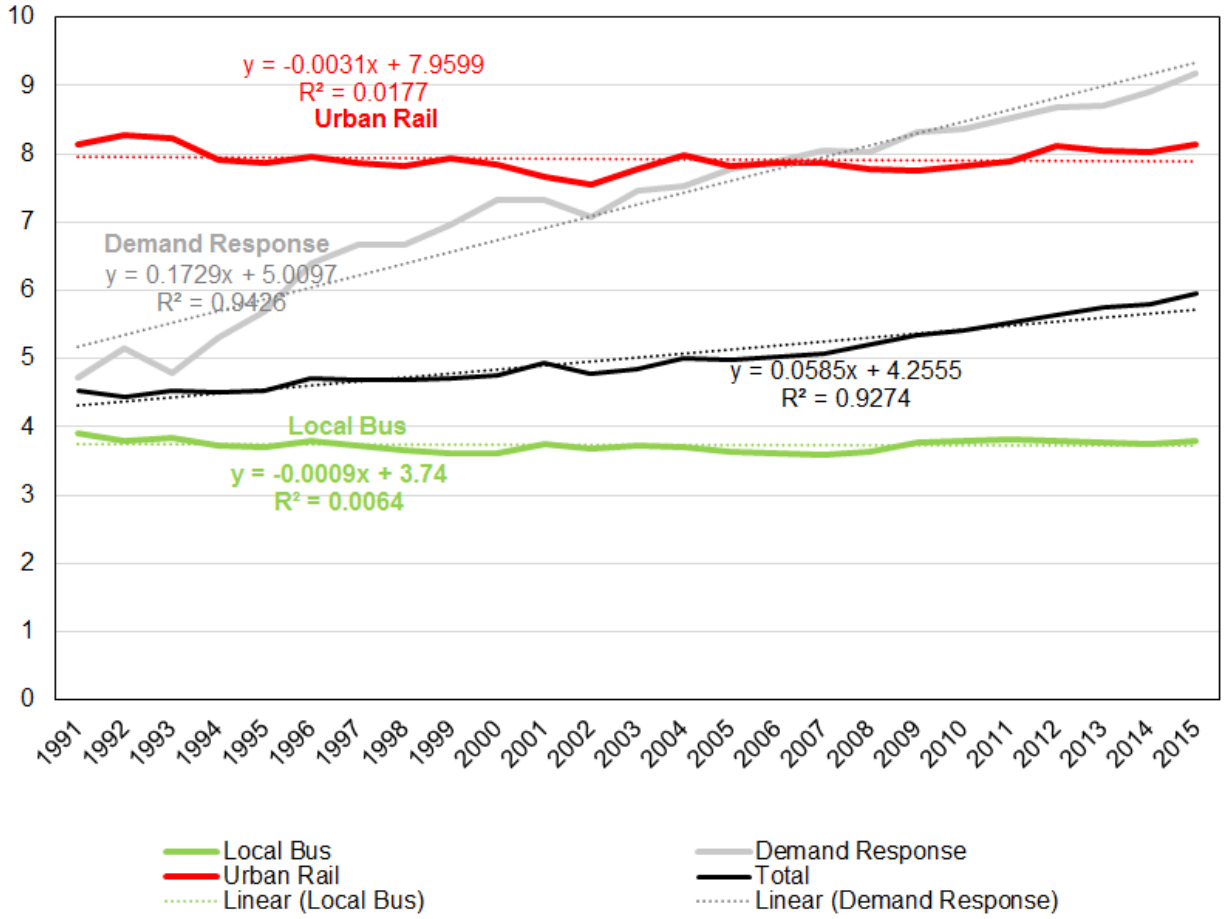


Figure 6-7: Trend in Passenger Miles Traveled per Unlinked Passenger Trip, Selected Modes



Vehicle Occupancy

Table 6-6 compares three metrics of vehicle utilization among modes. Trips per vehicle revenue mile is an average the number of boardings per mile of a vehicle's route, and even within modes varies widely between agencies because of variations in vehicle speeds and urban and regional density. As mentioned above, trips per vehicle revenue hour as a chief indicator of service efficiency. Average vehicle occupancy is a calculation of passenger miles traveled per vehicle revenue hour. While vehicle occupancy varies widely between and within routes (an efficient transit route can have low occupancy at one or both tails of the route), the statewide average trend provides some insight into vehicle utilization and service efficiency.

Average vehicle occupancy is trending down over time 0.0482 passengers per year (R^2 is low at 0.25), driven primarily by reductions in average bus occupancy. This could mean that, if vehicle size is held constant, vehicles are becoming less crowded and passengers are more likely to find a seat. However, potential greenhouse gas reductions are a function of mode shift from automobiles and transit vehicle occupancy. The combined effect of reduced average vehicle occupancy and increasing automobile fuel economy would erode the greenhouse gas reductions that come from switching to transit.

Table 6-6: Measures of Vehicle Use, by Mode, 2015

	Trips per Revenue Mile	Trips per Revenue Hour	Average Vehicle Occupancy
Local Bus	3.1	35.3	11.8
Demand Response	0.1	2.3	1.4
Urban Rail	3.3	82.1	26.7
Vanpool	0.1	6.1	6.3
Commuter Bus	0.6	16.5	12.1
Commuter Rail	1.6	60.2	43.9
Bus Rapid Transit	11.0	65.6	28.3
Other	4.4	67.2	28.2
Ferry Boat	9.4	157.8	120.5
Total	**2.2**	**33.8**	**13.2**

Some modes, like commuter rail or ferry boats, have high average vehicle occupancy. However, these larger vehicles also have high per-hour costs. Figure 6-8 shows the annual trend statewide average vehicle occupancy, by mode. Both commuter rail and urban rail vehicles experienced a trend of more passengers per vehicle service mile since about 2003. Local bus service has experienced declining average vehicle occupancy since 1997, with the exception of a bump between 2010 and 2013. This could mean that local bus service is

becoming less crowded, or it could mean that transit agencies are using smaller capacity vehicles to provide local bus service.

Figure 6-8: Trend in Average Vehicle Occupancy, by Mode, All Agencies

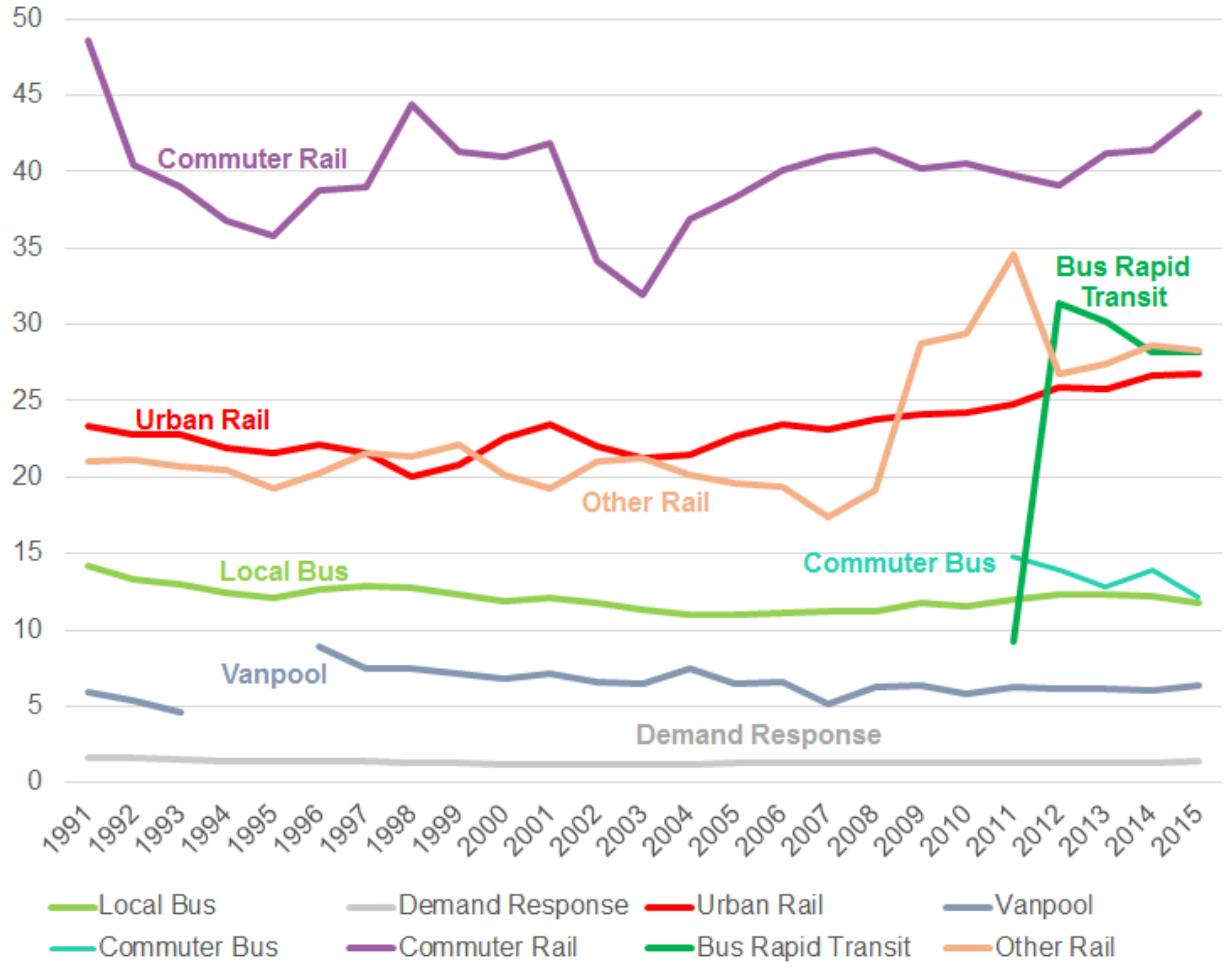
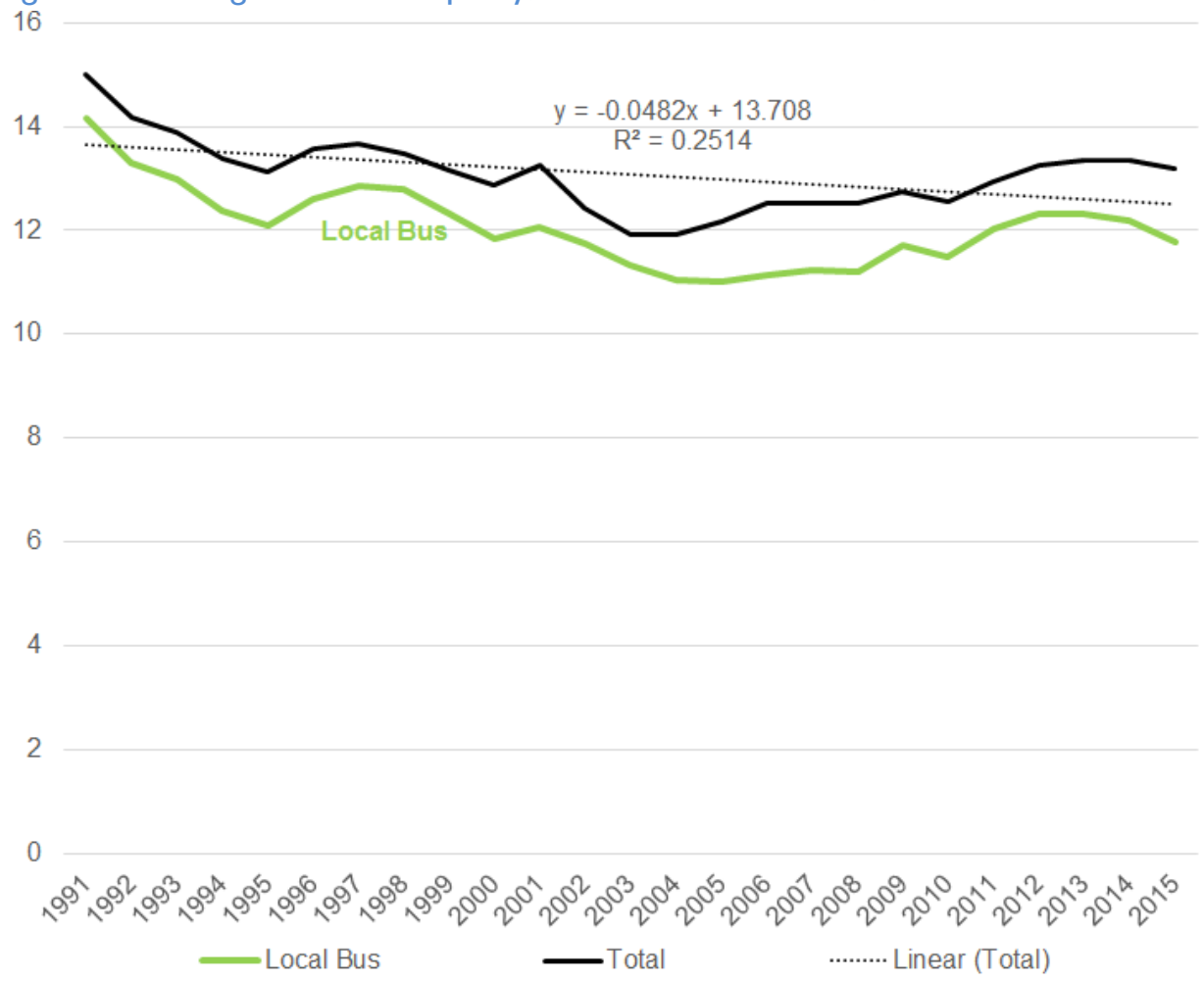


Figure 6-9 shows how the overall trend in passenger miles traveled per vehicle revenue mile is closely related to the declines in the average vehicle occupancy of local bus service.

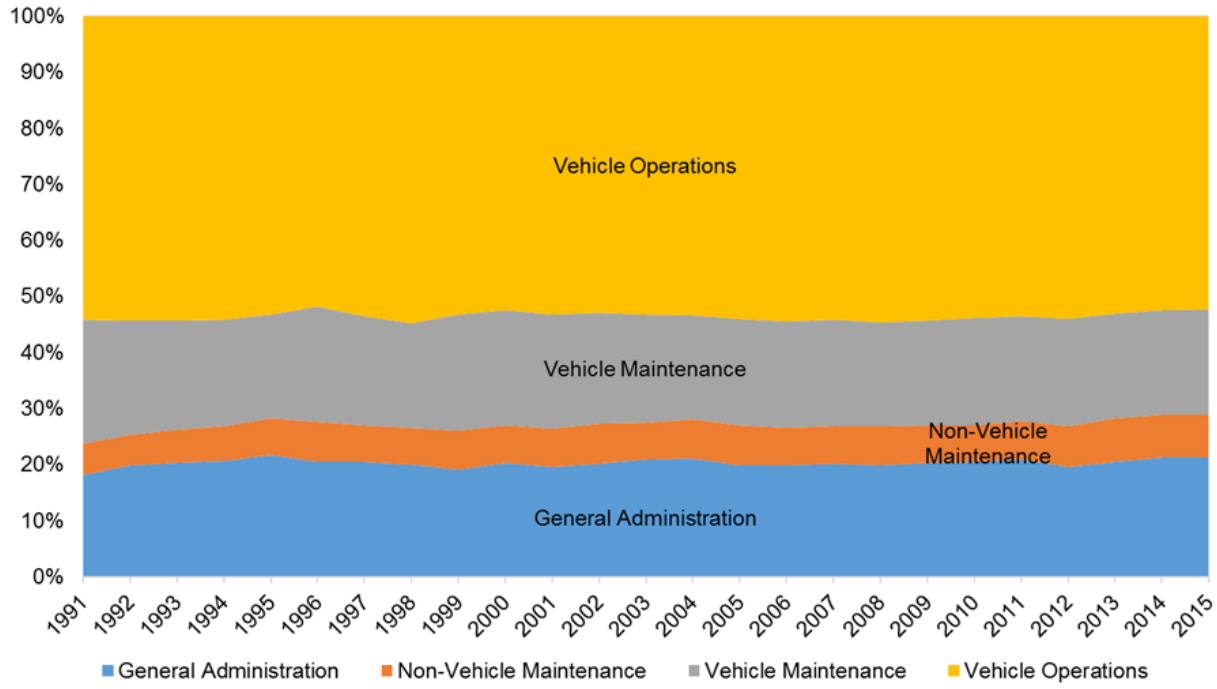
Figure 6-9: Average Vehicle Occupancy, All Modes and Local Bus, 2015



Operating Cost Trends

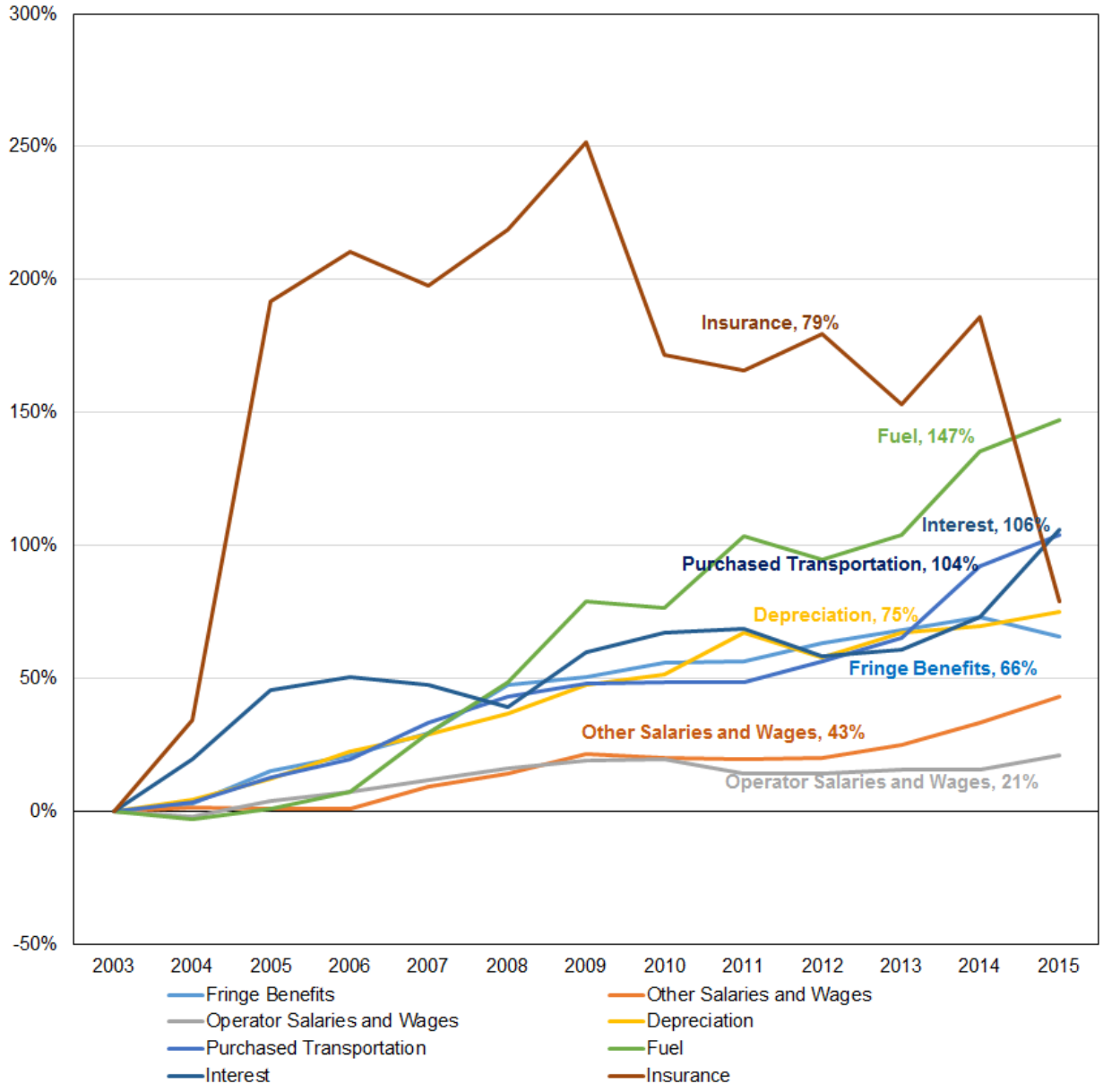
While total transit expenditures have increased as a whole, the composition of costs has not changed significantly: As shown in Figure 6-10, as a proportion of total operating cost, the categories of vehicle operations, maintenance, non-vehicle maintenance, and general administration have remained generally stable between the years of 1991 and 2015.

Figure 6-10: Trend in Composition of Operating Costs



As shown in Figure 6-15, within the operations cost category, costs within management control that have increased most significantly since 2003 are purchased transportation (104%), fringe benefits (66%), other salaries and wages (43%) and operator salaries and wages (21%). These costs have, however, remained below those mostly outside management's control such as fuel (147%), insurance (79%), and depreciation (75%).

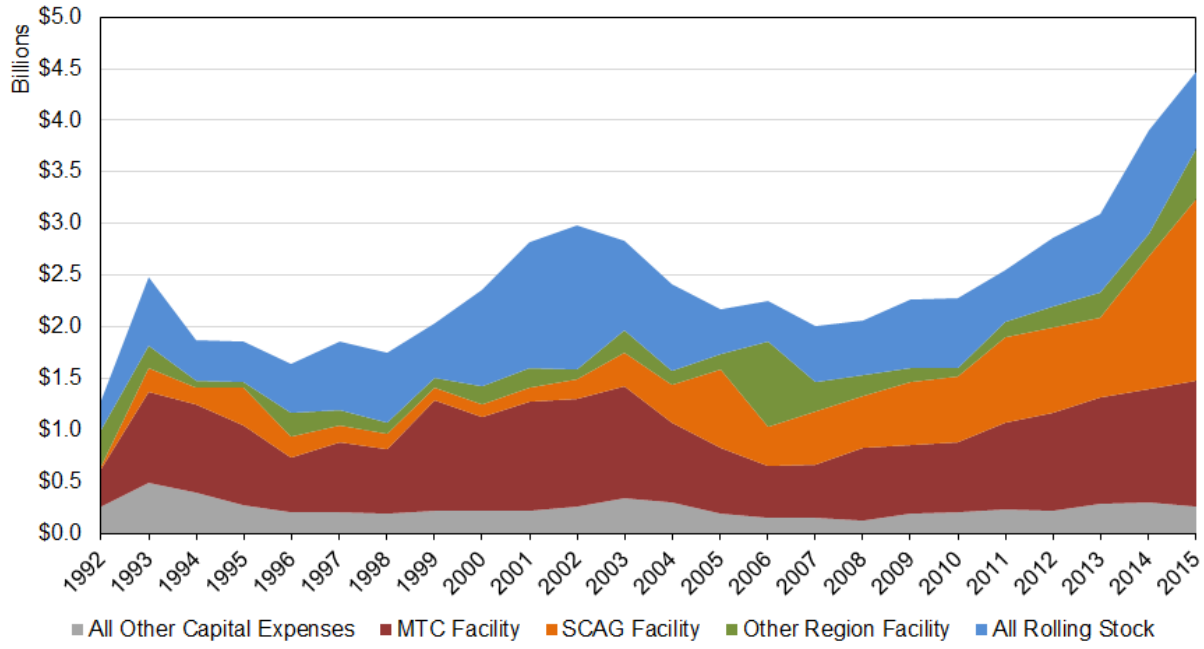
Figure 6-11: Relative Change in Operating Cost Component Since 2003



Capital Cost Trends

California is in the midst of a transit-construction boom, with more capital dollars spent in 2015 than in any year since 1992, even after adjusting for inflation. This boom is centered in the Los Angeles region. Figure 6-12 shows that the proportion of statewide transit capital expenditures that are for facilities in the SCAG region has increased from 1.8% in 1992 to 39.2% in 2015.

Figure 6-12: Inflation-Adjusted Transit Capital Expenditures by Selected Category



CHAPTER 7

Private Provision of Shared Transportation Services in California

Chapter 7: Private Provision of Shared Transportation Services in California

In recent years, new private companies have entered the market to provide shared transportation services, though they are excluded from the federal definition of public transportation[1]. These companies provide and broker three kinds of services:

1. Inter-city bus services
2. Private shared transportation focused on scheduled commuter trips like employer-provided shuttles and Chariot.
3. Point-to-point on-demand services provided by TNCs, both as a potential alternative to traditional public transit, and a complement to it

The introduction of Transportation Network Companies has arguably been one of the most significant transportation developments in decades. Several transportation agencies have partnered with TNCs to support carpooling and provide connections with public transit stations. In the Bay Area, MTC partnered with Lyft to match commuters interested in carpooling, while the Livermore / Amador Valley Transit Authority (LAVTA) partnered with both Lyft and Uber to offer discounts on rides in specific areas. In Southern California, LA Metro has partnered with Uber to discount rides to and from stations along the Exposition Line extension to Santa Monica during its opening. Meanwhile, OCTA has partnered with Lyft to provide discounted rides after discontinuing two bus lines in San Clemente. These partnerships offer further evidence that private companies are impacting the market for public transportation in California.

A growing number of private inter-city bus companies serve an expanding market for travel between major cities in California. In addition to Amtrak Thruway and other federally-funded services, approximately twelve companies provide long-distance travel between cities in and around California. These include five companies with service between greater Los Angeles (LA) and the San Francisco Bay Area, six companies with service between LA and the Las Vegas area, and two companies with service between LA and Mexico. Several of these companies provide customer service in languages other than English service and cater to Latino, Chinese, or Vietnamese communities.

Transportation Network Companies

The California Public Utilities Commission (CPUC) defines a Transportation Network Company (TNC) as “a company or organization operating in California that provides transportation

[1] 49 USC §5304

services using an online-enabled platform to connect passengers with drivers using their personal vehicles".[2] TNCs existed in a legal gray area until September 2013, when the CPUC established the TNC regulatory category and began issuing permits to TNCs.[3] As of October 2016, the CPUC has issued permits to eight TNCs, including four which are specifically licensed to transport children.[4] As drivers must be using a personal car, either owned, leased, or rented, to qualify as a TNC, the category excludes other shared mobility services such as buses, taxis, limousines, and vanpools, although increased technological sophistication is causing these products to resemble TNCs in many ways.

Although the dominant TNCs provide luxury and shared ride options, their core product is an on-demand ridehail by smartphone and provided by private individuals in their own private cars; Uber and Lyft call this service UberX and Lyft, respectively. When a customer requests a ride, the nearest available driver obtains the customer's name and location after accepting the request. As the customer must submit electronic payment information before requesting a ride, payment is made automatically without any physical transaction. For their core product, Uber and Lyft allow up to 4 riders per request, although they each offer high capacity versions for up to 6 riders, known as UberXL and Lyft Plus.

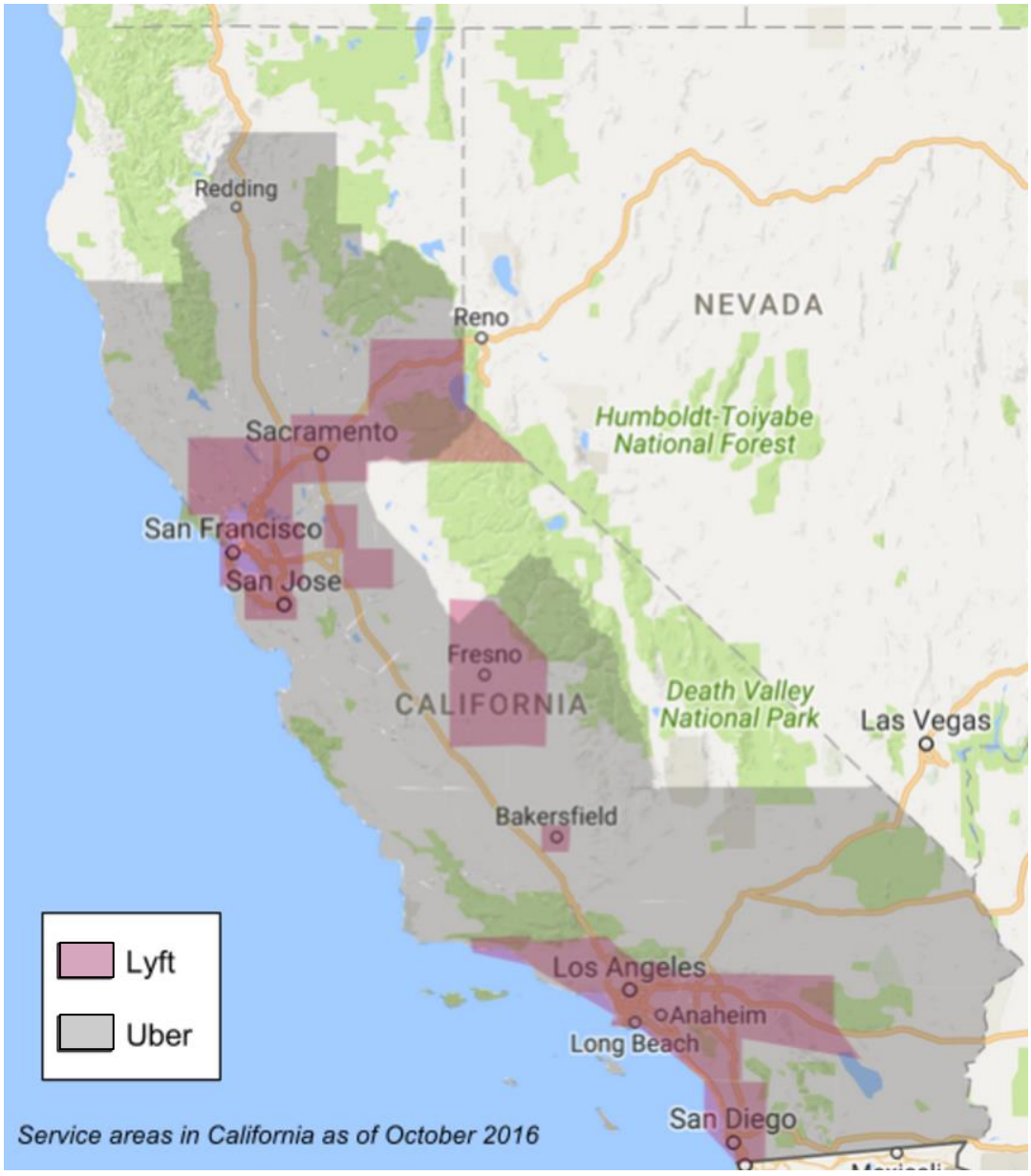
Uber's service area extends throughout nearly all of California, while Lyft's service areas are clustered around major cities. Figure 7-1 shows the service area for Uber in California.

[2] California Public Utilities Commission. (2016). "Basic Information for Transportation Network Companies and Applicants." Retrieved from http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Licensing/Transportation_Network_Companies/BasicInformationforTNCs_7615.pdf

[3] California Public Utilities Commission. (2016). "Recent Passenger Carrier Investigations." Retrieved from http://consumers.cpuc.ca.gov/carrierinvestigations/

[4] California Public Utilities Commission. (2016). "TNC Permits Issued." Retrieved from http://consumers.cpuc.ca.gov/tncpermitsissued/

Figure 7-1: Service areas of TNCs in California



Uber and Lyft each offer a range of luxury and shared-ride variants of their core products, as shown in Table 7-1. Uber's shared-ride option, uberPOOL, offers 1 to 2 riders a lower fare in exchange for the possibility that the driver may pick up additional passengers traveling along the same or a similar route. Lyft offers a nearly identical service known as Lyft Line. The potential of these services to increase transportation system efficiency (and vehicle occupancy) is

particularly noteworthy for researchers and policymakers.[5] These services have also managed to utilize government benefits previously reserved for mass transit riders. Uber recently partnered with WageWorks, an administrator of commuter benefits for employees, to allow commuters to use pre-tax dollars to pay for uberPOOL.[6]

Table 7-1: Services offered by Lyft and Uber

TNC Name	Ridehail	Passenger Matching	High-capacity	Luxury
Uber	UberX	UberPOOL	UberXL	UberSELECT, UberBLACK, UberLUX
Lyft	Lyft	Lyft Line	Lyft Plus	Lyft Premier

TNC Relation to Public Transit

TNCs can affect public transit in four main ways.

First, TNCs can allow those with limited or no access to private cars to purchase automobility on a per-trip basis. Transit offers per-trip pricing, but without the flexibility of automobility. Some agencies see TNCs as a viable alternative to per-trip services, either low-productivity routes or origin-to-destination services that require flexible routing.

Second, by providing auto-like service for those trips that traditional transit does not serve well, TNCs may make it easier to be carless or car-light in transit-intensive areas, thus encouraging more transit use in the years ahead. It can do this by offering people different mode options for mobility on different legs of a multi-leg journey. For example, someone who takes transit to a bar at 8pm may take a TNC home after midnight when transit offers reduced service.

Third, by partnering to address first and last mile challenges, TNCs could make transit more attractive. Enabling passengers to avoid parking challenges at transit stations while maintaining the flexibility of auto ingress and egress can reduce the need for agency-provided transit stations.

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[5] Stephen R. Miller. (2016). "Decentralized, Disruptive, and On Demand: Opportunities for Local Government in the Sharing Economy," *Ohio State Law Journal Furthermore* 77, 47-57.
[6] WageWorks. (2016). WageWorks Partners with Uber to Offer Pre-Tax Commuter Benefits for uberPOOL. Retrieved from https://www.wageworks.com/about/news/press-releases/august-2016/wageworks-partners-with-uber-to-offer-pre-tax-commuter-benefits-for-uberpool

Fourth, TNCs may affect the operations of transit vehicles. In dense urban areas like San Francisco, TNCs may compete for curb space with transit buses or make drop-offs/pickups without pulling out of traffic, slowing all vehicles including buses. This could negatively impact transit speeds and the relative attractiveness of transit versus other mobility options.

Each of these could significantly impact transit patronage in the future.

TNC and Application-based Mobility Service Partnerships with Public Transportation Agencies

Many transit agencies in the United States have incorporated transportation network companies (TNCs) or related application-facilitated mobility services into their plans, policies, and marketing strategies. These efforts have largely focused on how TNCs can complement, rather than substitute for, traditional mass transit. Nationwide, public transit ridership has increased as transportation network companies have expanded operations.[7] However, this trend may be a result of other factors, and it is unlikely to hold across all locations and time periods. In California, Lyft and Uber have partnered with several transit agencies to offer a variety of service enhancements and modifications.

Some of these partnerships have involved region-wide metropolitan planning organizations. In March 2016, Lyft and the MTC launched the first partnership between a TNC application provider and a government agency.[8] The Lyft Carpool service was separate from Lyft's core ridehailing and passenger matching services and was not subject to the CPUC TNC regulations. Lyft's passenger-matching technology offered MTC a new way to more efficiently match commuters.[9] Lyft Carpool served as a substitute for public transit and/or single-occupant vehicle trips.

Lyft and MTC suspended the Lyft Carpool partnership in August 2016, as the low number of participants prevented the service from functioning effectively.[10] Ride-matching services require

[7] Transit Center. (2016). Private Mobility, Public Interest. Retrieved from http://transitcenter.org/wp-content/uploads/2016/09/TC-Private-Mobility-Public-Interest-20160908.pdf
[8] Lyft (2016). Lyft Partners with California's MTC to Deliver New Carpooling Mode. Retrieved from http://blog.lyft.com/posts/lyft-mtc-511-carpooling
[9] Metropolitan Transportation Commission. (2016). MTC and Lyft Partnership Brings New Carpooling Resource to the Bay Area. Retrieved from http://mtc.ca.gov/whats-happening/news/mtc-and-lyft-partnership-brings-new-carpooling-resource-bay-area
[10] Siddiqui, Faiz. (2016, August 19). Lyft ditches casual carpooling, citing a lack of driver interest. *Washington Post.* Retrieved from https://www.washingtonpost.com/news/dr-gridlock/wp/2016/08/24/lyft-ditches-casual-carpooling-citing-a-lack-of-driver-interest/?utm_term=.30bc312e8bc2

a sufficient volume of passenger requests and driver offers in order to "clear" rides - or provide a high probability of a match. TNCs overcame this early-stage ridematching barrier by providing drivers with incentive to be available at high-demand times and go anywhere a passenger requested. Successfully matching passengers with drivers who already intend to travel to the passenger's destination at the requested time requires a high volume of driver and passenger activity.

For many years, the public sector has operated programs with mixed success that match riders and drivers in carpools for commute trips. MTC had previously demonstrated an interest in promoting carpooling by sponsoring 511 RideMatch, an online portal that matches travelers with similar origins and destinations to facilitate carpooling. Additionally, MTC had provided information online about locations for casual carpooling. In 2016, MTC created a formal process for partnerships with private sector carpooling services and has four active partnerships with Carzac, Duet, Muv, and Scoop.

LA Metro also formed a TNC partnership, albeit one much more limited in time and geographic range. Uber and LA Metro jointly marketed the May 2016 opening of the Exposition (Expo) Light Rail Line extension in Santa Monica. Additionally, Uber offered a $5 discount for all uberPOOL rides to and from the Expo Line extension the weekend of the Line's opening.[11] In their announcement of the arrangement, Uber explicitly mentioned that their services could be a solution to the first-and-last mile problem of transit station access.[12]

Two other agencies in California have explored similar discount arrangements with TNCs that have involved the elimination of bus service. In September 2016, the Livermore / Amador Valley Transit Agency (LAVTA) launched a one-year pilot program with both Lyft and Uber. LAVTA paid $200,000 to cap fares at $3 in West Dublin and $5 in East Dublin, above the $2 fare for Wheels (the local bus system), but lower than a typical TNC fare. Due to the new partnership, LAVTA also eliminated one bus route in West Dublin, which previously averaged 5 riders per hour at a public subsidy of $15 per rider. Although the local bus driver union criticized the changes, LAVTA claims the partnership will deliver the same level of service at a much lower cost.[13]

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[11] Los Angeles County Metropolitan Transportation Authority. (2016). Five dollar discount for Expo extension riders who use uberPOOL this weekend. Retrieved from http://thesource.metro.net/2016/05/19/five-dollar-discount-for-expo-extension-riders-who-use-uberpool-this-weekend/

[12] Uber. (2016). Drive Less, Explore More with Metro + uberPOOL. Retrieved from https://newsroom.uber.com/us-california/drive-less-explore-more-with-metro-uberpool/

[13] San Jose Mercury News. (2016). Bay Area transit system to subsidize Uber, Lyft rides. Retrieved from http://www.mercurynews.com/2016/08/18/bay-area-transit-system-to-subsidize-uber-lyft-rides/

In October 2016, OCTA discontinued two bus routes in San Clemente due to low ridership, and launched a partnership with Lyft and the City of San Clemente to subsidize any rides along the former routes. Funded by an OCTA grant, the city agreed to a two-year, $900,000 contract with Lyft to subsidize up to $9 per ride, ensuring that riders pay no more than $2 for any ride that would ordinarily cost $11 or less. To receive the subsidy, riders must start and end their trip near a former bus stop, and the rides must take place between 6am and 8pm.[14] Lyft and city representatives noted that the discontinued bus routes had very low occupancies, and Lyft claimed they wanted to continue providing service for "those who didn't own a car and were dependent on transit."[15]

Figure 7-2: Lyft Pickup Zone and Discontinued OCTA Routes 191 and 193

[14] The Orange County Register. (2016). San Clemente partners with Lyft to fill gaps after 2 OCTA bus routes end. Retrieved from http://www.ocregister.com/articles/octa-731232-clemente-san.html
[15] Lyft. (2016). Reimagining Public Transit in San Clemente. Retrieved from http://blog.lyft.com/posts/reimagining-public-transit-in-san-clemente

Source: Lyft[16] and OCTA[17], with image editing by authors

California agencies have established at least four partnerships with TNCs as of November 2016. Other states are exploring new partnerships as well, particularly in the provision of paratransit services. In September 2016, the Massachusetts Bay Transit Authority (MBTA) partnered with Uber and Lyft to launch a one-year pilot program offering on-demand paratransit. Under this partnership, MBTA subsidizes up to $13 of rides costing $15 or less, ensuring that customers pay $2 for most rides. Additionally, customers can request rides on-demand. Previously, MBTA's RIDE service cost passengers $3.15 per ride and required booking rides one day in advance. Lyft partnered with a local non-emergency medical transportation firm to obtain wheelchair-accessible vehicles for the pilot program, while Uber used existing wheelchair-accessible vehicles in their system as part of their UberASSIST service.[18]

The next two phases of the California Statewide Transit Strategic Plan project will consider the role of TNC-Transit integration in California.

Private Commuter Shuttle Service in the San Francisco Bay Area

A growing transportation trend in California is private commuter shuttle service. These services typically have higher-end amenities such as padded seating, seat-belts, and wireless internet. Many of these services are arranged and paid for by large employers and are subject to the Internal Revenue Service's threshold of a tax-free benefit $255 per employee per month. An emerging category of pay-per-seat services that allow anyone to utilize a commuter route, regardless of their employer. The public can use these pay-per-seat services, such as Chariot, by purchasing a monthly subscription.

The introduction of private commuter-focused service has been concentrated in the San Francisco Bay Area. To better understand these services, the Metropolitan Transportation Commission (MTC) conducted a Bay Area Shuttle Census. In their 2016 Census[19], the MTC identified 765 vehicles providing 9.6 million passenger trips in 2015. Figure 7-3 shows that these services provided for regional trips across multiple transit agency service areas. The

[16]Lyft. (2016). Reimagining Public Transit in San Clemente. Retrieved from http://blog.lyft.com/posts/reimagining-public-transit-in-san-clemente

[17] OCTA. (2016). EBusBook. Retrieved from http://www.octa.net/ebusbook/RoutePDF/route191.pdf and http://www.octa.net/ebusbook/RoutePDF/route193.pdf

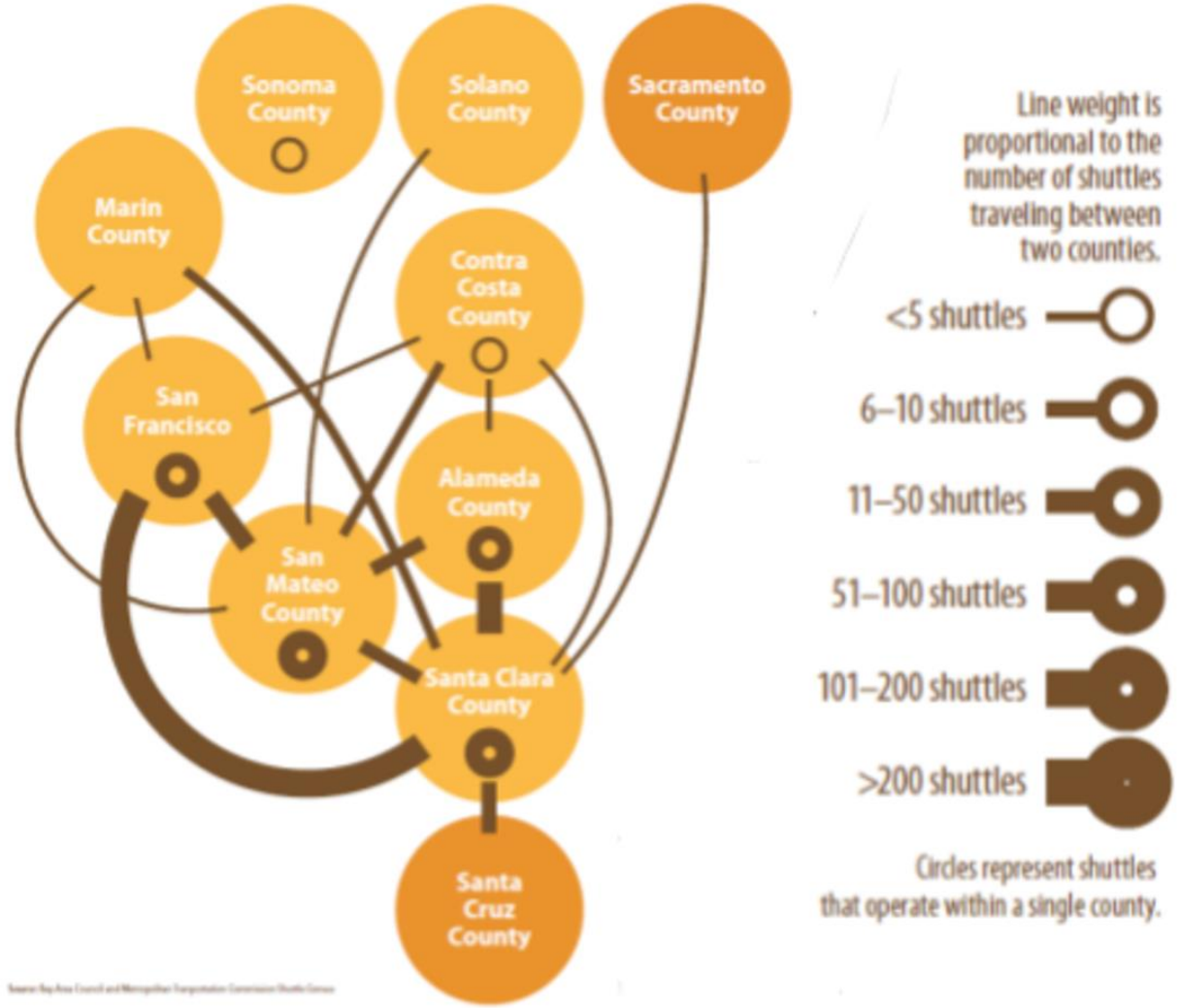
[18] Northeast Regional Center for Vision Education. (2016). Massachusetts Bay Transit Authority Pilot Project with Uber and Lyft. Retrieved from https://www.nercve.org/content/massachusetts-bay-transit-authority-pilot-project-uber-and-lyft

[19] Metropolitan Transportation Commission. (2 September 2016). "Bay Area Shuttle Census." Available at http://mtc.ca.gov/sites/default/files/2016%20Bay%20Area%20Shuttle%20Census.pdf

MTC Census identified services from 35 employers and transportation providers. Chariot and other pay-per-seat services were not included in the study.

MTC plans to conduct a second Shuttle Census in 2017 to further understand the role of shuttle services in the Bay Area's transportation landscape.

Figure 7-3: Employer-Provided Shuttle Service Route Map[19]



Intercity Bus Service in California

Private providers of intercity bus service offer a public transportation option for long-distance travel. In the past decade, several new companies have entered the California intercity bus

marketplace. Most private companies are focused on express services between major California cities; Greyhound, Amtrak Thruway, and Orange Belt Stages offer service to smaller towns.

The market for intercity bus service could continue to grow in the next decade as two policy changes allow for bus-only ticketing on Amtrak Thruway buses and a greater diversity of providers for routes that connect with California's rail network. A working draft document associated with the 2018 State Rail Plan recommends legislative changes to allow bus-only ticketing on routes that connect to rail. Additionally, the State Rail Plan will look to expand these routes and diversify their provision. Future rail-connecting service "could be met by express bus routes operated by local transit districts, a commercial operator, or by provision of dedicated interurban feeder bus as part of the Thruway bus network."[20] Intercity bus routes that connect with rail hubs will also connect with local and regional transit services that serve those hubs, extending the reach of the state's public transportation network.

Inventory of Private Intercity Bus Companies and Routes

Roughly a dozen private companies provide intercity bus services in California. Table 7-2 below outlines some of the most popular services provided by private operators, drawing from the list of services provided in the 2008 *California Statewide Rural Intercity Bus Study*[21] and adding additional services that cater to specific communities. The list was compiled based on a review of California Public Utilities Commission data and internet searches for regularly-scheduled intercity bus service with additional focus on companies serving populations that speak languages other than English.

Express buses to specific private business (e.g., casinos, tourist attractions) are not included, nor are Amtrak Thruway buses or public intercity services funded under the federal formula grant funded Rural Intercity Bus Program (Section 5311f).

In general, most of these services connect the major destinations in or near California, including the Los Angeles metropolitan area, the San Francisco Bay Area, Las Vegas, and Mexico. Figure 7-4 below, provided by the *2008 California Statewide Rural Intercity Bus Study*, shows the extent of the statewide network in 2008.

[20] From an unpublished document provided to the UCLA ITS research team for review.
[21] KFH Group. (2008). "California Statewide Rural Intercity Bus Study." Prepared for the Caltrans Division of Mass Transportation. Retrieved from http://www.dot.ca.gov/hq/MassTrans/Docs-Pdfs/5311/Bus-Study/5311finalintercitybus_study011911.pdf

Figure 7-4: 2008 Map of Intercity Bus Service in California

Table 7-2: Frequency and Routes Served by Intercity Bus Services in CA

Routes	Frequency per Day	Service Providers	Other
Multiple Routes Throughout California and to Mexico	100+ trips / day	Greyhound / Autobuses Americanos (AA) / Autobuses Cruceros (AC) greyhound.com	AA and AC serve cities in Mexico
LA - SF	30 - 40 trips / day	**Bolt Bus** boltbus.com **California Shuttle Bus** cashuttlebus.com **Megabus** Us.megabus.com **Transportes Intercalifornias (TI)** Intercalifornias.com **Hoang Express** xedohoang.com	TI caters to the Latino community Hoang Express caters to the Vietnamese community
LA - LV	20 - 30 trips / day	**American Lion Bus** amlionbus.com **Bolt Bus** boltbus.com **Lux Bus America** Luxbusamerica.com **Megabus** Us.megabus.com **Tufesa** Tufesa.com **CHD Group** chdestination.com	Tufesa caters to the Latino community CHD Group caters to the Chinese community
LA - Mexico	30 - 40 trips / day	**Transportes Intercalifornias (TI)** Intercalifornias.com **Tufesa** tufesa.com	TI and Tufesa cater to the Latino community

Note: SF - San Francisco Bay Area, LA - Los Angeles Metropolitan Area, LV - Las Vegas

Conclusion

The recent trend of increasing private sector involvement in providing transit options for the public could have a profound effect on traditional public transit operators. A continued trend of new developments for shared and innovative mobility services led by the private sector will bring new challenges and opportunities for transit operators. For instance, in late January 2017, MTC and BART began a carpool program with Scoop, a private ridesharing facilitation platform, to encourage shared ride trips to the Dublin/Pleasanton station.[22]

The next two phases of the Statewide Transit Strategic Planning project will consider current and future possible challenges and opportunities and the potential for a statewide strategic response.

[22] More information at http://www.transitwiki.org/TransitWiki/index.php/Scoop

CHAPTER 8

Standardized Transit Data and Transit Performance Metrics

Chapter 8: Standardized Transit Data and Transit Performance Metrics

The data and tools originally designed for passenger route planning and real-time arrivals notification have evolved to become an emerging source of data for analyzing current service data for dozens of agencies. This chapter presents a proof-of-concept analysis on the use of General Transit Feed Specification (GTFS) and GTFS-Real Time data for automated analysis of interagency stop optimization and multi-agency corridor frequencies. These data sources can be used for robust analysis of performance metrics contained in the California Transportation Plan 2040.

Over the past decade, General Transit Feed Specification (GTFS) has become the transit industry's standard data format for describing transit attributes, such as stops, schedules, and routes. GTFS is important for at least two reasons. First, it is part of the open source ecosystem that has facilitated the recent innovations in consumer-facing transit resources like Google Transit directions and apps like NextBus. Agencies that provide GTFS data make their transit services visible in these applications and thus have new and greater opportunities to reach new riders and generate more trips. Second, GTFS' standardization allows for the data to be aggregated in a statewide database, making it easier for the state to understand key metrics of service provision and track them over time.

This chapter contains an inventory of the California agencies that have GTFS feeds, and a description of their contents. This serves as a baseline for any state efforts to expand the use of GTFS. The state can also take advantage of GTFS to do data-driven statewide planning and longitudinal analysis. To illustrate GTFS' potential, the chapter also contains the calculation of some statewide transit metrics, maps of transit stops statewide, an analysis of interagency stops in California, and a multi-agency analysis of trip provision statewide.

What is GTFS? A Background

The General Transit Feed Specification (GTFS)[1] defines a standard data format for public transit routes, schedules, and stops. An agency's data in GTFS format (known as a "GTFS feed") consists of a .zip file containing comma-delimited text files. Those text files have standard file names, and the data within them has consistent field definitions. Developed in 2005 by Google, this common open-source format enables third-party map applications, such as Google Maps or Transit App, to provide transit directions and route information. The ability to make route, stop, and schedule information broadly available in popular mapping and other smartphone applications provides a strong incentive for agencies to use this format, and as a result, GTFS

[1] Accessible at https://developers.google.com/transit/gtfs/reference/

has emerged as an industry standard. GTFS is also the foundation for real-time data, the next frontier in transit data. GTFS Realtime is an extension to GTFS allowing agencies to publish real-time data on arrivals, delays, and routing changes.[2] Google Maps Live Transit Updates pulls from GTFS realtime feeds.

Because GTFS is an open-source standard based on rudimentary technology (.txt files), there is no additional software or capital cost required to use it. There are staffing costs to create the feed initially, which are often outsourced to consulting firms that specialize in this service. Whenever routes or schedules change, there is also some staffing cost involved in updating the GTFS feed.

In March 2016, USDOT Transportation Secretary Anthony Foxx issued a "Dear Colleague" letter inviting the nation's transit agencies to contribute to a national repository of GTFS feed data.[3] This would allow everyday users who are not developers to view maps based on GTFS data and to download GTFS data. Foxx stated that about half the nation's transit agencies, including nearly all the large ones, have provided a publicly available GTFS feed. Foxx announced the creation of a National Transit Map and encouraged agencies to share GTFS data with USDOT, and to avail themselves of various grants to develop GTFS feeds if they did not have them. Foxx articulated the value of aggregating GTFS data: it enables "the realistic treatment of transit for planning, performance measures, and resiliency" and enables the value of transit to be described at a state or national level.

GTFS Technical Information

GTFS is structured like a *relational database.* This structure is typical of modern databases and is used by software like Microsoft Access, Microsoft SQL Server, PostgreSQL, and others. Nearly all modern databases use the SQL language to query and maintain the database. The data are stored in tables in which each row is a unique record identified by a primary key. These primary keys are then used to relate the tables as necessary: a given table can contain a column for a foreign key, used to relate data from another table.

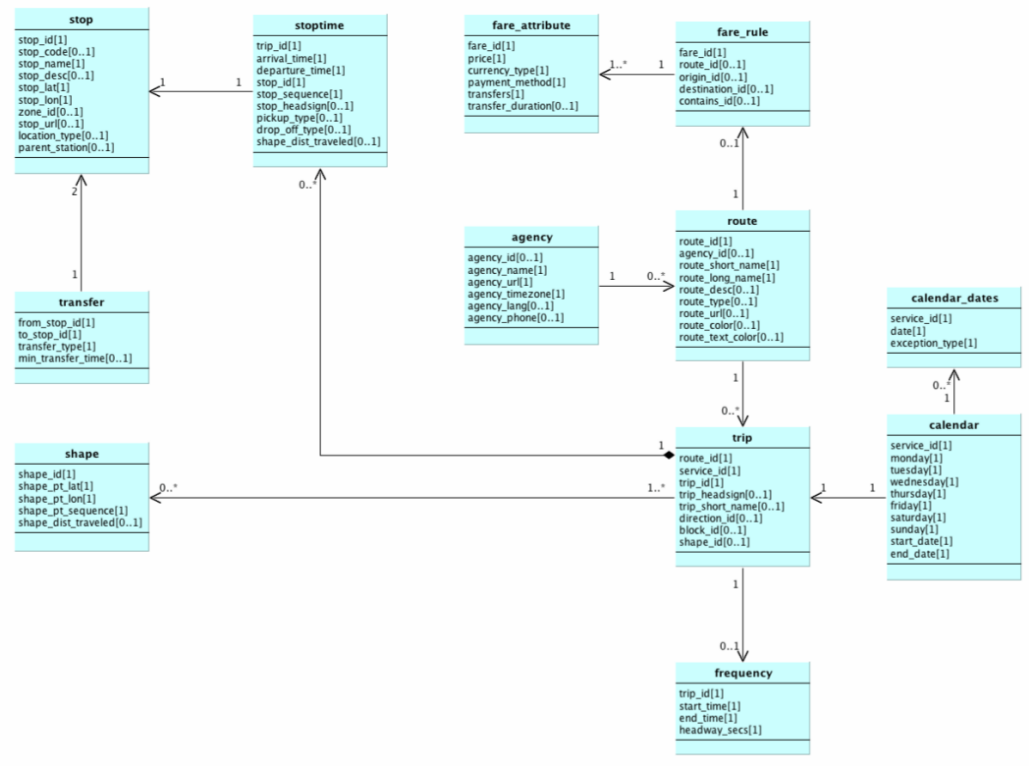
For example, each of the entries in the GTFS calendar table describes whether a given service runs on Monday, Tuesday, and so on using columns with binary (0/1) indicators. The primary key from the calendar table, service_id, appears as a foreign key in the trip table. For a given trip, the trip table gives its name, e.g. "720 - Westwood" and contains a foreign key allowing for the reference of what days that trip runs on. The GTFS database diagram describing these relationships is shown in Figure 8-1. GTFS is technology neutral. A developer or analyst can

[2] Accessible at https://developers.google.com/transit/gtfs-realtime/
[3] Accessible at http://maps.bts.dot.gov/Transit/downloads/DearColleague.pdf

read GTFS data into the specific implementation of the relational database of her preference, whether it be postgreSQL or MySQL or something else.

To perform the analyses presented in this chapter, the authors sought to quickly replicate the functionality of a possible future statewide GTFS database. The authors searched for publicly available GTFS feeds online[4] and used the open source python module, **gtfsdb**, to read each agency's GTFS feed into a **sqlite** database. The python module **sqlite3** then allowed the authors to submit SQL queries to each of the individual sqlite databases and return the query results as a single aggregate result. The result effectively achieves, with limited functionality, a statewide GTFS database that can be queried with SQL. Creating a true statewide GTFS database would require a more thorough process to systematically read, check, and input the data, editing data types, primary keys, and foreign keys during the input process. In addition, a more thorough protocol would be needed to assess data quality and to keep the database up to date.

Figure 8-1: Diagram Relating the Various Data Tables that Comprise a GTFS Feed.



[4] Located through searches on 1) TransitWiki's publicly accessible public transportation data (http://www.transitwiki.org/TransitWiki/index.php/Publicly-accessible_public_transportation_data), 2) Agency websites, 3) Transitland (transitland.org), 4) Transitfeeds (Transitfeeds.com).

Inventory of California Agencies with GTFS Feeds

Of the 99 agencies in California that are "full reporters" to the Federal Transit Administration's National Transit Database, 66 have GTFS feeds. Agency size is a strong predictor for whether an agency will have GTFS data.[5] This result is expected given that larger agencies tend to have more information technology and marketing capacity. Perhaps there are also greater ridership incentives for enabling transit routing and scheduling applications in large urban areas where the natural transit market is bigger and more diverse in terms of habitual vs. spontaneous trips. All but two of the 31 large agencies (defined as agencies with over 100 vehicles) in California have GTFS feeds. The exceptions are LACMTA - Small Operators, which is a bundled reporting entity for many small operators in Los Angeles County, and Santa Clarita Transit. Of the 68 small agencies with fewer than 100 vehicles, about half (37) have GTFS feeds. A disproportionate number of these 37 are in the greater San Francisco area.

As Table 8-1 shows, all of the 66 agencies with GTFS feeds had the required tables that comprise a GTFS feed (with one minor exception: one agency is missing a calendar table). Only a few agencies use all of the optional tables.

Table 8-1: Completeness of California GTFS Data

Table	Required or Optional	Description	How many CA agencies have this table (N=66)?
agency.txt	Required	One or more transit agencies that provide the data in this feed.	66
stops.txt	Required	Individual locations where vehicles pick up or drop off passengers.	66
routes.txt	Required	Transit routes. A route is a group of trips that are displayed to riders as a single service.	66
trips.txt	Required	Trips for each route. A trip is a sequence of two or more stops that occurs at specific time.	66
stop_times.txt	Required	Times that a vehicle arrives at and departs from individual stops for each trip.	66
calendar.txt	Required	Dates for service IDs using a weekly schedule. Specify when service starts and ends, as well as days of the week where service is available.	65

[5] This analysis excludes vanpool and demand-responsive transit agencies reporting to the NTD.

calendar_dates.txt	Optional	Exceptions for the service IDs defined in the calendar.txt file. If calendar_dates.txt includes ALL dates of service, this file may be specified instead of calendar.txt.	65
fare_attributes.txt	Optional	Fare information for a transit organization's routes.	43
fare_rules.txt	Optional	Rules for applying fare information for a transit organization's routes.	41
shapes.txt	Optional	Rules for drawing lines on a map to represent a transit organization's routes.	61
frequencies.txt	Optional	Headway (time between trips) for routes with variable frequency of service.	27
transfers.txt	Optional	Rules for making connections at transfer points between routes.	29
feed_info.txt	Optional	Additional information about the feed itself, including publisher, version, and expiration information.	33

Potential for GTFS to Enable Statewide Transit Planning

A statewide GTFS database could support a number of important transit planning analyses. For example, California Transportation Plan 2040 includes a mid-to-long range implementation measure to "improve upon scheduled transfers between regional transit services." Regular analyses of statewide GTFS data can identify suboptimally scheduled transfers and create a performance metric to track the number of such transfers from year-to-year, making it easier to evaluate progress.

Other possibilities that a statewide GTFS database would facilitate:

- Mapping a statewide frequent transit network and identifying gaps in that network
- Identifying stops with interagency transfers
- Identifying stops with many arrivals and departures, inclusive of all agencies that service that stop. The state can use this to prioritize funding for station amenities such as wayfinding and real-time arrival and departure information.
- Identifying where and when many transit vehicles travel on the same stretch of roadway. The state can use this to prioritize funding for projects that enhance travel speed and reliability on such corridors, such as the ability of transit vehicles to hold the green phase of a signal or bus-only lanes.
- The creation of a statewide agency categorization schema based on consistent metrics like trips per weekday, or number of routes.

- An expediting of recurring state planning processes, such as TOD planning or the RTP/SCS process, with the use of a consistent format for transit data.
- Identifying opportunities for first and last mile investments.
- Identify where interagency and regional fare agreements would have some public benefit.

All of the above could be done with GTFS data alone, but a statewide GTFS database could serve as the scaffolding to add various other data on such aspects as ridership, fares, vehicles, or infrastructure to enable even more powerful analyses at the state level. These data would be in additional linked tables that augment the core GTFS structure.

For example, when GTFS static information is collected along with GTFS-RT real-time vehicle position and arrival information and matched with on-board passenger counts, it becomes possible to automate the calculation of multi-agency person-delay in a corridor. This metric would help prioritize investments in new infrastructure projects or transit priority roadway treatments and signal optimization.

By encouraging local agencies to publish their data in GTFS format, the state stands to benefit from a greater ability to identify opportunities for interagency coordination and cost-effective investments and projects.

Using GTFS Data to Calculate Summary Statistics, Map Transit Stops, and Identify Interagency Stops in California

The following are several *proofs of concept* to demonstrate the value of GTFS data in statewide transit planning. The geodata provided in the stops and shapes tables facilitate easy visualization of transit service in the state; likewise, the data in the feeds provide for the calculation of statewide summary statistics like the number of trips per day or the total length of the route network. Finally, GTFS makes it possible to identify interagency stops as well as to sum the number of trips per day served by a stop without regard to the agency providing the service.

Overview of Transit Service in California

GTFS data enables an overview of transit service in California (keeping in mind that, as mentioned earlier, about half of the small agencies are not represented in the current dataset). First, simply mapping the stops in the 60 GTFS feeds allows for a quick visualization of service. The GTFS format facilitates mapmaking because all the stop coordinates are in the same coordinate system. In the following maps, the stops are color-coded by the agency providing the GTFS feed.

Figure 8-2: Transit Stops from California GTFS Feeds

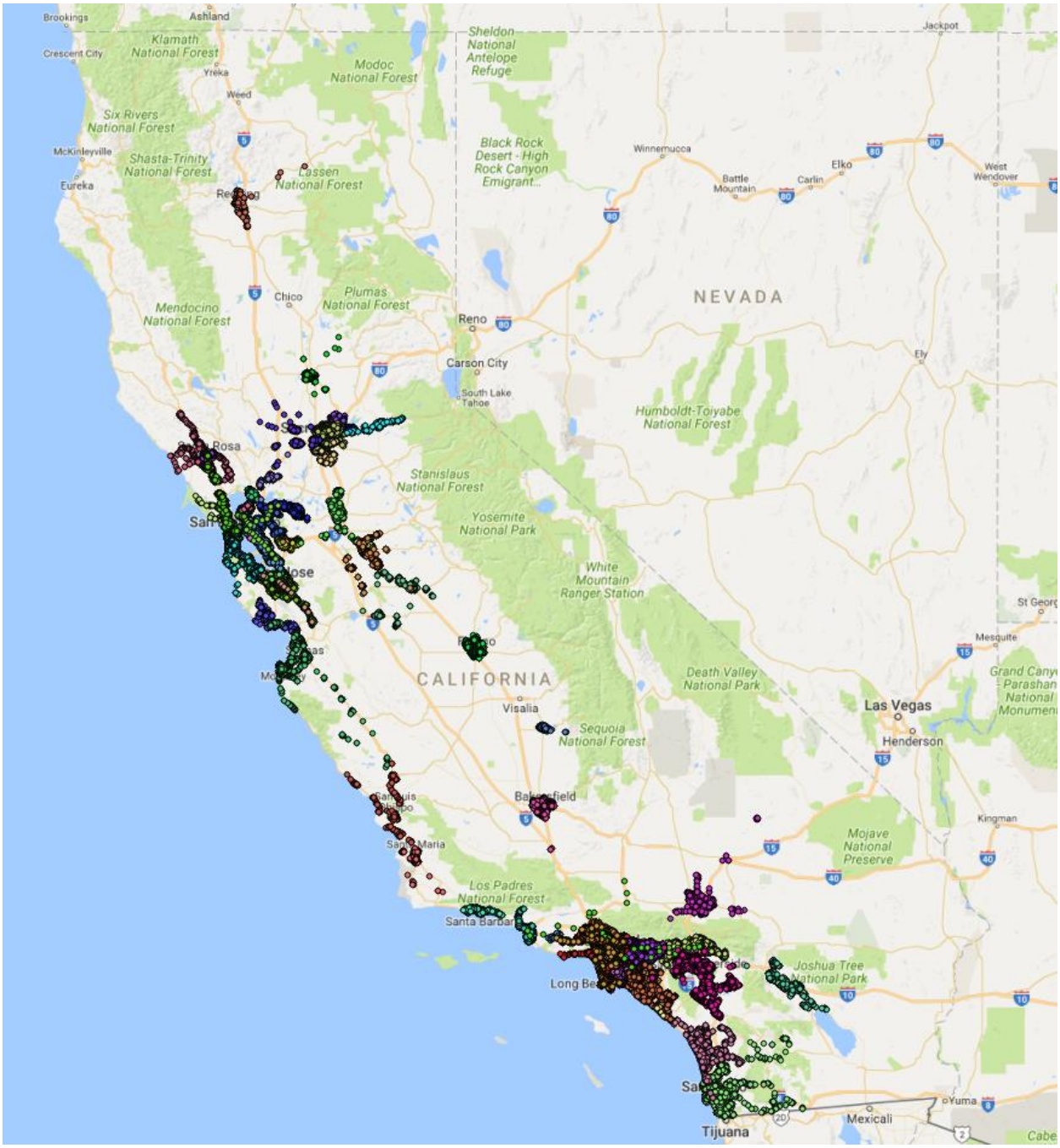


Figure 8-3: Greater San Francisco Bay Area Detail, Transit Stops from California GTFS Feeds

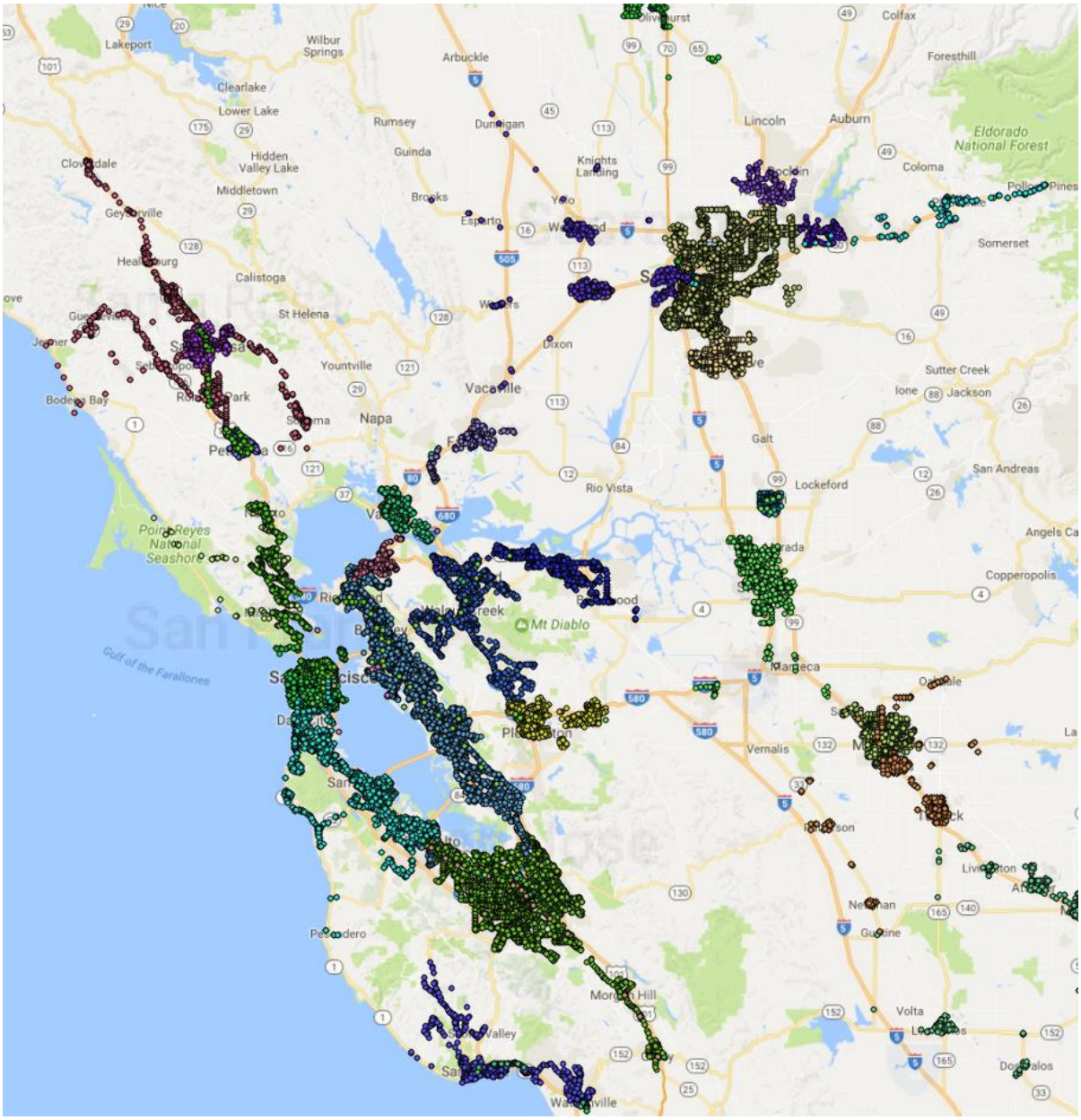
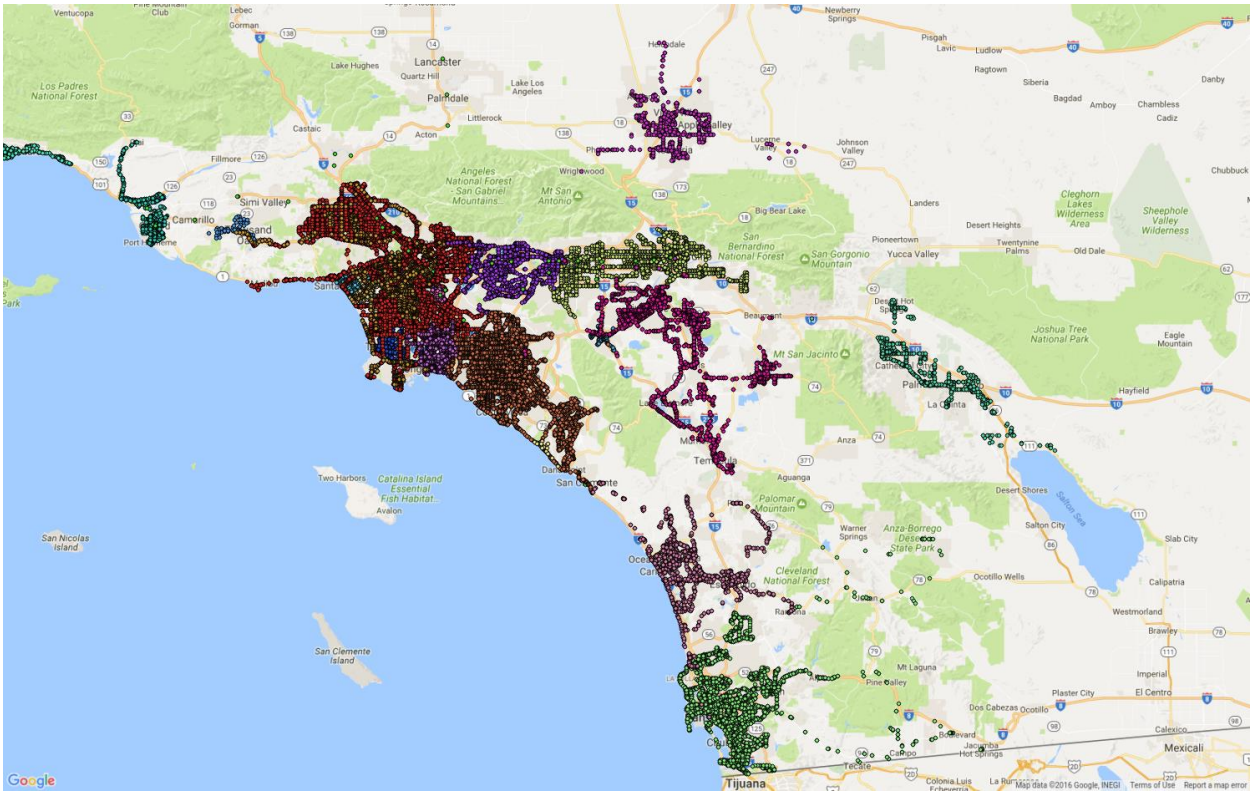


Figure 8-4: Southern California, Transit Stops from California GTFS Feeds



Summary Data for California Agencies with Published GTFS feeds

The collection of GTFS feeds also enables the calculation of summary statistics, allowing for a high-level overview of California transit services included in published GTFS feeds.[6] These statistics are not meant to be definitive; rather, they suggest what is possible using a statewide repository of GTFS feeds, and in some cases they highlight what is possible if every agency participates in providing optional tables like 'fare_attributes' and 'transfers'. Examples include:

Stops

There are 84,613 unique transit stops in California.

[6] Recall that about half of the small agencies in the state are excluded from this summary.

Routes

There are 2,610 unique routes in California, where a route is a set of trips that is presented to the customer as a single service, e.g. the 720 Line. A subset of these routes is tagged with a modal label: 2,209 are bus routes, 21 are light rail, 15 are intercity rail, 11 are ferry routes, 6 are subway, and 3 are cable car.

Trips per day

Considering Monday service as representative of weekday service, there are 235,139 unique transit trips per day running on Mondays in the State of California. The mean number of trips per day per agency is 3,265. The median is 709 trips per day. The maximum, found in the GTFS feed for LA Metro's bus service, is 32,441 trips per day.

Transfers

Twenty-nine agencies in the state use the 'transfer' table to define rules for making connections between routes. A total of 288 transfers are described across these 29 agencies. Of these 162 are transfers that require a 3-minute minimum time to transfer between routes.

Fares

Forty-three agencies use the 'fare_attributes' table to describe the fare price, whether the fare is paid on board or pre-paid, and the number of transfers permitted on a given fare. A total of 403 fare classes are described. Of these, 256 are fare classes on Metrolink and BART, which use route and distance-based fares. Excluding BART and Metrolink, the median price for the remaining fare classes is $2.50.

Interagency Stops Assessment

To demonstrate the capability and flexibility of these data for analyzing interagency coordination, the authors queried the state's GTFS feeds for transit stops that are within 50 feet of a stop from another agency. These closely colocated stops are referred to as "interagency stops" throughout the following.[7]

[7] 50 feet is a fairly conservative distance threshold for examining these interagency stops. Most major boulevards are wider than 50 feet, so this threshold will not tag closely located stops on opposite sides of a major street. It is difficult to identify a scale-neutral threshold that will work for rural, suburban, and dense urban areas of the state. A related challenge is the 50 foot threshold is much smaller than the physical footprint of many rail stations, and as a result the (lat,long) centroid of the station does not intersect with bus stops at its perimeter. Agencies that provide rail service, such as BART and Metrolink, are thus shown to have low numbers of interagency stops in this analysis, much fewer than the functional reality.

Of the 84,614 stops in California, 5,587 (6%) are closely colocated with a stop from another agency. Nearly every agency (53 of 60) has one of these interagency stops. The stops are distributed across agencies as follows:

Table 8-2: Agency Feed Names and Interagency Stops

Feed Name	Interagency Stop Count	Feed Name	Interagency Stop Count
Metro - Los Angeles	1,421	MTS	28
LADOT	902	Santa Cruz Metro	27
Golden Gate Transit	387	Monterey-Salinas Transit	25
Torrance Transit	297	Commerce Municipal Bus Lines	23
Marin Transit	272	Paso Robles Express	23
Big Blue Bus	180	WestCat (Western Contra Costa)	22
Long Beach Transit	156	Roseville Transit	22
San Francisco Muni	154	Modesto Area Express	22
Culver City Bus	120	Anaheim Resort Transportation	21
Orange County TA	120	Tri Delta Transit	20
Foothill Transit	120	SolTrans	16
Sonoma County Transit	120	Thousand Oaks Transit	16
AC Transit	117	City of San Luis Obispo Transit	14
SamTrans	116	Bay Area Rapid Transit	13*
VTA	95	Yuba-Sutter Transit	13
Yolo County Transportation District	86	Fairfield and Suisun Transit	13
Sacramento Regional Transit	76	Caltrain	10*
Stanislaus Regional Transit	72	San Joaquin RTD	7
Santa Rosa City Bus	67	Sunline Transit Agency	6
Petaluma Transit	54	Santa Maria Area Transit	5
Unitrans (Davis)	52	Livermore Amador Valley TA	5
Etran (Elk Grove)	52	OMNITRANS	5

El Dorado Transit	48	Folsom Stage Lines	4
Riverside Transit Agency	43	Merced The Bus	4
Corona Cruiser	33	Laguna Beach Transit	3
North County Transit District	30	Metrolink Trains	1*
County Connection	29		

* A low count for rail agencies is due to 50 foot buffer size (see footnote on page 8-10)

This table prompts a few nontrivial observations. Closely colocated stops—stops that effectively serve multiple agencies—are common throughout the state. The Los Angeles area dominates this type of colocated stop. Over 10% of Metro's stops are colocated with another agency's, and 40% of LADOT's stops are colocated with another agency's. Many of the observed LADOT-Metro colocated stops observed could be due to peak-hour LADOT Commuter Express bus service. The map reveals further insights into the nature of these stops (with interagency stops shown in yellow).

Figure 8-5: Interagency Stops in San Francisco Bay Area

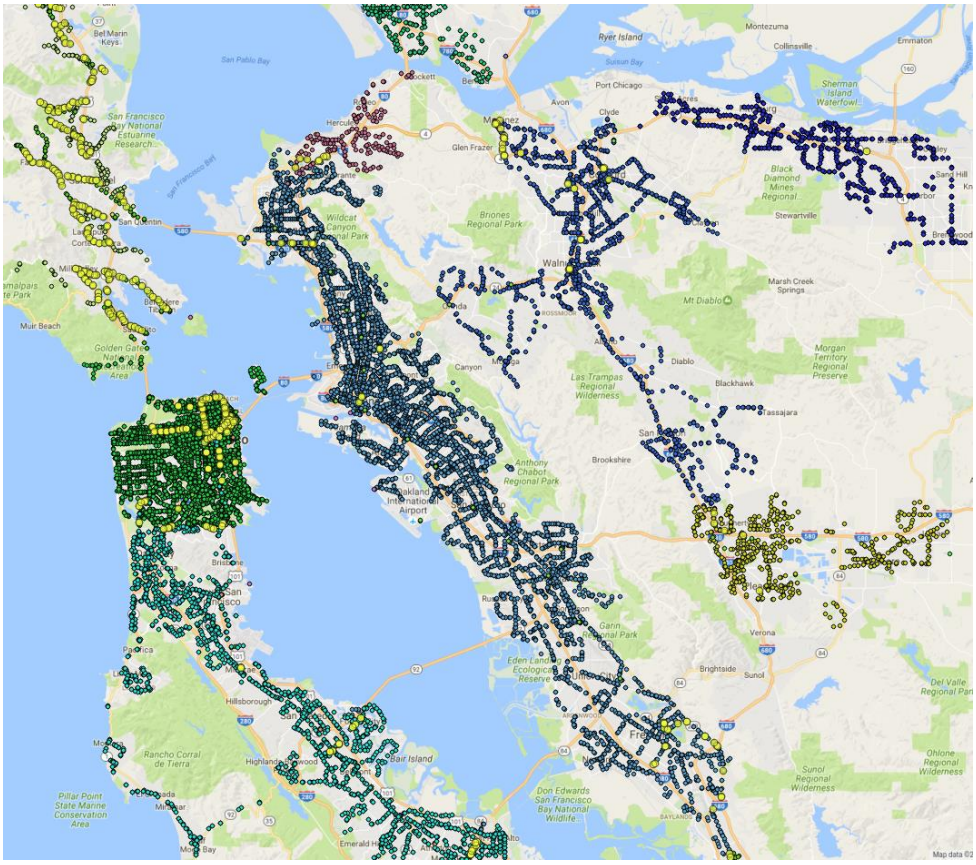
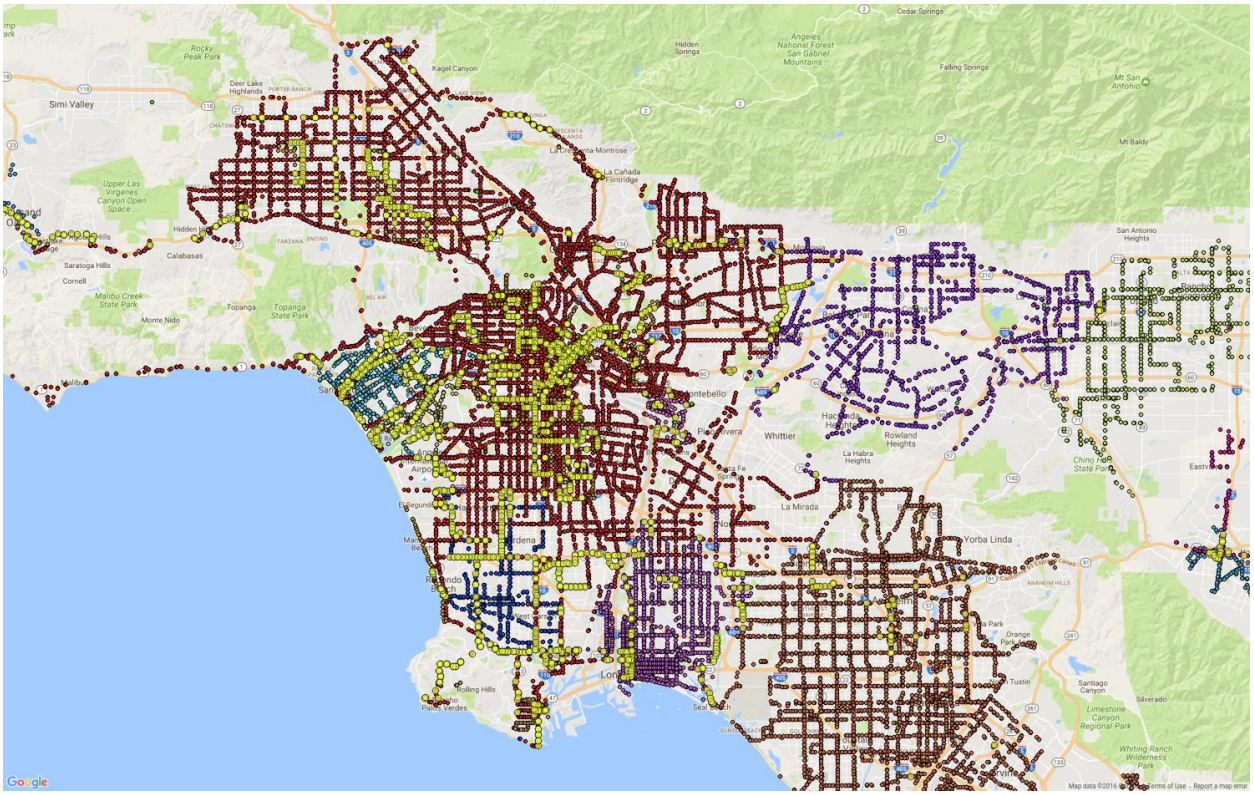


Figure 8-6: Interagency Stops in Los Angeles Region



These two figures highlight a prominent difference between the Los Angeles area and the Bay Area. In Los Angeles, LA Metro (shown in red) is a very large regional agency whose territory overlaps substantially with that of smaller agencies. In addition, LA Metro and LADOT operate alongside one another on overlapping, intersecting corridors. As a result, nearly every agency in the Los Angeles area has interagency stops, and several have large numbers of these stops. In the Bay Area, on the other hand, there is no LA Metro equivalent, and the territories of most agencies are geometrically compact and non-intersecting. (Notable exceptions to this in the Bay Area are Caltrain and BART.) As a result, there are far fewer interagency stops in the Bay Area.

Another pattern that can be seen in these maps is that these interagency stops are rarely isolated. More typically, an agency will run a line into another agency's territory and have a series of interagency stops. This makes the analysis of interagency transfers more complex; it may create more good options for the transfers themselves. An example from outside the two major urban areas of two agencies with overlapping lines is the City of San Luis Obispo Transit and Paso Robles Express. Although these agencies have distinct territories, there are still many co-located stops between them in the City of San Luis Obispo.

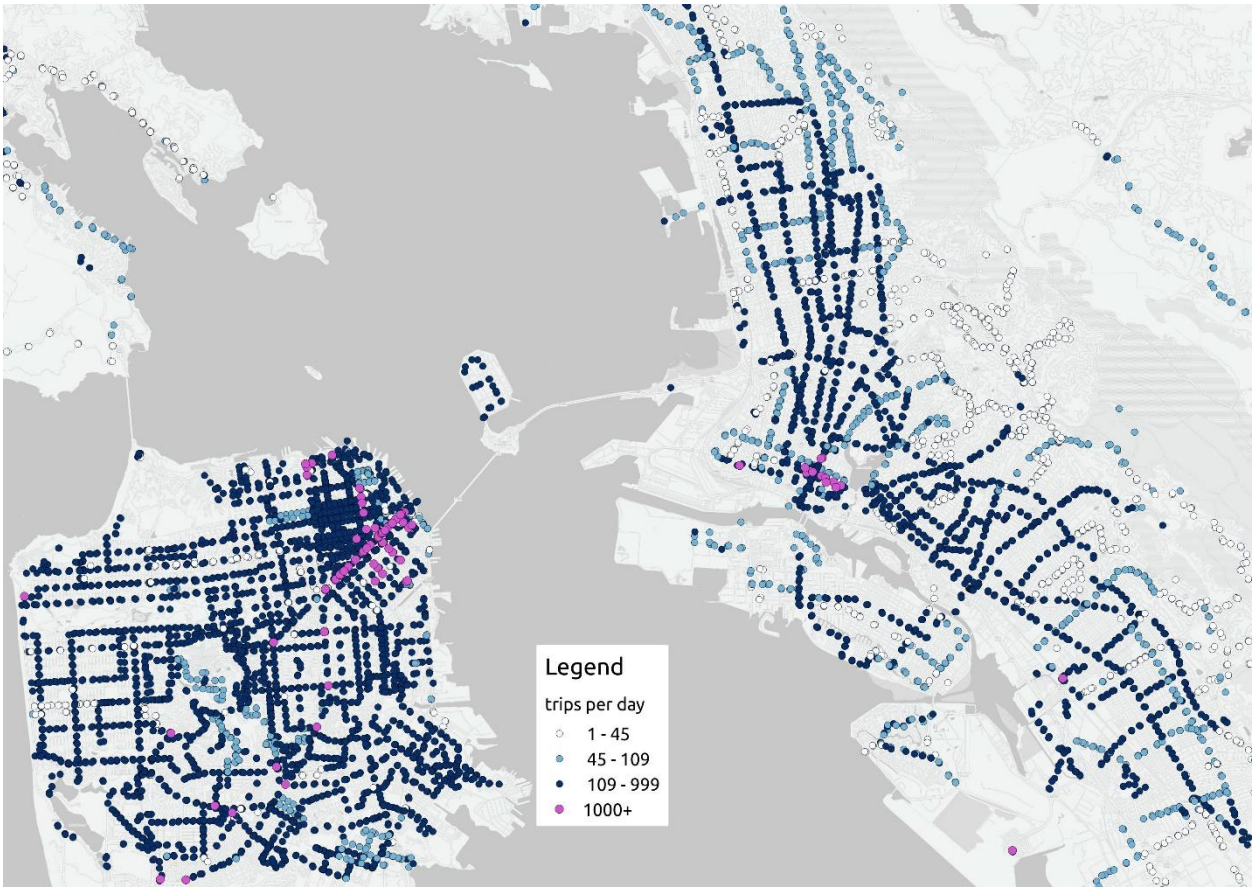
Figure 8-7: Many Interagency Stops in the City of San Luis Obispo

Multi-Agency Frequency Assessment

The database of GTFS feeds also allows for mapping and analysis of how many trips per day serve a stop, without respect to which agency is providing the service.

In the following maps, all transit trips running Monday service and stopping within 150 feet of each stop in the statewide GTFS data are shown. This provides a view of how the quantity of transit service is distributed statewide (trips per day are classified by quartile).

Figure 8-8: Stops displayed by trips per day across all agencies, Greater San Francisco Bay Area



In Figures 8-8, 8-9, and 8-10, it is shown that in the state's two mega-regions, most stops serve over 100 trips per day. In the Los Angeles region, an inter-agency divide is evident on the border between trips offered by Long Beach Transit and Metro in Los Angeles County and those trips offered by the Orange County Transit Authority; service in Orange County runs fewer trips per day than service in the adjacent Long Beach area. Parts of western Orange County have

lower densities than Long Beach and the Gateway Cities in Southeastern Los Angeles County. Additionally, Los Angeles County agencies have additional sales tax funds for operations that are not available in Orange County. Nevertheless, this contrast serves as a reminder that incentives and resources are not always aligned to supply interjurisdictional trips.

Purple dots represent the top ~1% of stops in the state by trips per day. These stops have over 1,000 trips per day. The San Francisco and Los Angeles areas have a handful of these stops each. These stops are not found outside the major urban areas.

Figure 8-9: Stops displayed by trips per day across all agencies, Los Angeles County / Orange County border detail

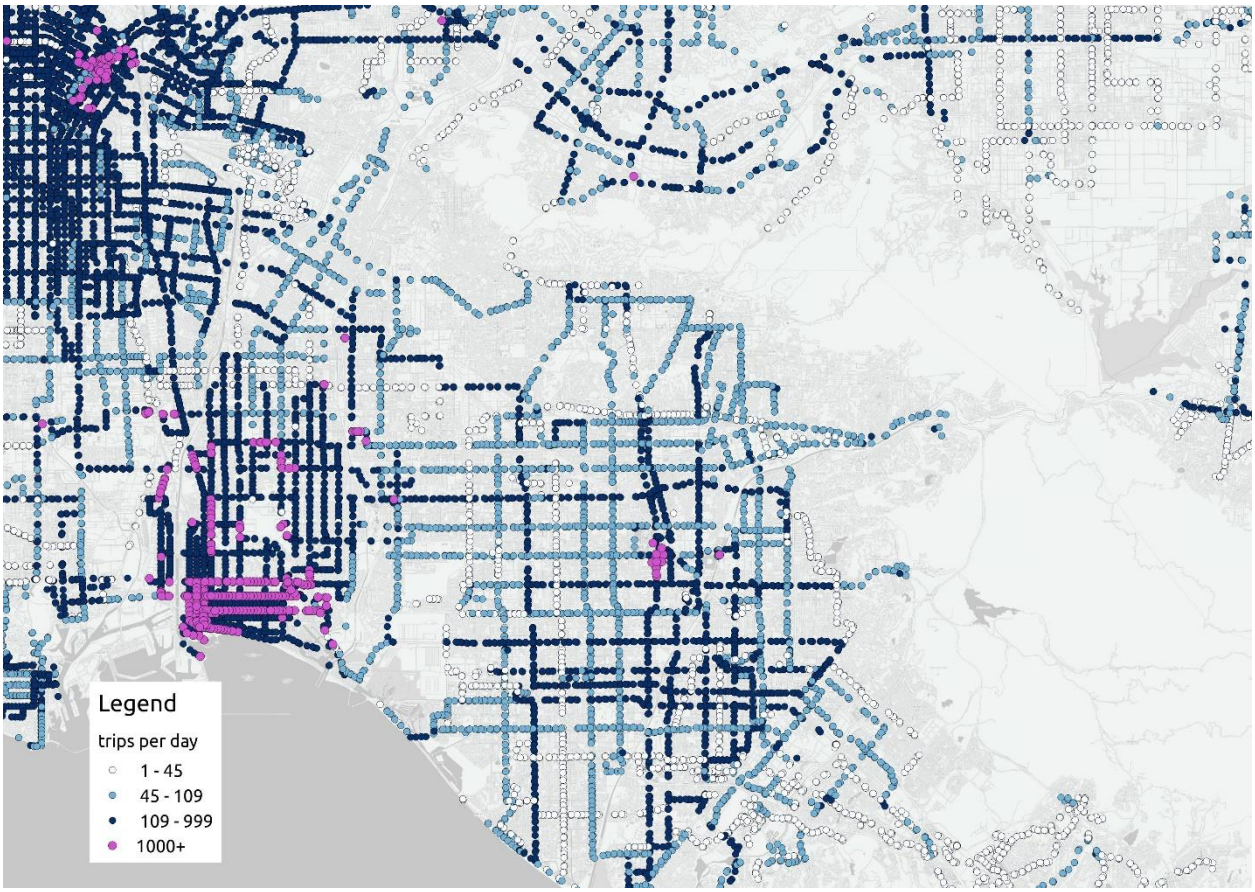
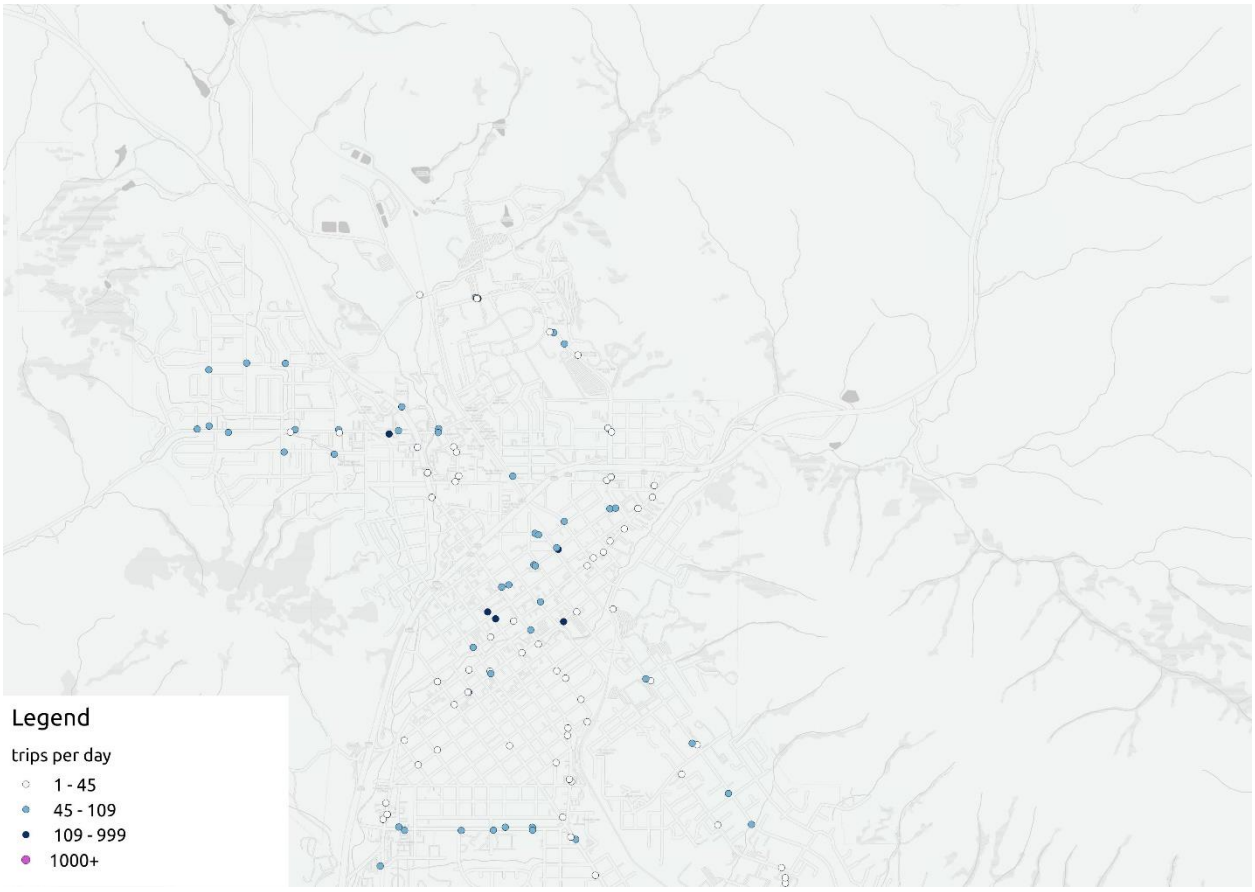
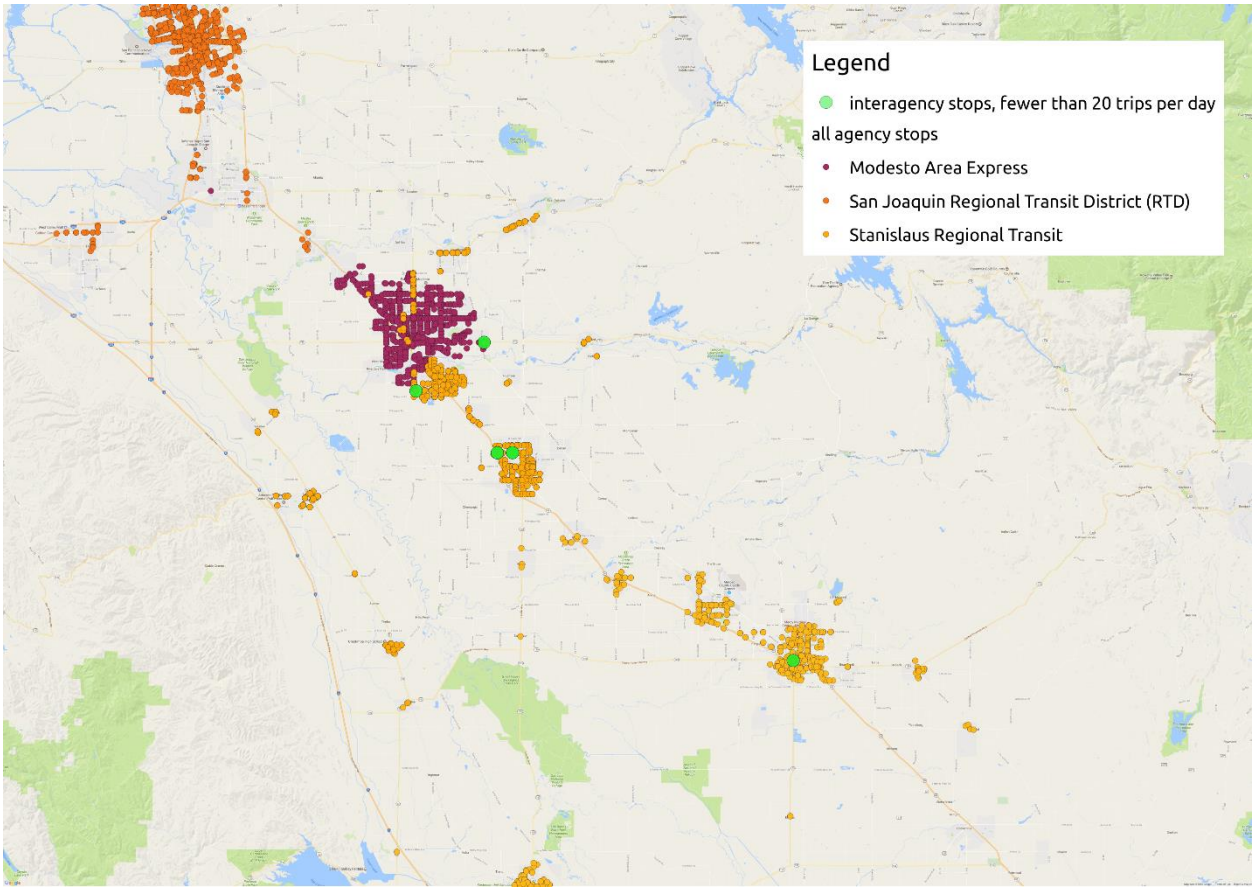


Figure 8-10: Stops displayed by trips per day across all agencies, City of San Luis Obispo



This analysis also allows us to narrow the focus on interagency stops by examining only those which serve fewer than 20 trips per day. When such stops are identified, agencies can review the schedules of the various services across all agencies that serve that stop. This could lead to identifying opportunities to reduce long wait times for transfers. Figure 8-11 illustrates an example. In the Modesto area, three agencies provide transit service. There are exactly five stops that serve multiple agencies and also serve fewer than 20 trips per day. There may be opportunities to reduce wait times for transfers at these stops.

Figure 8-11: Interagency stops with fewer than 20 trips per day, Modesto area



Conclusion

While agencies produce GTFS data primarily for passenger-facing information systems, they are also useful for a wide variety of analyses on service provision, including analyses of transit networks, routes, schedules, fares, and interagency cooperation, among other factors. GTFS reduces the barriers for regular, automated or semi-automated analyses of transit networks, which were previously impractical because of the manual work involved in digitizing and regularizing route maps and schedules.

State policy, through funding requirements, funding allocations, and other incentives and laws, can encourage agencies to create and maintain GTFS feeds. The usefulness of these data for statewide analysis is only limited by agency participation. The analysis in this chapter includes

data from only 66 of the 165 agencies which report to the National Transit Database. More robust analysis of interagency connections and multi-agency corridor frequency would become possible if more agencies were to publish GTFS data in the future. Each agency that provides an up-to-date GTFS feed benefits individually from its inclusion in web-based and mobile applications that provide greater opportunities to reach riders. The state benefits from the fact that GTFS allows for data aggregation and the creation of a statewide GTFS database.

A statewide GTFS database would allow the state to readily calculate and track key metrics of service provision such as trips per day, route mileage in the state, and fare trends. More specifically, such a GTFS database could be used to regularly calculate some of the performance metrics from the California Transportation Plan (CTP) 2040 (see Table 8-3).

Table 8-3: Use of GTFS to Calculate Selected CTP 2040 Transit Performance Metrics

Metric	How to Calculate It With GTFS
Transit accessibility: housing/jobs within 0.5 miles of a major transit stop	GTFS enables the up-to-date identification of major transit stops based on service or modal criteria, as well as the identification of transit routes based on frequency criteria. Thus, this can be measured using GTFS combined with Census data on housing or a data source on jobs.
Transit/rail travel time reliability	Use GTFS-RT feeds to measure cumulative delay per time, variability in travel times, and other reliability metrics.
Transit accessibility	Transit accessibility at any given geographic unit (e.g., Census block group) can be measured using the GTFS routes, trips, and stops that are found within that unit.
Travel time to jobs	For a given geographic unit and a given time threshold, this can be measured using route and trip data from GTFS combined with a consistent source of spatial data for jobs such as the Longitudinal Employer-Household Dynamics (LEHD) survey.

9

CHAPTER

Conclusions

Chapter 9: Conclusions

Based on information and data contained in this Baseline Report, conclusions are presented in four sections below: Ridership, Planning, Revenues and Cost-Effectiveness, and Emerging and Future Issues. Recommendations to the state and transit agencies are reserved for the December 2017 Statewide Transit Strategic Plan.

Ridership

The 42.2 million hours of public transit service provisioned in California in 2015 sustained 1.4 billion passenger trips taken and 8.5 billion passenger miles traveled. Ridership is the primary outcome measure for successfully providing transit service in a built environment and policy setting that supports transit use. An ultimate focus on ridership is paramount. Intermediate measures are necessary to affect ridership

In California Transportation Plan 2040, Caltrans referenced an internal strategic goal to double transit use statewide by 2020 relative to the 2010 mode share. As shown in Table 4-2 in Chapter 4, California's four large MPOs have also projected increases in transit use ranging from 3% to 11% per year in their most recent Regional Transportation Plans.

Achieving the state's mode share target will require substantial increases in transit service provision and usage to keep up with growth in population and any growth in travel via modes other than transit. The data reviewed for this baselines report also suggest that increases in service levels and ridership on low-capacity modes such as demand response and vanpool will have a very limited effect on statewide ridership compared with increases in service levels and occupancy of higher-ridership modes such as local bus and urban rail.

However, an analysis of data from California agencies reporting to the National Transit Database indicates that statewide transit ridership is currently trending downward. Except for the MTC region, the overall number of transit trips is trending downward. Even within the MTC region, transit ridership per capita is trending down.

The data presented in this report show that transit use in California is declining at the same time as the State seeks to increase transit use. This suggests that current trends need to be reversed to bring statewide transit use to levels not seen in recent decades.

Two-thirds of California's transit trips occur on local bus service, which has recently experienced the greatest declines in ridership and service productivity. This trend will need to be addressed before the state can reverse the downturn in transit ridership.

Twenty large and medium-sized transit agencies carry almost 90% of transit passenger trips in the state. Thus, it's possible for the state to target initial efforts to increase transit ridership, such as pilot projects, on a handful of larger agencies rather than adopting interventions or requirements that apply to all agencies.

While California's Transit Agencies are responsible for serving transit trips, they have only a limited set of tools to intervene and reduce the trend of declining ridership. Successfully reversing the trend will require interventions both within and beyond agency control. The State, and to a lesser extent, MPOs, have influence over the costs of mobility alternatives to transit. Cities and counties also play a large role by controlling housing production, parking policies, and the rights-of-way used by transit.

Table 9-1: Transit Agency Control over Factors which Influence Transit Ridership

Degree of control	Factors which influence transit ridership
Transit agencies can control	• In-vehicle passenger experience • Service schedules and frequency • Acceptance of regional fare media • The availability of commonly-used digital information, including route information via GTFS and real-time information systems
Transit agencies can influence	• Vehicle reliability • Travel times • Out-of-vehicle passenger experience • Passenger fares, subject to legislative constraint of 20% farebox recovery ratio • Routes and stop locations
Transit agencies have little or no ability to influence	• Whether an individual's origin or destination is transit accessible • Whether or not future population and employment growth in the service area is accommodated via transit-supportive land use • The costs of mobility alternatives, such as vehicle access, operation, fuel maintenance, insurance, cost to use roads

Planning

The California Transportation Plan 2040 set forth many statewide goals and measures for the transportation system generally and transit in particular. A review of goals in state and local planning documents revealed that many local agencies have not incorporated the state's goals into their local plans.

An expanding set of transit agency data can serve as a tool for statewide analytics and interagency service coordination.

Revenues & Cost-Effectiveness

Serving an increase in transit mode share will require a level of operating and capital funding above and beyond what is needed to serve the growing population and keep up with inflation. This will require new sources of fund and expansion of existing funding sources in addition to greater stability in the State Transit Assistance and Greenhouse Gas Reduction Fund sources. Agencies are now more reliant than ever on local sales taxes for both capital and operations funds, but this dependence could bring new challenges.

Meeting the state's ridership goal, even on a longer time frame, will also require a transformative breakthrough which leads to more efficient and/or effective transit service. More cost-effective operations requires either (or a combination of) efficiency gains - reducing the cost of providing an hour of transit service - or more effective outcomes per service input (e.g. higher vehicle occupancy, faster trip times means more passengers per hour). Demand response service demands some intervention; the rate of increase in costs for providing a demand response trip is not economically sustainable as California's population ages.

Expanding transit service to meet the demands of a growing population - and more - will need not only cost-effective operations but also cost-effective capital projects. Based on the report, the concurrent obsolescence of multiple urban and commuter rail systems' rolling stock in the 2020-2035 period is a concern. If multiple agencies expect state contributions for rolling stock rehabilitation or replacement, demand for capital funding will spike.

Emerging and Future Trends

A few trends in California require a statewide strategy for transit's response. These include the proliferation of private shared transportation services, changing statewide demographics, possible changes to federal transit programs, and expanding vehicle automation and connectivity capabilities. The first two of these are discussed below; all will be more thoroughly considered in the next phase of the Statewide Transit Strategic Plan project.

TNCs can be a substitute for and a complement to public transit. TNCs can support California's transit ridership goals if they can replace low-productivity routes and demand response services and allow resources to be deployed in higher-productivity services. TNCs can also complement public transit by providing origin-to-station or station-to-destination flexible mobility with high-quality, high-capacity, high-productivity transit serving trunkline trips. However, TNCs can also compete for riders in areas where transit service is productive.

Private commuter shuttle services can also serve as a substitute for or complement to traditional public transit. The existing employer-provided shuttle market in the Bay Area largely augments

peak-hour peak-direction trips and provides additional capacity beyond what public transit systems can provide. The Bay Area market also allows for market segmentation, with those who have a higher ability to pay (via employer subsidies) and expect greater amenities concentrating on employer-provided shuttle services. Furthermore, the absence of a vehicle at worksite can generate additional mid-day per-trip mobility needs for lunch and errands trips. Bikes at work, TNCs, delivery services employer shuttles, or public transit can serve these mid-day trips.

The commuter shuttle services market can also develop innovations that can be replicated. For example, per-seat services like Chariot can help establish new commuter markets that may eventually be served by public vanpool and commuter bus services.

The California Department of Finance population forecasts indicate that the state's population will increase by 17% from about 39 million in 2015 to 47 million in 2040 and nearly 52 million in 2060. Equally significant to population growth is the change is the forecast age distribution of the population. The Department of Finance expects the share of Californian's 65 and older will increase from 11.5% of the State's population in 2010 to 21.5% in 2040 and 23.6% in 2060. This will create additional demand for demand response services and fixed route transit.

The MPO regions with the greatest populations today will continue to account for most of the state's population in the future. Meeting the State's mode share goals will require concerted efforts in these regions to grow transit usage at the expense of automobile use. The next phases of the Statewide Transit Strategic Plan will consider MPO-level population growth and implications for transit service provision and ridership.