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Authors

Deakin, Elizabeth
Chow, Chun Ho
Son, Daisy

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WHITE PAPER

PART 1
Chun Ho Chow, University of California, Berkeley
Elizabeth Deakin, University of California, Berkeley

PART 2
Daisy Son, University of California, Berkeley
Elizabeth Deakin, University of California, Berkeley

PART 3
Elizabeth Deakin, University of California, Berkeley

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Berkeley Institute of Transportation Studies

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WHITE PAPERS IN THE SERIES INCLUDE:

Forward

Assembly Bill (AB) 285 (Friedman, 2019) requires the California Strategic Growth Council (SGC) to submit a report to the Legislature by January 31, 2022, that includes the following:

- An overview of the California Transportation Plan (CTP) 2050
- An overview of all regional Sustainable Communities Strategies and any alternative planning strategies, as needed
- An assessment of how the implementation of the CTP and regional plans "will influence the configuration of the statewide integrated multimodal transportation system"
- A "review of the potential impacts and opportunities for coordination" of key state funding programs" to be conducted in consultation with the administering agencies
- Recommendations for improving these programs and other relevant transportation funding programs to better align the programs to meet long-term common goals, including the goals outlined in the CTP

In spring 2021, the SGC contracted with the University of California (UC) to provide materials supporting their report to the Legislature. Researchers at the UC Berkeley, UC Davis, and UCLA Institutes of Transportation Studies and the UC School of Berkeley Law joined forces to prepare a series of white papers to provide the evidentiary basis for the project. Elizabeth Deakin, the UC Berkeley principal investigator, coordinated the work.

Background

California has adopted ambitious goals for its transportation systems. The state has pledged to reduce greenhouse gas (GHG) emissions by 40 percent compared to 1990 levels and by 80 percent by 2050, and has also committed to achieve carbon neutrality by 2045. With transportation a major emitter, substantial changes in transportation vehicles, fuels, operations, and user choices must be achieved to meet these goals.

As pressing as climate change goals must be, other goals remain important. California has pledged to maintain its transportation infrastructure in a state of good repair, provide for safe operations, support economic development, meet air quality standards, protect the state's natural environment, coordinate urban transportation with housing policies, and do so in a way that is equitable for all. This ambitious set of goals places considerable responsibility on transportation planners and decision-makers.

A series of state initiatives has moved the state toward zero-emissions vehicles, cleaner fuels, and planning for transportation and land use measures that reduce vehicle miles traveled (VMT). Nevertheless, a 2018 assessment by the California Air Resources Board (CARB) found that the State of California is at risk of missing its 2030 GHG emissions reduction target for transportation-related emissions, in part due to increases in VMT. Since then, CARB has taken steps to tighten its requirements, the California Department of Transportation (Caltrans) has updated its plans and planning guidance, and metropolitan planning agencies and their partners (transit agencies, county transportation commissions, cities) have updated their plans and programs, which include both transportation and land use elements.

California's transportation plans for the most part have been developed in a context of anticipated growth in population and the economy. In a business-as-usual context, such growth is associated with increases in VMT. Nationwide, for example, the Federal Highway Administration has projected that VMT will continue to increase as the result of population increases, rising disposable income, increased GDP, growth in the goods component of GDP, and relatively steady fuel prices. For California to buck these trends would require a large-scale, concerted effort.

However, in the past two years, the COVID-19 pandemic has disrupted daily life and led to massive changes in travel behavior. As recovery from the pandemic occurs in fits and starts, whether and to what extent pandemic-induced changes in travel will persist remains in question. Major issues include whether telecommuting and e-commerce will remain popular and whether avoidance of shared modes will continue.

At the same time, new transportation options, from high-speed rail to bike sharing, are being added to California's transportation systems, and transportation technologies continue to evolve—electrification and automation are examples. Such changes need to be considered in plans that aim to steer actions for 20, 30, or even 50 years, along with other driving forces, including fuel prices and turnover rates for the vehicle fleet. How these factors are dealt with in plans can make a difference in how well the plans comport with actual experiences in the future.

The UC team has evaluated California's state and metropolitan transportation plans, financing for transportation, and the legal framework in this broad and uncertain context while taking into consideration the legacies of successive transportation technologies and the institutions that shaped and were shaped by them and the implications for change.

Research Methods

The UC team carried out its work based on 1) reviewing and analyzing previous research on the topic, including government reports, assessment document, and scholarly literature; 2) discussions with SGC staff and the staff of state agencies involved in transportation planning and related activities in California; and 3) interviews with key informants. A series of white papers was prepared to address the topics to be included in the report to the Legislature.

White Papers and Summary

Each white paper is designed to be read as a stand-alone document. In addition, a separate summary synthesizes the findings and recommendations.

Evaluation of California State and Regional Transportation Plans and Their Prospects for Attaining State Goals: Summary and Synthesis pulls together the key findings and recommendations of all the white papers. It assesses the prospects for achieving the state's diverse goals through its transportation planning and programming processes and identifies strengths and weaknesses of current policies and practices. It also provides the authors' recommendations for changes to policy and practice that could improve overall system performance and achievement of state goals for climate, equity, environment, safety, infrastructure, and the economy.

A Brief History of Transportation Policy and Institutions presents the development of transportation systems in the United States, with particular attention to California. The review includes key technological advances in transportation and the institutions that were developed to implement them. The paper also discusses the problem of organizational inertia and the issues associated with changing organizational culture to better reflect the problems of the day.
Review of Statewide Transportation Plans for California reviews the most recently adopted CTP and other key transportation plans adopted by state agencies, discusses the special attention given to new technologies in the CTP, and presents the findings from over 80 interviews with stakeholders across California who were asked to weigh in on the strengths and weaknesses of transportation planning practices in the state.

MPO Planning and Implementation of State Policy Goals evaluates California metropolitan planning organizations' regional transportation plans and sustainable communities strategies and looks at the relationship between MPO plans and what is actually funded through transportation improvement programs.

Examination of Key Transportation Funding Programs in California and Their Context assesses the congruence between funding programs and state goals for transportation. Particular attention is given to major funding sources, such the State Operation and Protection Program, and programs designed to promote key state goals, including the Affordable Housing and Sustainable Communities program, the Transit and Intercity Rail Capital Program, the Transformative Climate Communities program, and the Sustainable Transportation Planning Grant program.

Flexibility in California Transportation Funding Programs and Implications for More Climate-Aligned Spending examines key features of the legislative authority for transportation planning and finance in California, including local option sales taxes for transportation, and assesses the amount of flexibility that current laws and practices allow for reprioritizing projects as problems and priorities change.

Toward an Integrated Multimodal Transportation System for California: An Analysis of the California Transportation Plan 2050, Modal Plans, and Progress Toward Multimodal Integration

PART 1

Chun Ho Chow, Graduate Student Researcher,
University of California, Berkeley

Elizabeth Deakin, Professor Emerita,
University of California, Berkeley

October 6, 2021

Abstract

This paper examines the California State Transportation Plan (CTP) 2050 and several of the state's modal plans. It evaluates the extent to which the plans move the state forward toward an integrated, intermodal system that complies with state policies and goals, especially on such matters as climate change and equity. The paper is based on a close reading of the plan texts and a search for commitments to integrated systems across modes. We find that for the most part, the plans commit to the policies and goals set forth in federal and state legislation, but do not provide details about how those goals will be achieved. An exception is the state rail plan, and to some extent the draft transit plan, both of which take a full-systems view in plan preparation, consider linkages across modes, and pay attention to variations in demand across regions and user groups. An implementation element is planned for the CTP 2050 sometime in 2021 but was not yet available for review in mid-December 2021 when this paper was being finalized.

The plans could be strengthened by adding specificity, mapping problems being addressed to solutions being proposed, and discussing implementation, including funding and assignments of responsibility, in greater detail. For the CTP, which under current rules is fiscally unconstrained, this might require the addition of an alternative that is constrained by estimates of reasonably available funding and authorities to act (at a general level, not fund by fund or project by project.) The plan could also be strengthened by building on previous planning documents, reviewing what had been accomplished, what worked well, what should continue to be implemented, and which changes in direction are needed. In the longer run, greater attention to local, regional, and state plan linkages, the markets for various modes, and the connections to land use on a subarea, corridor, and regional basis would improve plan efficacy.

1. Statement of the Problem and Research Approach

Assembly Bill (AB) 285 (Friedman, 2019) requires the California Strategic Growth Council (SGC) to prepare a report assessing how the California Transportation Plan (CTP) 2050, regional sustainable communities strategies, alternative planning strategies, and other key transportation plans and programs will "influence the configuration of the statewide integrated multimodal transportation system." The assessment is to include recommendations to improve these plans and programs and other relevant transportation funding programs to better meet shared, long-term social, economic, and environmental goals.

In support of the SGC's response to AB 285, this paper examines the most recent CTP, which covers the 30-year period stretching to 2050 (CTP 2050.) In addition, the paper reviews four of California's six modal plans: the Interregional Transportation Strategic Plan, the Statewide Transit Strategic Plan (not released; reviewed in draft form), the California State Rail Plan, and the State Bicycle & Pedestrian Plan. It briefly touches on the Freight Plan and the Aviation Plan (Table 1).

The CTP and the modal plans are part of a much larger ecosystem of transportation plans for the state (Figure 1). Some plans cover important elements of transportation planning and spending, such as the traffic operations plan and the asset management plan. Others cover fields of study that significantly affect and are affected by transportation, including the climate action plan and the statewide housing assessment. Resources available for this study do not support investigation of these plans, although we do note the relevance of many of them to questions about goal attainment and plan integration.

We have carried out this assessment through a review of previous studies on transportation system integration, discussions with planning and policy staff at a number of agencies, and a deep reading of the selected transportation plans. This has allowed us to identify hallmarks of integration and multimodalism, flag problem areas, and identify ways forward that could increase goal attainment.

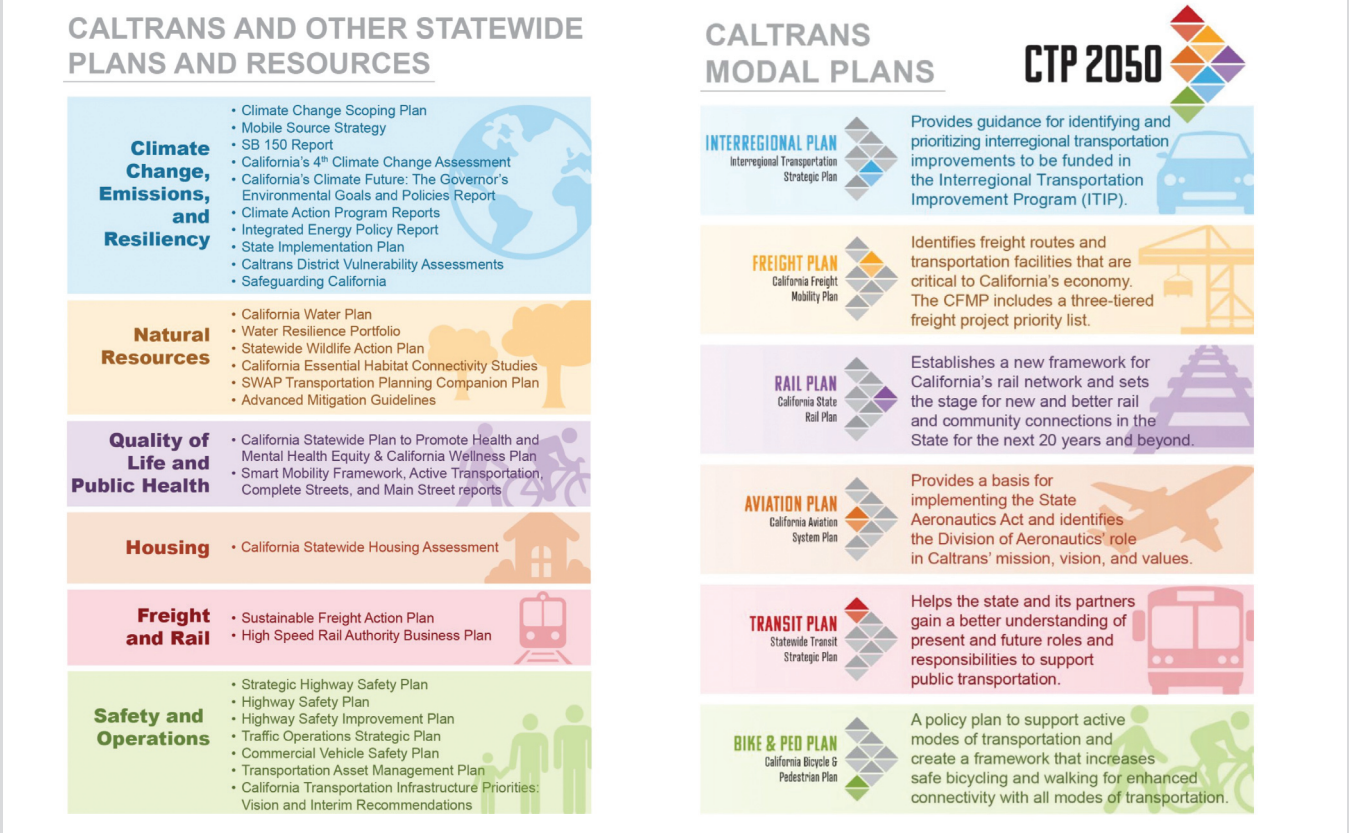
In the next section of the paper, we summarize definitions and planning frameworks for integrated transportation that have been set forth in the scholarly and professional literature and discuss the calls for an integrated transportation system in recent California legislation and policy proposals. We also review metrics and indicators that have been proposed for evaluating transportation system integration. The third section of the paper summarizes the key sections and messages of CTP 2050. The fourth section reviews the four selected modal plans, presenting an overview of their contents and their treatment of the issues of multimodality and integration. We present an assessment of the plans in the fifth section, considering the extent to which statewide plans as currently drafted are likely to produce an integrated transportation system that meets state goals. The final section presents recommendations for improving the plans.

Table 1: CTP and modal plans

Title	Year Produced	# Pages
California Transportation Plan 2050	2021	137
Interregional Transportation Strategic Plan	2021	73
California State Rail Plan	2018	309
Statewide Transit Strategic Plan (unreleased draft)	2017	269
California Bicycle & Pedestrian Plan	2017	84
California Freight Mobility Plan	2020	312
California Aviation System Plan	2021	396
Total pages		1,580*

*This paper focuses on the first five plans listed in the table. Page counts include appendices. Plans vary in the amount of data provided as part of the plan. A number of additional transportation plans on safety, asset management, and so on are available, but were not reviewed as part of this study.

Figure 1: Modal plans and other statewide plans intersecting with transportation (Caltrans 2021a, p. 19)



2. Multimodal Integrated Transportation Systems: Definitions and Planning Frameworks

The term "integrated multimodal transportation system" is left undefined in AB 285, so we turn to previous legislation, the CTP, and the literature to establish a working definition for integration and multimodality in a transportation system.

Senate Bill (SB) 391 (Liu, 2009) found that California lacked "a comprehensive, statewide, multimodal planning process that details the transportation system needed . . . to meet objectives of mobility and congestion management consistent with the state's greenhouse gas emission limits and air pollution standards." The legislation mandated the preparation of a state transportation plan addressing how the state "will achieve maximum feasible emissions reductions. . . of greenhouse gas emissions, taking into consideration the use of alternative fuels, new vehicle technology, tailpipe emissions reductions, and expansion of public transit, commuter rail, intercity rail, bicycling, and walking." While the legislation stipulated that the state transportation plan should not be project-specific, it called for the plan to draw on regional plans in identifying "the statewide integrated multimodal transportation system needed to achieve these results." The legislation made it clear that multiple modes should be planned together to effectively meet state goals of mobility and accessibility, integration and connectivity, efficient system management and operation, existing system preservation, safety and security, economic development, including productivity and efficiency, and environmental protection, air quality, and quality of life.

AB 285 builds on this framework for the CTP. It adds environmental justice to the list of topics to be considered in the plan and calls for future plans, beginning with the 2025 plan, to include a forecast of the impacts of advanced and emerging technologies over a 20-year horizon and a review of the progress made in implementing past CTPs. While recognizing the 2016 CTP as "an important step toward integrating statewide long-range modal plans, key programs, and analysis tools that build on regional transportation plans, sustainable communities strategies, and rural land use visions', the legislative finding was that 'more must be done to meet objectives of mobility and congestion management consistent with the state's greenhouse gas emission limit and air pollution standards." AB 285 directs that the CTP achieve the maximum feasible greenhouse gas (GHG) reduction and support the attainment of all state and national ambient air quality standards, elaborating that this should be done "taking into consideration the use of alternative fuels, new vehicle technology, tailpipe emissions reductions, ride sharing, vehicle pooling, and expansion of public transit, commuter rail, intercity rail, bicycling, and walking." It directs that the "plan shall identify the statewide integrated multimodal transportation system needed to achieve these results."

The CTP 2050 does not explicitly define integration in the context of a multimodal transportation system. However, previous studies have provided definitions. In particular, the scholarly literature provides several definitions of integrated transportation systems, illustrating different ways of conceptualizing them. For example, May (1991) and May and Roberts (1995) say that "integrated transport strategies are a combination of infrastructure, management and pricing measures to achieve better performance against transport policy objectives." May and Roberts (1995) add that the terms integrated, balanced, and package are largely synonymous and imply a combination of measures that not only are complementary but are purposely combined to achieve a strategic objective.

Givoni and Banister (2010), in the introduction to their edited book, point out that the concept of an integrated transportation system has been around for a long time but has proven hard to accomplish. As they see it, the difficulty is rooted in the way that transportation institutions have developed: Users care about the door-to-door travel experience, yet on the supply side, specialization has occurred that has typically focused on a limited subset of the transportation

system, most often the particular modal network and its nodes. Givoni and Banister argue that this limited, supply-oriented view of the transportation problem became embedded in separate institutions and planning processes that often ignore the fact that many trips (passenger and freight) depend on more than one network and mode. In their view, as a result of this narrow modal network approach, transportation systems fail to be integrated, and users are not fully taken into account. In addition, because transportation integration is a prerequisite for a sustainable transport system, a modal approach is unlikely to meet the full range of social, economic, and environmental objectives.

Likewise, Kanafani (2008) says that the key to multimodal integration is to plan, invest, and evaluate the different modes together rather than in isolation as separate systems on a mode-by-mode basis. In his view, integrated multimodal planning should consider the different modes (walking, cycling, public transit, automobile, and so on) as part of a complete transportation system, paying attention to the connections and interactions between modes. It should not be biased toward or focus on the improvement of a single mode (typically road traffic), without also considering the impacts on other modes (Kanafani, 2008; concurring, see Litman, 2021 and Raw, 2003). Additionally, not only the network and modes but also the operations and management need to be coordinated 'to create an interconnected [integrated] mobility management system' (Ghandeharioun et al., 2020).

May and Roberts (ibid.) elaborate that the design of an integrated transportation plan should combine measures to increase overall effectiveness, raise funding through one element needed to implement another element, or increase public acceptance through mitigating or offsetting less palatable measures. Noting that some elements of an integrated plan might face constraints, they advise that part of an integrated transportation strategy should be to identify those constraints and propose ways to overcome them. The authors also note that in some cases public policy objectives can be in conflict, or at least seen as such, by some of the participants, which itself can be a constraint on integration. This is a topic that is addressed at some length in the literature on implementation (Pressman and Wildavsky, 1974) and on policy transitions (Avilino et al., 2016).

Professional reports have also addressed the integration issue, although often from a supply and operations perspective. For example, a UN Habitat report specifies the integration of a multimodal transportation system along four dimensions, from what the report authors view as the easiest to hardest to integrate (Haas 2018):

- Physical (nodes)—Smaller, nodal, hard infrastructure, such as stations; usually the easiest to integrate
- Network—Larger hard infrastructure, such as links for feeder services; usually the most expensive to integrate
- Operational—Soft infrastructure, such as routing, timetabling, and fares and ticketing, made easier by technological advances
- Institutional—Policy and governance, such as coordination or merging government agencies; usually the most difficult to integrate and takes the longest

While these four dimensions of integration are likely necessary, users are also part of the system, and focusing only on the supply side can lead to project selection that does not fully fit needs.

Legislation and policy documents often narrow the focus to a specific mode, for example, transit. As a case in point, SPUR, a Bay Area nonprofit that works on public policy issues, has proposed changes to transit networks, operations, and governance to deliver a seamless transit service that functions as a single rational network. SPUR's advocacy work implies that seamlessness for the user would be the result of a comprehensively planned and well-integrated transit system (Tolkoff, 2021). While there is considerable support for these moves, there also are recognized institutional issues that are still to be tackled, including competition for leadership and trust in various organizations' ability to perform the tasks

sought. The ability to fill gaps in the system and pay for its longer-term operation are also continuing unresolved matters of concern.

California Complete Streets legislation and policy directives are another instructive example. In the case of complete streets, the integration effort covers multiple modes but is sometimes more directed at specific links and nodes than at the network overall. In addition, the interventions to date have not fully tackled the institutional dimension. While Caltrans directives speak in favor of complete streets, and state legislation calls for complete streets to be included in city and county General Plans, there remain ongoing disputes over organizational authority (for instance, who has final say over bikeway design and lane widths and which permits are needed). In addition, conflicts over policy choices persist without clear processes for conflict resolution (for example, whether a state-owned arterial that is also a shopping street should be designed and operated as a "freeway reliever" or alternate route for travel during congested periods, or rebuilt for slower speeds, wide sidewalks, bike lanes, and amenities, such as street trees, outdoor seating for restaurants, and mid-street loading lanes for delivery vehicles). These examples illustrate that integration along a few dimensions can produce valuable steps forward, but other implementation factors can impede progress.

An even broader position on integrated planning is taken in such legislation as SB 375's (Steinberg, 2008) requirements for sustainable communities strategies, which aim to combine land use and transportation plans. Deakin (2019), in an edited book that looks in part on the successes and failures in implementing SB 375, notes that it is not just transportation plans but transportation, land use, and environmental planning that need to be integrated, arguing that accomplishing this will require closer attention to institutional design and to empowering participants in the process to contribute to the transition to new planning paradigms.

3. Analysis of the California Transportation Plan 2050

In this section, we turn to an analysis of the state's CTP 2050. We summarize the relevant sections in the plan and provide brief comments.

California has mandated numerous plans affecting different elements of the transportation system in addition to the CTP and the modal plans. The CTP acknowledges the complex ecosystem of statewide plans that intersect with transportation (Figure 1). A notable feature of this set of plans is that a key mode is missing from the list of modal plans: There is no separate modal plan for streets and highways. Of course, highway topics are intertwined with other modal plans, because streets and highways are the links on which many transit vehicles, bicycles, freight carriers, and pedestrians travel, and they provide much of the access to airports and rail services (as well as to ports and waterways; another transportation mode for which a separate modal plan does not exist). It is also the case that several of the planning resources listed in Figure 1 deal with highways, especially those listed under safety and operations. Still, the omission of a highway plan leaves it to the CTP to pull together the policies and priorities that apply to this important and sometimes controversial motor vehicle highway system.

CTP 2050 Overview

The 154-page CTP 2050 contains a 10-page Executive Summary; 58 pages of background material that describe the state's transportation systems and some of the challenges and opportunities they present; a 12-page third chapter on policies, objectives, and performance measures, some of which are required by federal law and regulation; a 21-page chapter that describes the scenarios tested, assumptions made, and modeling results that informed the plan; and a final chapter with 28 pages of recommendations and 2 more pages on next steps.

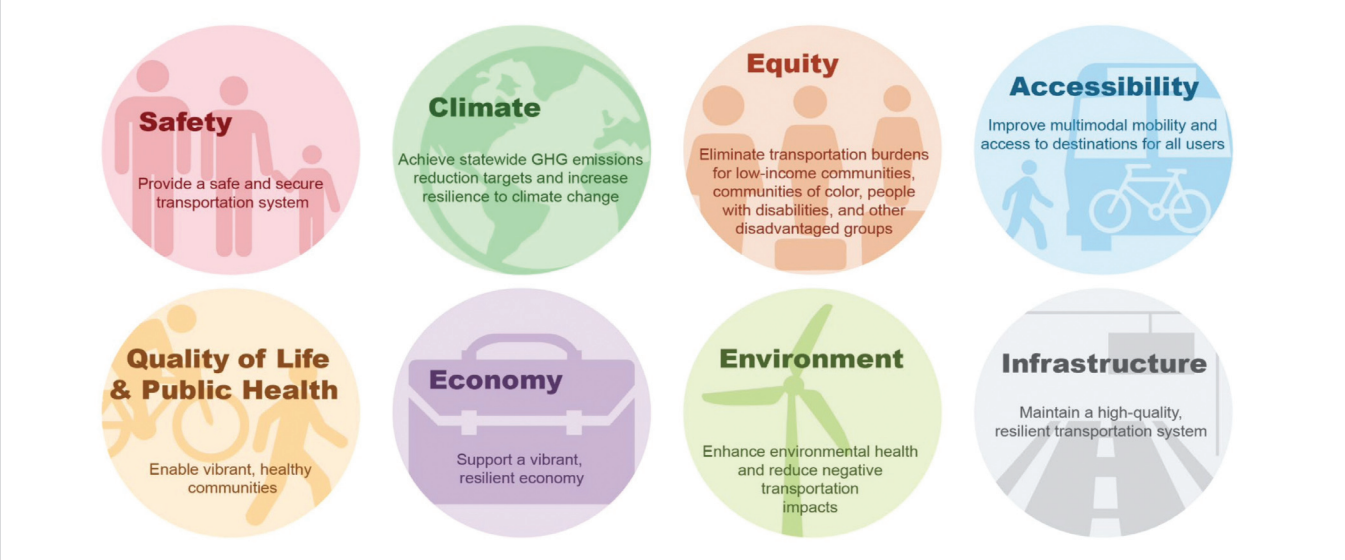
CTP 2050 is grounded on an assessment of current conditions and projections for change over the 30-year planning horizon. Noting that California is projected to add six million people over the next several decades, the plan is positioned as a step to meet the transportation needs of the state's growing and increasingly diverse population and economy. The plan acknowledges transportation's role in economic opportunity, environmental quality, health, and quality of life. It also acknowledges problems that require particular attention. Written during the COVID-19 pandemic, which disrupted nearly every aspect of transportation and the economy, and at a time when people were taking to the streets to protest widespread and systemic racial injustice, the plan makes a commitment to address the pandemic's impacts as well as adverse impacts and disparities disproportionately affecting people of color. The plan also pledges to support California's firm commitment to combatting climate change.

The plan states its overall vision as follows:

> "California's safe, resilient, and universally accessible transportation system supports vibrant communities, advances racial and economic justice, and improves public and environmental health."

To make that vision a reality, the plan outlines goals (Figure 2), objectives, strategies, and actions to be taken in the near term and over a longer period. For each goal, two or more objectives are listed, along with performance measures.

Figure 2: CTP 2050 goals (Caltrans 2021a, p. 5)



A scenario analysis was used to inform the plan's development and test the performance of various packages of strategies. Scenarios included a baseline scenario that assumed plans in place would be implemented, a scenario focusing on land use, a scenario focusing on transportation strategies, and a combined package of land use and transportation strategies. The results of the scenario analysis showed that the strongest performance came from the combined package of strategies.

Based on the analysis and in consultation with other agencies and stakeholders, 14 recommendations were developed, each of which has many action items that elaborate intent. The 14 recommendations are:

1. Expand access to safe and convenient active transportation options
2. Improve transit, rail, and shared mobility options
3. Expand remote access to jobs, goods, services, and education
4. Advance transportation equity
5. Enhance transportation system resiliency
6. Enhance transportation safety and security
7. Improve goods movement systems and infrastructure
8 Advance zero-emissions vehicle (ZEV) technology and supportive infrastructure
9. Manage the adoption of connected and autonomous vehicles
10. Price roadways to improve the efficiency of auto travel
11. Encourage efficient land use
12. Expand protection of natural resources and ecosystems
13. Strategically invest in state of good repair improvements
14. Seek sustainable, long-term transportation funding mechanisms

The action items include current actions that are to be continued as well as new initiatives.

The plan is supplemented by four stand-alone documents that elaborate on the strategies considered, the analysis conducted, the planning process, funding options, and implementation strategies. Of these four, the financing element and the implementation element are the most salient. The financing element is in draft form, and the implementation element is still under development as of the time of this writing (mid-December 2021). As currently stated, the implementation element will:

1. Identify short (5-year), mid, and long-term implementation actions, each with agency leads, process expectations, and anticipated outcomes.
2. Provide details regarding implementation of new and continuing actions, specifying the lead agency and other parties responsible for implementation of each action, a timeframe for completion and key milestones, and the resources needed to support implementation.
3. Identify coordinated actions with other state agencies to maximize implementation potential.
4. Identify initial financial needs and sources for short-term implementation actions.
5 Identify statutory changes that may be needed to implement the plan.
6. Create a process for monitoring travel, economic, demographic, and other conditions, that identifies potential indicators of recovery and long-term structural change that could support refinement of the new and continuing actions.
7. Provide guidance for integration of the CTP with Caltrans modal plans and regional planning efforts, highlighting specific CTP goals, objectives, performance measures, and strategies that are relevant to each modal plan.

8. Provide guidance for integration of the CTP into State transportation policies related to topics like systems planning, corridor planning, project development, design, project delivery, project prioritization, and programming.
9. Define strategies for ongoing coordination with partners and engagement with the public during plan implementation, including a steering committee to coordinate overall implementation activities, as well as working groups for specific actions.
10. Define strategies for coordination within Caltrans divisions, offices, and districts, to link the CTP vision and goals to a wide range of agency initiatives.
11. Develop an ongoing performance monitoring process that reports progress toward all CTP objectives, including both federally required and state-specific.

It is important to note the plan's focus and intent—what it sets out to do and what it does not do. As the CTP Executive Summary (p. 11) states, "The CTP does not contain projects, but policies and strategies required to close the gap between what the regional transportation plans (RTP) aim to achieve and how much more is required to meet 2050 goals." In addition, while the plan draws on the state's modal plans and the RTPs, it does not amend them: "The CTP will inform the next round of modal plans," but "does not attempt to modify or prioritize project spending at the regional level" (which is justified in the text on the grounds that the CTP, by law, must remain fiscally unconstrained). Instead, the plan refers to the implementation element as giving direction: "To aid Caltrans and our partners at the regional and local level in advancing the CTP recommendations, CTP 2050 includes an Implementation Element, which defines how implementation will be conducted over the lifetime of the CTP 2050."

CTP 2050's Description of California's Transportation System: Current Conditions and Opportunities

The CTP section entitled "Our Multimodal System" (pp. 41–68) addresses each mode separately. It is clear that the CTP considers roadways, seaports, bridges, active transportation, airports, transit, freight, and international ports of entry as parts of the multimodal transportation system. It is less clear how these modes fit together into an integrated system. Although the preamble asserts that the "integrated system's value is far greater than the sum of its parts," the ways that the modes could complement each other or potentially could conflict, with a few notable exceptions, are given little explicit attention.

Streets and Highways

In the section on the state's streets and highways, CTP 2050 states that "California's roadways are the backbone of our multimodal transportation system" and discusses their importance to passenger and freight movements. The plan asserts the need for the state to maintain both the 51,000 lane miles of the State Highway System and other local and regional roadways, all of which are "critical to [California's] communities and economy" (Caltrans 2021a, p. 43).

The text calls out complete streets and multimodal corridor plans as examples of integrated multimodalism, noting that "... local, state, and regional agencies are increasingly taking a holistic approach to transportation planning, adopting Complete Streets plans and multimodal corridor plans to ensure that infrastructure is seamlessly integrated, well-connected, and supports all modes and users" (Caltrans 2021a, p. 42). However, the section does not elaborate on streets' use by buses, bikes, pedestrians, and micromobility modes, such as scooters, nor does it give much attention to the issues of priority and potential conflicts that can arise in accommodating a variety of users. Nor does the text discuss the relationship of streets to economic development activities, the housing crisis, and overall growth patterns, although land use and housing in particular are noted as related plans.

Transit and Rail

Integrated transit systems are seen as a major way forward in the transit and rail section of CTP 2050 (Caltrans 2021a, pp. 46–48, 67), which also proposes intermodal integration with respect to access and street and highway transit treatments. Noting that the downturn in transit ridership during the COVID-19 pandemic had been preceded by earlier transit declines in much of the state, the discussion points to "modal connectivity barriers" (including not being physically and logistically well-connected, barriers to use, and cost) as major challenges, along with transit service frequency and travel times.

Major opportunities for multimodal integration and ridership recovery identified in this section include:

- Seamless integration of transit modes, routing, booking, and payment (as being explored through Cal-ITP) to reduce the uncertainty of end-to-end transit travel and improve convenience
- Interlining connected routes between transit, traditional rail, and high-speed rail
- Dedicated right-of-way for transit vehicles (for example, bus rapid transit)
- Transit ITS, such as transit signal priority, automatic passenger counters, and real-time traveler information systems
- First-last mile investments, including mobility as a service (MaaS) connections to traditional bus and rail transit systems
- Transit-oriented development (TOD)

The section also posits that the development of high-speed rail offers opportunities for future growth, especially with seamless connections to regional rail system. Oddly, the section calls out "the quality and connectedness of first-last mile infrastructure such as sidewalks and bike lanes" as one of the factors leading to drops in transit use pre-pandemic, but it does not list their improvement as an opportunity, perhaps subsuming that action under TOD or leaving it to the active transportation section.

Active Transportation

Integrated multimodal transportation comes out strongly in the section on active transportation (walking, biking, micromobility modes). CTP 2050 emphasizes the importance of not having gaps in connectivity in active transportation corridors and discusses complete streets. It identifies the Caltrans Deputy Directive 64-R2 to implement complete streets, defined as "a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility," as a way forward. It also lists e-bikes and shared, dockless mobility as modal options under active transportation and calls for further study of their statewide expansion (Caltrans 2021a, p. 106; Caltrans 2021a, pp. 49–52).

Aviation

CTP 2050 considers air travel to be an "increasingly vital elemen[t] of the state's multimodal transportation system," and states that "California's Aviation System Plan is focused on enhancing future connectivity between air travel and other modes, improving airport access in small and rural communities" (Caltrans 2021a, p. 53). While the plan recognizes that there are a variety of airports in the state and notes that some might face capacity problems, it does not specifically discuss the role of other modes as alternatives or supplements, other than one line identifying an opportunity: shifting short-haul air travel within the state to high-speed rail. However, the implications for airports of such a shift are not discussed.

Freight and Urban Goods Movement

CTP 2050 addresses issues and opportunities in trucking, rail, and ports and waterways as part of the discussion of goods movement; air freight is also a prominent element of the aviation section. The text acknowledges interdependencies as well as competition among the various freight modes and facilities (for example, identifying bottlenecks and lack of truck parking along highways as a problem truckers face, and noting the potential for competition as well as cooperation between trucks and rail). The goods movement section also includes a discussion of pollution from current freight modes and the equity issues this raises. It refers to proposals in the California Freight Management Plan (CFMP) and Sustainable Freight Action Plan that identify new technologies (vehicles, fuels, operations) for trucks, rail, and aircraft as opportunities for improvement. Port access reliability; border efficiency; interstate and intrastate freight movement and resiliency; and sustainability and innovations are identified as key themes. Opportunities to improve freight transport focus heavily on new technologies: zero-emission trucks; autonomous trucking and platooning; advances in freight intelligent transportation systems (ITS); and alternative last-mile deliveries, such as drones and other automated delivery technologies. Tthe discussion also mentioned bike couriers as a method for reducing truck traffic on local roads.

Evaluating Alternatives: Scenario Modeling

Having provided a status report on the transportation modes in the state, CTP 2050 presents its baseline forecast for 2050, which uses the socioeconomic forecasts adopted by the MPOs (which show higher growth than is forecasted by the state Department of Finance) and further assumes implementation of the anticipated transportation system changes from Caltrans' six modal plans, MPOs' RTPs, the High-Speed Rail Business Plan, and the California Air Resources Board's (CARB) Climate Change Scoping Plan. The modeling results show almost no change in mode choice (about a 1 percent increase in transit, cycling, and walking) and little change in vehicle miles traveled (VMT) per capita by 2050. The reasons for this inertia are not discussed in any detail. Population growth is forecasted to increase VMT and congestion, and the baseline forecast would result in worsening problems absent additional interventions. Mobile source GHG emissions are expected to decline substantially by 2050 due to more widespread adoption of electric and fuel-efficient vehicle technologies, as mandated by CARB.

The plan then turns to a discussion of technological advances and their likely impact on transportation. CTP 2050 posits that advances in the technology of shared mobility, together with the development and deployment of connected and autonomous electric vehicles, can further help move the state toward its CTP goals. CTP 2050 also hopes that better "modeling, simulation, and data collection and monitoring tools can help manage multimodal assets more efficiently."

In exploring options for the future, the participants in the CTP planning process considered a vast array of ways to improve performance. Figure 3 shows the number of strategies considered for each goal of the plan—a total of 287 strategies. The strategies were combined into packages to create three scenarios in addition to the baseline, one emphasizing transportation, another emphasizing land use, and a combined strategy.

In addition to assuming in its scenario modeling that the technological advances would become on-the-ground realities, the scenario analysis assumed that HOVs would be 3+, that transit would be free and its frequency and capacity doubled, that future population and employment growth would be concentrated in the state's densest centers, that freight deliveries by truck would decline by 50 percent, that cordon pricing would be implemented around the state's largest cities, and that vehicle operating costs would increase by 50 percent (but not for low-income households). With these assumptions, the combined scenario showed a reduction in VMT by about 26 percent.

Figure 3. Number of strategies considered for each goal

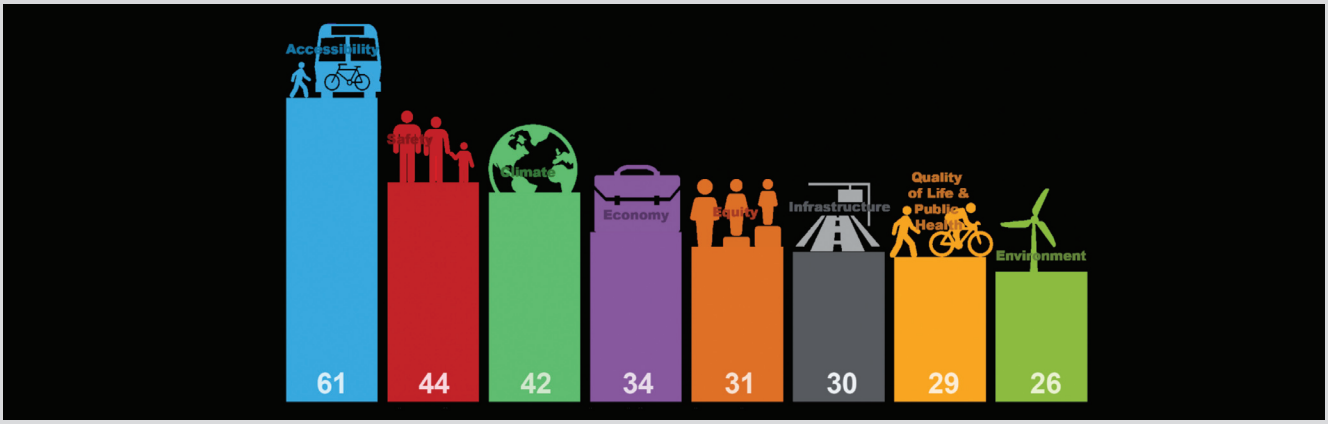
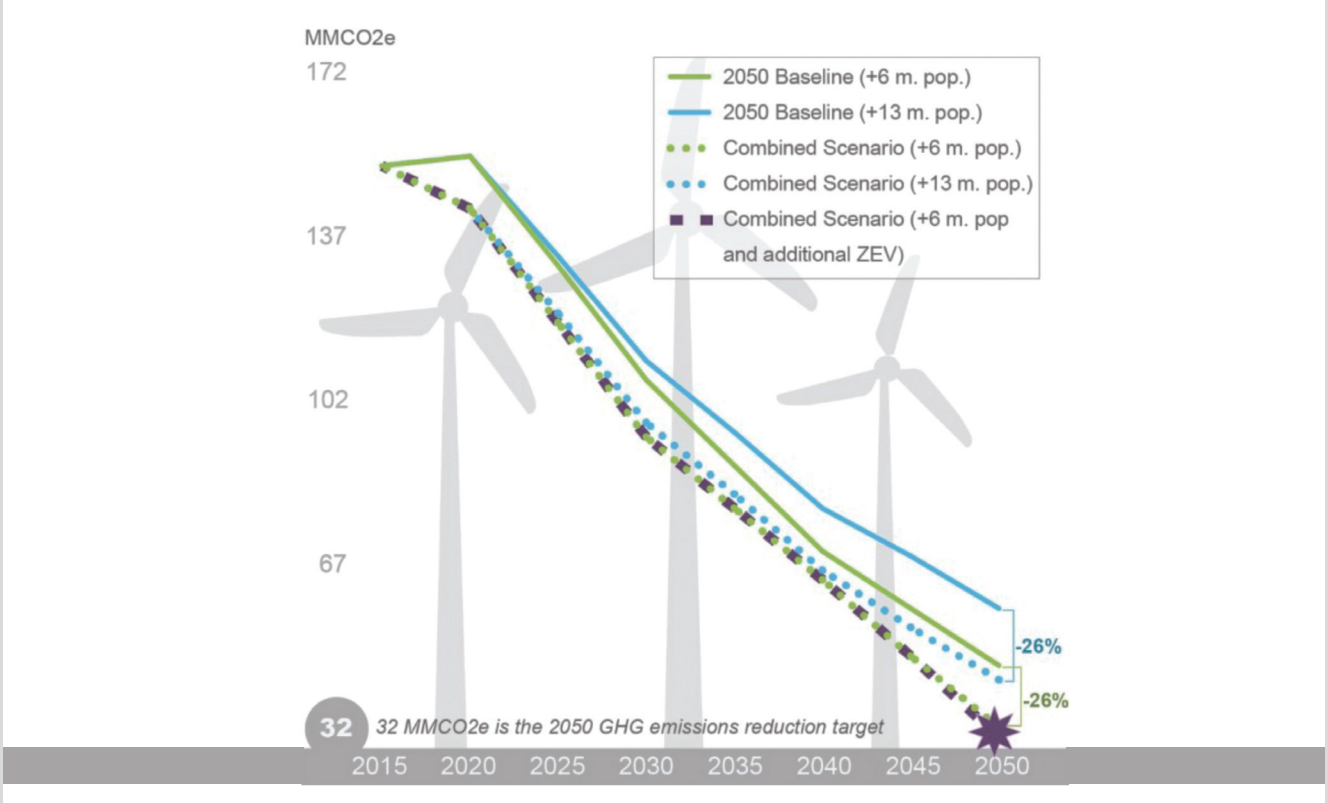


Figure 4 shows the CO_2 reductions that could occur from the combined scenario under two population forecasts: the higher one from regional planning agencies' assumptions, and the lower one from the state Department of Finance. As the graph indicates, under the combined scenario, and with all current RTPs and state plans implemented, additional ZEV implementation would still be needed to achieve the mandated emissions reductions by 2050 (CTP, p. 94).

Figure 4. Emissions reductions from the baseline for combined scenario and alternate population assumptions



Relation to Regional Plans

In addition to stating that it builds on but does not aim to change RTPs and that it has modeled them as inputs to its scenario analyses, the CTP 2050 includes a brief overview of the state's RTPs and Sustainable Communities Strategies (SCS), including a summary of the recent priorities from these regional plans. It notes that the plans list multiple modes, including transit and active transportation, as priorities for investments within each region. It does not examine whether the RTPs and SCSs treat the different modes as an integrated system (Caltrans 2021a, p. 45).

CTP 2050 modeled capacity increases that the RTPs include, but also noted that such increases might work against state VMT and emission reduction goals: "The 2050 Baseline scenario assumes regionally-adopted roadway capacity enhancements identified in RTP/SCSs are completed by 2050, although these are likely to increase VMT and GHG emissions from current levels and could make achieving State GHG reduction targets more difficult." (CTP, p. 94).

CTP 2050 Goals That Promote Multimodal Integration

The analyses in the CTP 2050 makes it clear that VMT reduction and emissions reduction are being given high priority. However, it is noteworthy that none of the eight goals (Figure 2) has an explicit orientation toward the multimodal integration sought in AB 285 (Caltrans 2021a, pp. 5, 71). However, four of the goals, Equity, Accessibility, Quality of Life & Public Health, and Infrastructure, do accommodate and promote multimodal integration to some extent, as detailed below.

Equity and Multimodal Integration

The CTP specifies "improving access to a range of high-quality, safe, equal[,] and affordable mobility options within disadvantaged communities" to be one of its equity objectives. Note, however, that the focus is on access to mobility options, which may or may not produce equitable access to destinations (but see the next section on accessibility) (Caltrans 2021a, p. 74).

Accessibility and Multimodal Integration

The accessibility goals are the ones that are most directly tied to multimodal integration. In fact, the CTP's overarching goal for accessibility is to "improve multimodal mobility and access to destinations for all users." This goal is further divided into four objectives (Caltrans 2021a, p. 75):

- Increase access to destinations via both transportation system enhancements and compact, diverse land uses that support multiple modes.
- Increase the competitiveness of transit, shared mobility, and active transportation options to address the current auto-oriented nature of our transportation system, expanding access to airports, transit, first- and last-mile options, biking and walking, and emerging forms of on-demand, shared and dockless mobility, in a way that is safe, affordable, and accessible to people of all ages, incomes, and abilities.
- Provide integrated and seamless travel connections through multiple modes of transportation. Gaps in the existing transportation network are also to be addressed, so as to improve the convenience and reliability of travel throughout the state.
- Optimize system performance across all modes of travel.

Quality of Life, Public Health, and Multimodal Integration

An objective under the quality of life and public health goal is to "expand access to healthy transportation options" and "reduce dependence on the single-occupant vehicle and ensure that people have access to safe and healthy travel options such as biking, walking, and transit" (Caltrans 2021a, p. 76).

Infrastructure and Multimodal Integration

An infrastructure objective is to "preserve and maintain existing multimodal transportation assets." The plan acknowledges the negative impacts of "decades of prioritizing auto-oriented infrastructure" and highway expansion, although it does not explicitly discuss strategies that would mend past damage. (This could include such strategies as freeway replacement with boulevards or parkways, and improving transit, pedestrian and bicycle access across railroads and freeways; such strategies have been implemented previously in California.) CTP 2050 also suggests (but does not mandate explicitly as a goal) "investing in rail" as a better alternative (Caltrans 2021a, pp. 79–80).

In sum, the goals of the CTP make room for multimodal integration and add objectives intended to guide priorities, but integrated multimodal planning is not a specific goal or objective.

Benefits and Metrics

It is worth noting that the CTP 2050 must respond to federal regulations as well as state laws and guidance, and the federal performance measures overlap with but do not entirely match those of the state. Federal performance measures address highway safety, pavement and bridge condition, system performance, transit safety, and transit asset management. Additional performance measures could be added as a result of the passage of the federal Bipartisan Infrastructure Bill in late 2021.

The CTP summarizes the plan benefits in terms of VMT and GHG reductions, economic growth, an increase in non-auto mode share, and a decrease in total vehicle-hours of delay. These are model outputs from the scenarios (packages of measures) tested as part of the plan development, described earlier. Other federally required performance measures and state metrics are described qualitatively or in separate documents.

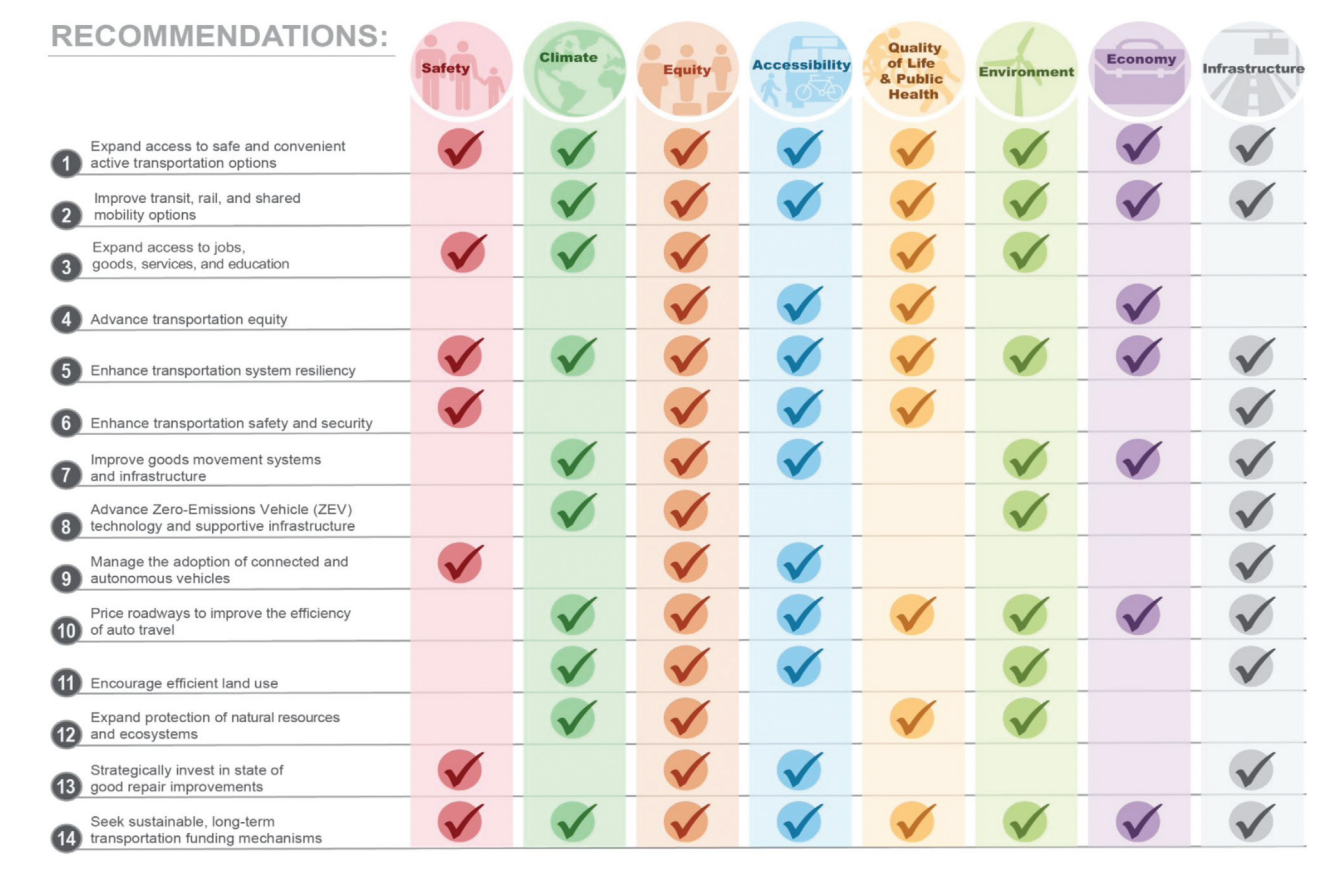
There is not much discussion of the direct benefits that the plan might bring to the users of the transportation system in California, nor of the expected safety or equity outcomes, or of the implications for infrastructure quality and reliability. The relevant performance measures listed separately under each goal mostly focus on access, cost to users, and mode share (Caltrans 2021a, pp. 7, 62–66, 72–80).

CTP 2050 Recommendations

The current list of 14 recommendations, as shown in Figure 5, range from very high level and abstract (such as advance transportation equity) to relatively specific (such as price roadways to improve efficiency). Neither multimodality nor system integration are explicitly included in the 14 recommendations (Caltrans 2021a, p. 104), although in the text and in action items under some of the recommendations, multimodal integration is reflected, particularly in the discussion of complete streets and proposed linkages between transit and other forms of shared mobility.

The recommendations also do not point to an actor responsible for their accomplishment, although this is promised in the still-to-be-promulgated implementation element.

Figure 5. CTP 2050 goals that each recommendation supports (Caltrans 2021, p. 104)



Highlighted Actions

The CTP's many action items include several that speak to integration and multimodalism, focusing on complete streets and active transportation, and rail, transit, and shared mobility.

Active Transportation and Complete Streets

Several action items are listed under the recommendation to "expand access to [. . .] active transportation." The text calls for actions to "revise permitting and standards" so that local and regional agencies can more easily implement "innovative transportation projects, such as "Slow Streets" programs," to "prioritize projects that include complete streets elements," and to "require multimodal project components and Complete Streets upgrades" whenever feasible during routine work (Caltrans 2021a, p. 105). These appear to be directed to Caltrans, because Caltrans is responsible for many permits and projects on or affecting the State Highway System.

The recommendation to "enhance transportation safety and security" also asks the state to "expand funding for implementation of safety plans at the state, local, and regional level, including Complete Streets, Safe Routes to School, and Vision Zero plans," and to "promote infrastructure design that enhances safety for vulnerable roadway users" (such as bicyclists, pedestrians, and people with disabilities). These safety actions include measures such as "reducing driving speeds" and "reducing the occurrence of distracted and impaired driving" (Caltrans 2021a, pp. 114–15).

The recommendation for instituting road pricing also calls for "invest[ment] in non-auto travel options along corridors subject to roadway pricing," but does not explain which corridors are in fact subject to it (Caltrans 2021a, pp. 106–07, 121–23).

Rail, Transit and Shared Mobility

The recommendation to improve transit, rail, and shared mobility options specifies, among other action items, the development of a statewide strategy for expansion of shared mobility options, the development of "statewide standards for fare integration, trip planning, and data reporting" via the California Integrated Travel Program (Cal-ITP), "facilitat[ing] coordination and information sharing between transit agencies, as well as between transit agencies and private shared-mobility providers," and supporting bus rapid transit and bus-only lanes.

Implementation Element

The CTP's implementation element was not included in the document released in February 2021 but instead is to be developed after adoption of the CTP 2050 (making it unclear whether the implementation element is a separate document or part of the plan).The implementation element is proposed to be financially constrained and to guide the integration of the CTP with the modal plans, regional plans, and state transportation policies. It also is intended to identify and provide guidance for coordination strategies and actions, both within Caltrans and between Caltrans and other state agencies and partners (Caltrans 2021a, pp. 8, 9, 130). However, it is not clear that there is a legal mandate for other plans to comply with the CTP.

4. Modal Plans

A brief review of California's interregional, transit, rail, and bicycle and pedestrian modal plans is presented in this section. Three of these plans actually predate the CTP 2050, and the transit plan reviewed here is an unreleased draft (see Table 1). These plans often refer back to the CTP 2040, the final version of which was published in June 2016. Goals changed between CTP 2040 and CTP 2050, so gaps in compliance with current goals might be a matter of timing rather than intent. It also should be noted that the CTP, regional plans, and some of the modal plans are required by federal law as a condition of receiving federal aid, and plans must address criteria set forth in federal law and comply with federal rule-making on transportation planning and programming. (See www.transportation.gov for an overview of federal laws and policies and links to relevant provisions of the Code of Federal Regulations.)

A surprising feature of the set of modal plans that the state has prepared is that one is missing: There is no plan specifically and systematically addressing streets and highways or related auto infrastructure, such as parking. Several of the supplementary plans shown in Figure 1 do lay out intentions for the State Highway System, including the asset management plan, highway operations plan, safety plan, and infrastructure priorities plan, but the absence of an overarching strategy for streets and highways creates a gap in the framework of California transportation plans.

The Climate Action Plan for Transportation Investments (CAPTI), released shortly after CTP 2050, lays out priorities for the allocation of funds over which the state has discretion. It is a positive response to the need for priority setting and implementation policy, but it is partial inasmuch as it does not cover the full set of policies or funds.

2021 Interregional Transportation Strategic Plan

The ITSP "aligns with the Climate Action Plan for Transportation Infrastructure, California Transportation Plan 2050, Caltrans Freight Mobility Plan, and the Caltrans State Rail Plan," and sets priorities and criteria for interregional transportation investments. Responding to federal programs, the ITSP focuses on rail and highway connections within 12 Strategic Interregional Corridors in the state (Figure 6), but also acknowledges the importance of active transportation modes as feeders to the interregional system for first-last mile connections. While the plan has a heavy focus on freight, its figures present each corridor as a multimodal system consisting of highways, intercity rail, and high-speed rail.

The ITSP lists integration of regional, intercity, and high-speed rail as a priority for most rail corridors and calls for an integrated express bus network (together with the San Francisco–Larkspur ferry). However, the detailed recommendations still treat highways and rail as two separate systems, rather than as an integrated whole. The plan lists improvements and strategies for highways and rail separately, without considering the interactions between the two modes, such as how improvements to one mode might induce a mode shift from the other mode (Caltrans 2021b).

Figure 6. ITSP Strategic Interregional Corridors (Caltrans 2021b, p. 12)

2017 Statewide Transit Strategic Plan

The STSP, an unreleased draft document written by the University of California, Los Angeles Institute for Transportation Studies, recommends "seamless public mobility for a thriving California" to be the vision for the future of California, with "seamless" explained as "multimodal services [that] are well-integrated, effortless, safe, and reliable."

The STSP separates its "vision for transit's role" into different geographies within the state, ranging from urban cores to rural settlements, recognizing different markets for services. The plan calls for the integration of transit with active transportation in urban areas, and the creation of "Town Center mobility hubs" in suburban communities for "seamless connections between public and private mobility services."

Regarding multimodal integration, the STSP calls for a "seamless, safe, and affordable multimodal experience for transit passengers." This goal involves "tak[ing] a user-centric approach to improving the passenger experience" via technology, statewide ticketing and accounts systems, and "support[ing] Regional Comprehensive Operational Analyses (RCOAs)" for coordinated, seamless, integrated mobility. It also involves restructuring and simplifying fares under guidance and discount eligibility verification at the state level.

Certain items under the other three goals also touch on multimodal integration, including calling for "better regional planning and coordination," transit agencies to "transition from transit operator to mobility manager," statewide data platforms for "multi-agency collaboration," and for the state to "support communities' transition to complete streets."

The draft STSP's recommendations are divided into the sections "Transformative Changes" and "Making Transit Excellent." With respect to multimodal integration, the Transformative Changes section lists transit-first (including transit lanes) and multimodal complete streets, mobility management ("a balanced approach to embracing innovation while recognizing a transit agency's public-service mission"), and MaaS (including a shift toward shared mobility and an integrated statewide ticketing system and fare restructuring).

The Making Transit Excellent section recommends a seamless, multimodal experience for passengers. However, "seamless," as explicitly called out here, encompasses only fare and ticketing integration. Additionally, the draft STSP recommends "enhanc[ing] multimodal connections to urban rail" and calls for an update to "urban passenger-rail crossing guidelines to promote transit priority and pedestrian and cyclist connections to transit stations"—important issues but ones that would seem to pale in comparison to gaps in the transit network. The document proposes that gaps be addressed through regional comprehensive operational analyses, which presumably could get to the issue of competitive services (travel times, hours of operation, bottlenecks in the road network, and so on).

The draft STSP deals with several important institutional issues. It recommends "prioritiz[ing] agency coordination over consolidation." It advises that "Caltrans should provide statewide web-based platforms for data sharing and interagency service planning and coordination" and suggests that "the Legislature should identify or establish regional authorities to facilitate coordination among transit agencies" and that "the State and regional authorities should increase regional coordination and oversight in areas with multiple transit operators" ("particularly with regard to regional transit planning and policy, monitoring and coordinating infrastructure investments, scheduling, and providing information for riders"). The draft plan also advises that transit agencies should standardize policies and operations to "leverage scale efficiencies" and "improve legibility for riders" (Caltrans Division of Rail and Mass Transportation and UCLA Institute of Transportation Studies, 2017). Unfortunately, because the draft was never released in final form, it is not possible to say whether any of its recommendations are considered state policy.

2018 California State Rail Plan

The CSRP addresses the high-speed, intercity, and regional rail systems in California. It places a high level of importance on multimodal integration throughout the plan, envisions "customer-friendly connections" and "statewide integrated ticketing and trip planning" for the California rail network, and commits to "an integrated, state-of-the-art rail system" in California by 2040, with "a unified statewide rail network" that "connects passenger rail to other transportation modes, and supports smart mobility."

The CSRP acknowledges the current barriers in connecting between rail systems, and its 2040 Passenger Rail Vision (2040 Vision) "for an Integrated Statewide Rail Network" imagines smooth, quick, and easy transfers and connections at hubs between trains and to other modes, including first-last mile investments for active transportation, which would "extend the significant benefits of [. . .] multimodal connectivity to residents across the state." The vision also calls for a statewide trip planning and ticketing portal, a common fare system for integrated ticketing, and "pulsed" scheduling ("a transportation network with trains operating on coordinated schedules that repeat regularly"). Beyond the rail system, the CSRP also considers long-distance buses and the San Francisco–Larkspur ferry to fill in the gaps in the rail system and spells out the type of rail service or mode (high-speed rail, intercity, regional, Amtrak long-distance, or express buses) appropriate for each market, as illustrated in Figure 7. It projects that the 2040 Vision will divert 88 million daily passenger miles from highways to rail, adding 92 million daily passenger miles onto rail. These numbers, though, pale in comparison to the 917 million VMT in California in 2015 (Caltrans 2021a, p. 44).

The CSRP also calls for an integrated approach to investments, targeting the filling of network gaps and removing bottlenecks as a priority in a "phased delivery of integrated services," avoiding duplicative or stranded investments. With regard to funding, it acknowledges that the 2040 Vision requires both public-public and public-private active partnerships and coordination both within rail systems and with non-rail connecting services.

Many of the CSRP's proposed improvements and investments are tied to system integration. The plan states that, in an integrated system, improvements in one segment of the rail system will give direct and indirect benefits to service in surrounding areas, and that improved systemwide connectivity will "expand the efficiency and reach of the rail and transit networks, as well as the entire transportation system." The plan's recommendations are organized around nine geographic service areas or regions (Figure 7) and are "based on market analysis, ridership forecasts, and corridor-based planning principles." Service gaps are identified as potential areas for the rail system to expand or provide a higher level of service than currently available. The plan proposes further studies and possible capital investments to fill these gaps and expand service.

Looking ahead, the CSRP calls for more research on rail governance and service integration in a statewide inter-agency service integration plan, evaluating how best to leverage collaboration among existing institutions "without reinventing organizational structures and creating cumbersome institutions" (Caltrans 2018). Another need that could be addressed in greater detail is the conflict between freight and passenger operations, which is a major impediment to passenger service in several key corridors in California.

Figure 7: CSRP 2040 integration vision rail map (Caltrans 2018, p. 133)

Toward an Active California: State Bicycle & Pedestrian Plan (2018)

The Bicycle & Pedestrian Plan references the multimodal goals of the CTP 2040 and states that it is "an important element of a statewide goal to provide robust multimodal transportation options to everyone in California." Nonetheless, the plan mainly presents active transportation as a mode in itself, apart from other modes.

Within the Strategies and Implementation sections, the Bicycle & Pedestrian Plan contains recommendations for complete streets and thus touches on auto and roadway use and safety. The plan lays out several strategies concerning integration or multimodality under the Mobility objective (to increase active transportation use). It calls for a "comprehensive view of the existing network and gaps" and for Caltrans to help local, regional, and state agencies coordinate and "connect networks across jurisdictional boundaries, creating a seamless, integrated active transportation network." According to the Bicycle & Pedestrian Plan, this can be achieved through district-level planning, "increas[ing] state investment and encourag[ing] local and regional investments for complete bicycle and pedestrian networks," as well as by studying the opportunity for separated "bicycle highways" for regional and interregional travel (the planning for which would be carried out by regional agencies and Caltrans' Division of Transportation Planning), and promoting statewide and regional trails (though mostly oriented toward recreational uses).

The Bicycle & Pedestrian Plan recommends incorporating first-last mile planning for all transportation systems, including identifying bicycle parking needs at transit nodes. It also recommends the integration of bike share and transit fare systems and for the state to create a central database and "a standard for bicycle and pedestrian infrastructure and data." Moreover, it recommends that Caltrans "encourage local agencies to adopt traffic impact guidelines" and traffic analysis methods that consider active transportation and transit. Lastly, the plan recommends that Caltrans pursue internal (across divisions and project teams) and external partnerships to foster collaborations around active transportation planning, budgeting, and implementation, such that active transportation infrastructure can be incorporated into asset planning and management at all phases (Caltrans, 2017).

5. Assessment

Here we assess the gaps, strengths, and goals of the various Californian state transportation plans.

Plan Content

Much in the CTP 2050 and the modal plans reviewed here is inspirational. The plans state a vision and set forth goals, objectives and performance measures to achieve it, consistent with state law, executive orders, and federal regulations. Most of the plans' assessments and recommendations appear to resonate with public concerns in California. Objectives and recommended actions that would move toward implementation—some more specific than others—are listed. Where the plan falls short is in concrete steps toward implementation.

Blurry Vision?

The plans for the most part present their visions in broad strokes, focusing on desired outcomes without going into detail about what physical network and institutional structure the state is aiming for in its integrated multimodal transportation system. For the CTP 2050, this is could be due to the fact that the CTP is not fiscally constrained and focuses mostly on policy rather than projects. Nevertheless, it should be possible for the CTP and the modal plans to discuss priorities and explain how performance criteria will be weighed in evaluating projects. It should also be possible to discuss the types of investments that should be given priority, given state goals and challenges, without specifying individual projects.

The state's modal plans vary in the extent to which they point to specific actions to be taken. The rail plan stands out as the plan that most emphasizes the importance of multimodal integration, recommending urban and regional rail connections and schedule coordination to intercity rail, and calling for links to express bus, ferry service, and local mobility options. While we did not review the freight plans in detail, the freight plan also points to the need to consider links between water transport, rail, and trucking and stands out among the plans in recognizing that modes compete with each other and that substitutions of one for another could be in the public interest.

None of the modal plans reviewed here present themselves as a break from previous plans and policies, although they do sometimes acknowledge a shift in priorities within their recommendations. A further complication in assessing the modal plans is that several of them were written before the current CTP.

Transportation planning processes are intended to be continuing, and we anticipate that the modal plans will all eventually be made consistent with the latest CTP and with one another. However, another weakness of the plans we reviewed here is that they do not make explicit what was implemented under the previous plan, how well it worked, what was not done or did not succeed, what changes in circumstances or in policy direction have emerged in the years since the previous plan was developed, and the extent to which previous proposals are still vital or must be replaced with new directions being taken.

Missing Topics

The topical coverage of the plans is also an issue. Much of the discussion in the plans is on network links and nodes— the constructed guideways and stations that are traditional public works. Less attention is given to operations, finance, or user-side elements of the transportation system.

AB 285 (Friedman, 2019) called for an assessment of the extent to which California's state and regional plans will shape a statewide, integrated, multimodal transportation system. However, the treatment of each mode separately does not easily reveal how integration would occur, and the plans present relatively few examples of coordination across modes— recognition that feeder services to trunk lines might be by a different mode is the one clear exception.

More often, integration is seen in the plans as occurring within various subcategories of a mode of transportation. This is a positive step forward but is not likely to be sufficient to create full integration across modes. Modal separation might reflect the reality of transportation funding, with earmarks for specific programs and projects discouraging a more-rounded consideration of multiple modes together, but it results in less impact than might otherwise be accomplished and runs the risk of missing opportunities and failing to deal with conflicts.

The Rail Plan is an example of modal integration that begins to stretch beyond its own boundaries. The plan puts an emphasis on integration not only across rail services of different types (intercity, regional, urban) but also identifies roles for other modes, including express bus services and ferries. The Rail Plan pays attention to user needs as well as markets for different types of service. As such, it is a good model for other modal plans to emulate.

As another example, the CTP 2050 highlights the Cal-ITP project, which aims to seamlessly link together different transit operators, create better connections at nodes, and overcome barriers to users by establishing statewide standards for fare integration, trip planning assistance, and data reporting and sharing. However, less attention is given to operations problems, such as buses getting stuck in traffic on local streets and arterials or to financing issues, such as high operating costs for suburban and off-peak services, given that these are major challenges for most transit operators. Better linking together transit networks and coordinating fares is a step forward but unlikely to overcome the deterrent of low levels of service (limited hours of operation, low service frequencies) that make transit use uncompetitive with driving for many trips.

Nor does the plan give much space to gaps in the transit system in the many places where population growth has outstripped investments in public transport options, or public transit options are missing altogether. Mobility as a service is identified briefly as potentially having a role to play in improving access to transit serving suburban areas and providing service when and where there currently is little or none, but the discussion is brief and general. It is not clear whether these issues are given lower priority because they are deemed to be less important than network connections or because they are the responsibility of local and regional agencies and the private sector rather than the state transportation agency.

There is also limited discussion of the linkages with land use, especially housing, and the role of transportation choices in shaping the location of growth and economic development. The CTP 2050 references MPOs' SCSs and their link with housing plans for the region and acknowledges that the amount and location of new development will directly impact the magnitude and distribution of travel. The scenarios modeled also examine land use. However, while the CTP notes that denser land use offers an opportunity to accommodate travel demand with transit, shared mobility, biking, walking, and other low-carbon modes, and it models land use scenarios, it also assumes that projects adding capacity would proceed regardless of their impact. The role of new capacity deserves more discussion both for its effects on VMT and emissions and for impacts on where housing will locate and where economic development will land. In addition, new capacity will eventually age and require maintenance funding, which currently is not budgeted as part of the project. These are contentious issues but ones that will require attention.

A third missing piece from the CTP and most modal plans is discussion of actual and potential conflicts among plan goals and other barriers to implementation and how to resolve them. The CTP 2050 mentions new capacity as potentially conflicting with VMT reduction and GHG reduction but does not state how it would address this conflict. (CAPTI begins to do so.) Barriers to implementation could include a lack of funding for nonmotorized transport projects or for pilot projects on land use–transportation integration. Identifying such conflicts and barriers and proposing ways to address them would add realism to the plans and identify areas needing further study or policy attention.

Implementation

The CTP 2050's treatment of implementation as a separate activity that can be dealt with later in a stand-alone document adds to the sense of a plan that is not fully intended to provide direction or relay a sense of urgency in meeting its goals. While the CTP states that it will be releasing an implementation element, its absence for the better part of a year since the CTP's publication also results in a significant delay in moving the plans forward into action. As noted earlier, the CAPTI document issued after the CTP 2050 is an exception, listing priorities and actions to be taken, but CAPTI is not a complete statement of implementation intentions.

Implementation raises issues of who has authority to act, as well as organizational capacity (human and other resources) to act and commit, deliver on objectives, relate to external stakeholder, adapt and self-renew, and stay relevant through learning and adjustment (ECDPM, n.d.). As discussed elsewhere, (for example, SGCC, 2014, and the history paper prepared for this project), state transportation agencies grew up as engineering organizations designed to build facilities efficiently, but today the assignments of responsibility are far broader, and cultural change has been difficult. This suggests that attention should be paid to these issues in the implementation element of the plan.

A key issue in implementation is that much of the responsibility for transportation plans, programs, and funding in California has been devolved to cities, counties, and regions. Although some aspects of transportation planning, programming, and finance depend on federal law, the state legislature controls the rule book to a significant extent and could modify the respective roles and responsibilities of agencies within the state to clarify who is expected to comply with state policies. This has happened to some degree with regard to regional plans (for example, the mandate for SCSs) and some state activities (such as the mandate for a state-run road pricing pilot), as well as in the land use and housing arena (the housing element mandate, zoning preemptions allowing higher densities and infill in single family areas).

Recommendations in a fully developed implementation plan could cover such issues as whether SCS implementation mandates could be a next step, or whether corridor planning could be pursued more vigorously in urban settings and expanded to integrate transportation, land use, environment, economic development and equity as a package.

Comments on federal, state, regional, and local roles are present in the CTP 2050, but are not organized to make it clear who has responsibility for what portions of the transportation system. The CTP 2050 states that its intent is to fill gaps after the regional plans (produced by MPOs) are implemented and not to mandate changes to those plans. It states that it intends to guide future state modal plans (for example, the state rail or transit plan) but not to redirect those modal plans prepared earlier. It states that it assumes all highway projects in the regional and state plans will be implemented even if they make it more difficult to achieve VMT and GHG reductions. This is a limited view of the state's role, and it limits the impact the state plans will have, but it may well be what the Legislature intends, given their assignments of programming authority to the MPOs, RTPAs, and counties, the reality of city, county, and special district control over transit, ports and airports, and private control over trucking, freight rail operations, and most freight lines.

The draft State Transit Plan offers a good example of explicitly naming the agencies that would be in charge of actions on recommendations. The Rail Plan gives concrete commitments with target dates. The CAPTI performs well on both fronts, including tables that explicitly list the programs impacted, lead agencies, other support agencies, and timeframes for each recommendation (CalSTA 2021). Other state transportation plans would do well to follow the example set by these three plans.

Prospects for Goal Achievement

The goals in the CTP 2050 for infrastructure, safety, accessibility, climate, environment, equity, economy, and quality of life and public health are backed up with more detailed objectives and performance measures, including federally mandated performance measures in the areas of federal safety, infrastructure (pavement and bridge condition), and system performance (mode shares). Recommendations and action items are also included in the plan. However, the generality of many of the recommendations means that they offer little specific guidance (for instance, one recommendation is "advance transportation equity"). Action items vary in their specificity; some are concrete ("revise permitting standards") whereas others remain general ("expand funding") and don't say which steps will be taken. Many suggest further studies, and a number focus on the need for more funding (but without hazarding an estimate of how much more funding would be needed to implement the plan).

Projections for the metrics and performance measures listed in the CTP 2050 are highly dependent on modeling assumptions and parameters, some of which encompass substantial uncertainty. While we acknowledge that the scenarios tested are not necessarily the actions to be taken, it is important to note that in the scenario analyses, the CARB's plans, policies, and regulations in its Climate Action Plan are assumed to be fully implemented. California does have strong motivation to implement the Climate Action Plan, as well as leverage over vehicle fuel efficiency and sales of EVs, but the federal government facilitates such policies, as the current administration appears to be doing, or can make such policies difficult to implement, as the previous administration's actions on emissions standards illustrated. Uncertainties about other assumptions made in the plans, such as the share of the workforce that will telecommute, could also put goal achievement at risk.

Technological change, including production and uptake of CAVs, is prominent in the CTP 2050's assumptions. On the freight side, autonomous trucking, platooning, and intelligent transportation systems are identified as ways to significantly improve freight operations and capacity, and zero-emission trucks would reduce emissions. Alternative last-mile delivery mechanisms, such as drones and other automated delivery technologies, are suggested as ways to reduce local truck traffic. While all these technologies are promising, the timing of their availability, their costs, and the rate of uptake are uncertain, and there are also issues of social acceptance, which could speed diffusion of the innovation or slow it.

Another factor that could significantly affect goal attainment is what regions and local governments do. The CTP 2050 relies on the state's many RTPs to establish much of the direction for the next 30 years. These plans are supposed to be fiscally constrained, but they too make numerous assumptions about technology, expanded transit services and bike and pedestrian infrastructure, road pricing, mobility innovations, and smart growth policies. Funding for the transit, bike, and pedestrian elements is in short supply, authority to implement road pricing is uncertain and, for some facilities, would depend on federal as well as state, regional, or local approval, and pricing and land use changes are controversial and might not win the support needed to proceed as proposed. Thus, like the policies in the CTP 2050, many of the RTP policies and priorities are aspirational and will be difficult to achieve absent additional funds and grants of authority. In addition, as the plan itself notes, continued capacity increases are likely to increase VMT and emissions and spread out development, but state policy is to assume that the county and regional capacity projects will proceed as planned and programmed.

Equity is prioritized in a series of state laws, many of which mandate increasing the benefits that state policies deliver to disadvantaged communities. Transportation policy also establishes a complex web of requirements aimed at providing geographic and taxpayer equity. In addition, geographic connectivity is an important way that integration is conceptualized for state action: The CTP emphasizes the importance of "connecting urban, rural, coastal, mountain, and inland regions into an integrated multimodal network," and many policies in the plan focus on making connections among various service providers—regional rail to intercity rail, micromobility to transit centers, and so on. It counts on RTPs for "strong local and regional leadership to advance social equity and environmental justice."

Social equity problems are acknowledged in the CTP and given priority for funding (as required by state law). However, several strategies for increasing social equity—better transit, improved pedestrian and bike access to destinations—have been supported by funds that are oversubscribed, and while it is possible to reprioritize certain categories of funds to cover the gap, having to do so might be controversial, making implementation more difficult. Other programs that aim to increase transportation equity on the private vehicle side, for example, by subsidizing EVs for low-income people, are not explicitly discussed, even though their implications for access and mobility as well as environmental impact and congestion could be substantial.

The CTP acknowledges disparities in access to transportation and the health and budgetary burdens that transportation places on communities of concern. However, the forward orientation of the plan makes it harder to discern whether redress of problems caused by past transportation decisions will also be a priority. In addition, while recognizing that access to affordable housing and good jobs are ways to improve accessibility, the plan largely relies on local and regional initiatives for these moves, which puts additional responsibility on those levels of government without necessarily increasing their authority for action or funding to support it.

From the state perspective, economic development is addressed mostly in terms of freight movements and jobs created by infrastructure construction. Because many of the state's freight corridors have been designated as part of the National Highway Freight Network, federal policy and regulations will have a say. Urban development strategies are also acknowledged to play a critical role in economic development, but actions are left largely to local and regional organizations and the private sector.

The discussion of planned content for the infrastructure element is encouraging, in the sense that many of the gaps in the plan could be covered. At the same time, the discussion notes that the regional forecasted investment needs over the next 20 years exceed $1 trillion and do not include contingencies for such things as retrofitting infrastructure to handle additional electric vehicles or connected vehicles. The magnitude of funding needed to implement the plan suggests that goal attainment could be hard to achieve.

To sum up, a major weak point of the plans is implementation. For the CTP, the mandate that it be fiscally unconstrained frees planners and stakeholders to imagine what they would like to do if money were no object, and this can help motivate an interest to increase funding so that the aspirations of the unconstrained vision can become realities. On the other hand, it is hard to hold anyone accountable for implementation of a plan that does not have to be realistic in terms of fiscal capacity.

Even the plans that are purportedly fiscally constrained pose implementation issues. They often assume funding availability, regulatory approvals, and public acceptance levels that are not at all certain. Regional plans' assumptions about expanded transit and road pricing are two examples of plan elements that could be very difficult to achieve. Another major issue is that the CTP and most regional plans assume that past commitments are givens, even when such commitments are likely to work against important state goals like air quality improvement, GHG reduction, and reduction of negative impacts on disadvantaged communities. CAPTI suggests an alternative approach, as do recent actions of some of the MPOs.

5. Recommendations

We offer recommendations that in our assessment would make California's state transportation plans more relevant, useful, and effective.

Identify priority goals and strategies for harmonizing all goals.

The CTP 2050 lists eight goals and 14 recommendations without prioritizing them. In fact, the CTP 2050 explicitly states that its recommendations are not listed in any order of priority (Caltrans 2021a, pp. 105–29). Yet legislative directives and executive orders appear to prioritize tackling climate change and addressing equity problems while achieving other goals as well. If this is a correct reading of legislative and executive intent, state plans should clearly enunciate those priorities. If all goals have equal merit, attaining the deadlines specified in law (such as the GHG reduction targets) will require a rethinking of planning, project development, and program construction so that the overall targets are met.

California has supported sustainable development through SB 375 and related laws. A basic concept in sustainable development is to find ways to achieve multiple goals while recognizing that conflicts can arise and that it is necessary to find ways to harmonize policies. In the transportation realm, conflicts can arise when a program or project focuses on only one or two goals. For example, facilitating freight movements can support economic goals but can reduce options for passenger travel or lead to air pollution problems that harm the health of disadvantaged communities. Acknowledging such conflicts is a first step, and California transportation plans do acknowledge a number of such conflicts. However, the next step is establishing policies and procedures for resolving conflicts at the early stages of project development, such as in purpose and needs conceptions, rather than leaving problem resolution to mitigation at a project level. Combinations of projects could also produce the intended outcomes. Implementation plans could set out rules for conflict negotiation and resolution and specify performance measures with floors below which performance cannot fall as well as attainment targets.

If multimodal integration is to be one of the main objectives of the CTP, the plan needs to reference or spell out a process to manage modal conflicts, such as when proposals for complete streets that allow for safe travel by foot or bike compete with proposals to speed up auto traffic, or freight priorities conflict with passenger rail. A stance on priorities for different modes that are in competition might also be in order if a clear policy rationale is laid out. For example,

should the state support both short-haul passenger travel within California and high-speed rail? These two modes share overlapping markets, and if certain modes should be prioritized over other ones for environmental reasons, the plans should explicitly say so.

Include a fiscally constrained (and authority constrained) alternative in addition to the unconstrained alternative in the CTP to show what can be done under current authority and highlight what might be possible if constraints were removed.

While statewide transportation plans are expected to be unconstrained fiscally, this should not bar the analysis of what can be done under existing funding and authority. The CTP 2050 reports that in addition to effectiveness, benefits, and stakeholder support, the authors screened action items for their consistency with plans and policies, minimal regulatory barriers, and an assessment that they were "financially attainable." It should be possible to further screen for "possible under current law and regulation without special exceptions" and "possible within the budget currently approved for the next N years." using sketch planning methods and typical cost data rather than detailed project data.

By presenting a set of actions that is realistic under available authorities and funds, as well as a well-thought-out but unconstrained set of actions, a better picture of future options will be made available to decision-makers.

Include the implementation and finance elements in the CTP, not in stand-alone documents.

Along with an analysis of what is feasible under current authorities and funding, the CTP should include an implementation plan and a finance plan showing how the full plan could be implemented over time. Separating the development of the CTP's implementation element (which could include its finance element because implementation will stall if the needed funds are not available) into a later process and document is likely to defer the consideration of critical issues and action on them to a later date.

In the CTP 2050, information about the authority and assignments of responsibility given to various agencies, levels of government, and private parties is provided at various points throughout the document. Pulling this together into a plan section discussing implementation responsibilities would add clarity. Given the plethora of agencies in the transportation sector in California, transportation plans in California should explicitly name the lead agency or division in charge of bringing each recommendation or action item to fruition. In addition, a financial feasibility analysis discussing what currently available funding sources and levels could accomplish could propel the development of new sources of funding or reforms to expenditures.

A timeline for action should be established to support the monitoring of progress in plan implementation. The timeline could be specified in general terms, such as short, medium, or long term, or could be more detailed by specifying a year or range, such as by 2025 or between 2025 and 2030. The latter approach could be lined up with legislative deadlines, such as those for GHG reductions.

Pay more attention to equity goals.

It is unfortunate to see that of the equity actions listed in the CTP, all are considered new. State legislation has prioritized equity in a number of programs, and it is time to give it high priority in transportation.

In the past, California policies have focused on geographic equity (as reflected in north-south splits, county minima, state and regional funding shares, and so on) and taxpayer equity (return to source, rewards for self-help). The current CTP

continues the geographic equity emphasis with its aim to bring all parts of the state together. It also recognizes the need for action to end discrimination in transportation provision and access to destinations, but more can be done. A greater focus on equity for disadvantaged communities could offer a way to create a different, urgently needed kind of integration—one that reduces exclusion and undue burdens. The CTP should strengthen its equity and accessibility goals, explicitly endorse equitable access to destinations for all socio-economic groups, identify problem areas and proactively seek to redress the problems, and prioritize state, regional, and local actions that will alleviate or reverse harms done by past choices and practices. Giving people a say in the selection of projects and priorities through public engagement is an important element of equity, and it requires careful consideration of participation levels and resources needed to participate in various ways. It also requires attention to legal constraints and fiscal realities, being clear on the feasibility of various actions.

Identify the tools available to the state transportation agencies to steer agency actions toward new outcomes.

The plans leave unstated how it is proposed to encourage local and regional authorities to align themselves with state priorities, as expressed in the plans. Current law gives state agencies limited authority to mandate policies or expenditures, but legislative changes could be proposed when deemed necessary. Under current law, state agencies do have discretion over actions on the State Highway System and over certain funds. CAPTI shows how this discretion can be used to prioritize actions in support of climate goals, and a broader application of the approach is in order, especially for the high-priority goal of equity. Identifying which tools will be used to achieve desired actions and outcomes across all goals is a step toward effective implementation.

In addition to using ownership of state highways and authority over certain transportation funds to advance state priorities, state agencies could also seek a requirement that all agencies address state goals and priorities, could request additional funding to target new, high-priority initiatives, and could decline to approve, participate in, or support further advancement of projects that could delay meeting state goals. Because so much of the responsibility for California's transportation programs relies on regional and local plans, programs, and funding, it is critical to take steps to assure that local and regional authorities do not undermine the state's priorities (whether through disagreement with them or through continuation of legacy policies and programs). The need to bring agency decisions into alignment with contemporary policies also would apply to Caltrans district offices, which have considerable autonomy in day-to-day decision-making. In all cases, changes in organizational culture are likely needed, and the effort to effectuate such change should not be underestimated.

Clarify the roles and responsibilities of local and regional agencies and address boundary issues.

Researchers have identified a need to redefine planning institutions to enable them to address emerging problems and potential solutions, accounting for issues both of scale and scope (Bertolini, Clercq, and Straatemeier, 2008). For California, an important step would be to clarify the roles and responsibilities of local and regional agencies with regard to state policies and their responsibility for implementing programs and projects that meet state goals.

California governance policy has shown a preference for local land use decision-making and county-level transportation programs. These preferences put decisions close to people that are visibly affected. But job markets, housing markets, and travel are regional, and the people affected by land use and transportation decisions might not live in the localities making those decisions. A narrow local focus can result in interests being left out of decisions that affect their personal and economic well-being. In the case of transportation, policies that operate at the city or county level often cover only one end of the connection. Regional agencies were established to counteract this problem of scale and scope, but the relative anonymity of many regional agencies and the retention of considerable authority at the local level means that MPOs and RTPAs often serve as coordinators rather than leaders.

Notwithstanding the concern about the need for regionalism, most trips are local, and while their cumulative impact can be significant, local and regional authorities often have a much better sense of the actual situation on the ground and the immediate needs of local residents and businesses than do more distant state authorities. The state might do well to devolve some of its control of transportation projects and infrastructure to local governments with regional agencies, providing a review function to assure that there are no significant cross-boundary issues. This could work, for example, for the implementation of complete streets along state routes that are not otherwise designated as being of statewide or national significance.

California regional agencies have been given responsibility to develop Sustainable Communities Strategies, but they do not have the authority to implement them and must rely on persuasion and incentives to move local plans and programs in the direction of greater sustainability. If the state is to rely on regional plans for much of the content of its statewide effort, and the regions must rely on incentives to leverage local compliance, the incentives offered to cities and counties to participate in the implementation of regional plans must be much larger than they are today. Alternatively, the state could mandate that state policies apply to regions, cities, and counties, and that both cities and counties must implement the SCS or an alternative approved by both the region and state. The latter policy would likely make SCS preparation even more contentious than it has been to date, unless incentives for cooperation are substantial.

A related issue is MPO representation, where in many cases suburban areas are over-represented from a population perspective. Because of the suburban tilt, "MPO voting structures have the potential to bias funding decisions toward highway projects and away from investments in transit" (Sciara and Handy, 2017). Hence the state might need to mandate governance reform of MPOs if it wants to achieve a transportation system that is more balanced and environmentally friendly.

Yet another issue has to do with MPO boundaries. Due to suburbanization of employment, together with housing affordability issues, commutes often spill beyond traditional regional and MPO boundaries. Three of the four largest MPOs in California are in federally-recognized consolidated statistical areas (CSA), where there is an employment interchange of 15 percent or more across metropolitan boundaries. (San Diego doesn't meet the CSA definition but experiences the same phenomenon with trans-border interchanges.) The CSA that includes the San Francisco Bay Area and its nine counties also stretches out to Stockton, Modesto, and Merced to the east and to Santa Cruz–Watsonville to the south, but only the nine counties touching the bay are in the MPO. Similar issues arise with smaller MPOs; for example, the federal government recognizes Fresno, Madera, and Corcoran as a CSA, but the MPOs cover only the counties. While there are plenty of examples of cooperation across boundaries, greater policy effectiveness might be achieved with more formal, state-sanctioned or directed cooperative arrangements in place.

At the same time, it is important to recognize that outlying parts of metropolitan areas often face substantially different issues from the more developed areas in the core of the region. Finding a balance between local control and more effective coordination of issues that spill over city and county boundaries is the objective.

Align local and regional authorities' policies and programs with state priorities.

To complement the clarification of roles and responsibilities, the state should investigate ways to bring local and regional policies and programs into better alignment with state policy priorities. This could be accomplished through legislative mandates, funding structures that incentivize multimodal integration, or other means. State legislation could be an effective method to bind both state agencies and local or regional governments to ensure their adoption of multimodal integration priorities.

Demonstrate new planning approaches that integrate multimodal transportation planning, land use, and economic development planning, all with an equity and environment lens.

Today, many new planning experiments are being implemented worldwide in an effort to produce sustainable development outcomes. These range from efforts to reduce vehicle use, traffic speeds, and emissions in cities and towns to plans for grand boulevards and town centers that strategically combine economic development planning with new housing for a mix of incomes—creating walkable and cycle-friendly streets with transit connections to farther-flung destinations. Demonstration projects also are proceeding with new vehicle technologies.

California could provide leadership in this area by adopting best practices identified so far but insisting on a stronger equity dimension than many demonstration projects to date have shown. For example, urban development demonstration projects could target finding ways to limit displacement of current residents and businesses and include people with limited income, disabilities, or other special needs among the beneficiaries. Technology demonstration projects could investigate the community impacts and acceptability of new goods delivery methods, such as drones, and new regulatory proposals, such as restricting curbside parking in favor of loading zones for pickup and delivery. Carrying out more sophisticated, arms-length evaluations would provide important evidence for state, regional, and local plans. Accomplishing this would require new partnerships across state, regional, and local agencies but also has the potential for far-more livable and sustainable communities than programs to date have produced.

Streamline and integrate the state transportation plans.

The large number of statewide plans that address (and touch on) the transportation system in California, along with plans at the regional and local level, amount to thousands of pages. Much of the introductory material in the text is duplicative, making the collected works unnecessarily lengthy and increasing the chances for inconsistencies. Additionally, because the different transportation plans (in particular, the modal plans) are published on a staggered time frame, it is difficult for a reader to get an accurate snapshot of the state's future plans for its transportation system at any moment in time.

Several of the state plans are required as a condition of federal funding. Consequently, it is necessary to retain the ability to produce them as stand-alone modal plans. Nevertheless, there are ways to reduce the page length and create a more succinct set of documents focused on policy and actions. One way forward would be for the plans to all use the same introduction, description of the state's population, economy, and transportation system, and discussion of key transportation issues; the CTP should provide this text. The CTP should also provide a discussion of new policies and priorities since the last plan. Summaries of modal plans then could be reviewed in light of the policies in the CTP and updates made accordingly.

Although there are reasons for it, splitting the analysis of different modes into separate plans comes at a cost. It encourages the treatment of the different modes as separate systems and clouds responsibility for multimodal connections and resolving conflicts which can and do arise about modal priorities. The lack of clarity can result in inaction on pressing problems or continuation of past practices rather than embracing contemporary ones.

The CTP can help avoid such problems by being more explicit about what is meant by an integrated multimodal system. It can identify gaps and difficulties in various networks and nodes and problems in operations, and it can flag problems that users of the system face. An explicit discussion of the markets that various modes fill (or compete for) can reveal the options for investment, and choices can be prioritized based on enunciated policies.

Over 40 years ago, UC professor of Public Policy Eugene Bardach (1977) wrote:

> "What are we to make of implementation failures when everyone is agreed on the principal objectives? In such a case, the dialectic of pressure and counter pressure would presumably not exist and could therefore not shape outcome. But minor disagreements between just a few actors can cause delays, as can simple standard operating procedures in bureaucracies. A vicious cycle of delay, fear of ultimate failure or high salvage costs, withdrawal of previous commitments, more delay, increased anxieties, and so forth, can also cause implementation failure."

While Bardach's gloomy assessment might well be applicable to some of California's planning efforts today, there is room for optimism that positive results can be obtained by strategically addressing implementation shortcomings and experimenting with new ways forward.

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Author Contributions

Elizabeth Deakin served as the Principal Investigator for the project and is responsible for the overall structure of its reports, including this working paper. She took the lead on the statement of the problem and the literature review. Chun Ho Chow served as a graduate student researcher on the project and took the lead on reviewing the plans discussed in this report. Both authors contributed to the findings and recommendations.

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The Role of New Technologies in the California Transportation Plan

PART 2

Daisy Son, Urban Studies
University of California, Berkeley

Elizabeth Deakin, Professor Emerita,
University of California, Berkeley

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Abstract

Technological advances over the years have made transportation faster, safer, and more efficient and, in the past five decades, have improved fuel efficiency and reduced emissions. Nevertheless, concerns remain about the adverse impacts of transportation, from community disruption to congestion to continued deaths on the highways and unequal access to services. In recent years, transportation services have been undergoing rapid transformation due to emerging technologies. From shared mobility services enabled by mobile apps to driverless vehicles, these emerging technologies have the potential to transform the way people travel and the amount and quality of service they can obtain. This research analyzes how the California Transportation Plan (CTP) 2050 is preparing for future technologies and examines assumptions that are inherent in the plans. It is imperative that California adopts policies and plans that help the state to attain the current climate goals without exacerbating environmental and equity concerns. While new transportation technologies have potential to reduce greenhouse gas emissions and improve accessibility and safety, it is also possible that they could exacerbate inequalities.

This paper summarizes how the CTP 2050 characterizes the opportunities and risks posed by emerging transportation technologies in light of recent research on the topic and discusses the implications. The results of textual analysis reveal that 24 percent of the document pages show some discussion of new technologies, with zero-emissions vehicles and connected and autonomous vehicles given the most emphasis. New technologies are being framed as a promising solution to help prepare for a transport system that is safe, equitable, and accessible without compromising the health of the citizens and the environment. This finding underscores the importance of delivering new technologies as part of California's long range planning efforts and also points to the need to provide more analysis on new technology costs and benefits, as well as implementation opportunities and barriers.

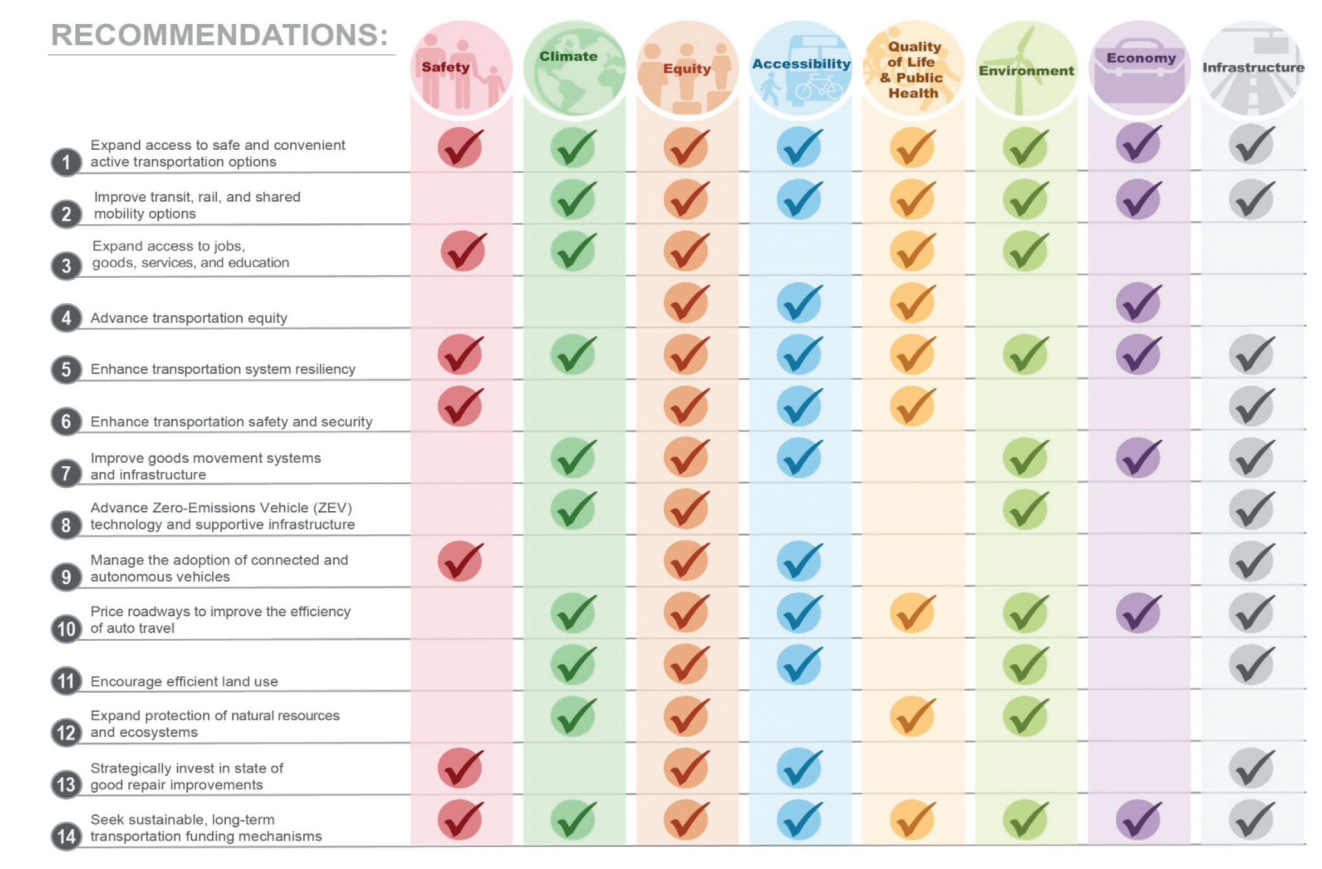
1. Introduction

Technological advances in recent years have brought rapid changes to the transportation system, opening up new possibilities for travel and at the same time posing challenges to existing transportation systems. This research examines the role that new technologies can play in meeting greenhouse gas (GHG) reduction and other objectives of the California Transportation Plan (CTP) 2050. New technologies discussed in this paper largely comport with the description that Assembly Bill (AB) 285 established, which includes but is not limited to "shared, autonomous, connected, and electric transportation options." Micromobility innovations and mobility services are included in the review, which considers user-side considerations as well as supply issues.

The CTP 2050 provides a long-range vision with a set of goals, recommendations, and policies (Figure 1) to help guide the state's future mobility needs while meeting the state's climate goals to reduce GHG emissions. Caltrans draws on regional plans developed by the state's metropolitan planning organizations (MPO) and fills the interstices. In addition, to provide relevant details to its strategies, the CTP is accompanied by six modal plans (Table 1).

This paper analyzes how the CTP uncovers current transportation and future mobility challenges in light of emerging technologies in the 21st century. It discusses the future of emerging technologies and examines the CTP's treatment of the topic with a critical eye, aiming to unearth assumptions in the plan, given the uncertainties of future technological changes.

Figure 1. CTP 2050 goals and recommendations (Caltrans 2021)



The analysis begins with a review of selected literature on emerging technologies, with a focus on autonomous vehicles (AV) and shared mobility services (Section 2). Section 3 then presents the methodology used in this paper to identify and analyze the CTP's discussions of emerging technologies. Section 4 presents the findings from this analysis, and the final section concludes with discussions of the findings and recommendations for further research.

We note that the terminology we use can be contentious. We use the term "autonomous vehicles" because this is what is used in the legislation and plans we reviewed. However, experts in the field often reserve the term "autonomous" for a vehicle that can self-drive based on sensors, distinguishing it from "automated" vehicles, for which a range of capabilities have been described.

Table 1. Overview of Caltrans modal plans

Caltrans Modal Plans	Summary
Interregional Plan	Provides guidance for identifying and prioritizing interregional transportation improvements to be funded in the Interregional Transportation Program.
Freight Plan	Identifies freight routes and transportation facilities that are critical to California's economy. It includes a three-tiered freight project priority list.
Rail Plan	Establishes a new framework for California's rail network, and sets the stage for new and better rail and community connections in the state for the next 20 years and beyond.
Aviation Plan	Provides a basis for implementing the State Aeronautics Act, and identifies the Division of Aeronautics' role in Caltrans' mission, vision, and values.
Transit Plan (draft)	Helps the state and its partners gain a better understanding of present and future roles and responsibilities to support public transportation.
Bike & Pedestrian Plan	Support active modes of transportation, and creates a framework that increases safe bicycling and walking for enhanced connectivity with all modes of transportation.

2. Literature Review

We reviewed selected literature on emerging technologies, with a focus on AVs and shared mobility services.

Emerging Transportation Technologies

Technological advances over the past five decades have transformed transportation systems, changing the way people travel on an everyday basis. Motor vehicles are more fuel efficient, produce fewer emissions, and provide greater safety than the vehicles of earlier decades (EPA, 2021). Improved highway design and construction techniques better protect the environment (Newman et al., 2012). Operations strategies improve safety and help alleviate congestion. Transit message boards and computer and cellphone apps provide real-time information on when buses arrive, increasing traveler convenience.

Despite these advances, problems with transport systems persist. In many areas, congestion continues to impose economic costs and stress for travelers. Transportation systems are responsible for a large share of total GHG emissions (EPA, 2015). Air pollution from automobiles includes not only tailpipe emissions but particulate matter from tires and brakes (Emissions Analytics, 2020; Kole et al., 2017).

Recent innovations in transportation have shown the potential to further make travel safe, efficient, and environmentally friendly. These include carsharing programs, micromobility options, including bike sharing, e-bikes, and e-scooters, and transportation network companies (TNC), such as Uber and Lyft, which facilitate on-demand rides with prearranged payment. These new travel options have increased choices for those who can access them and have enabled many users to travel with greater ease and at lower cost than was previously possible. However, the options have been available mostly in central cities and other high-density areas, creating a geographic divide, and low-income and minority neighborhoods have been underserved, creating an equity problem. In addition, their community impacts have been mixed, with controversies over impacts on pedestrian safety (especially for dockless bikes and scooters), traffic congestion, and impacts on transit ridership (Shaheen and Cohen, 2013; Urasaki and Hall, 2015; Shaheen et al, 2016, Shaheen and Cohen, 2016, Namazu, 2018; Sperling, 2018; Malalgoda and Lim, 2019; Shaheen and Chan, 2019; Baker, 2020; Abduljabbar et al., 2021).

TNCs are a case in point. TNCs are a modern combined approach to the traditional taxi industry and carsharing, providing users with a more convenient way of travelling with orders placed by a smartphone, cashless stored payment, and real-time information on routes and wait times. Introduced a dozen years ago, TNCs quickly expanded to cities across the globe. In many markets, they severely cut into taxi use. While shared-ride TNC options are available, many cities have found that most TNC trips serve only one passenger; some cities further found that congestion had increased (Roy et al., 2020; Tarduno, 2021). Some cities have concluded that TNCs also take substantial numbers of trips from transit, although the latter impact has been challenged, and the available evidence on transit ridership suggests the impact is small and can be positive (Namazu, 2018; Baker, 2020).

Cetin and Deakin (2017) drew on interviews with experts in the field, current taxi and TNC drivers, and four focus groups with San Francisco Bay Area residents to evaluate the impacts of TNCs in the context of a highly regulated taxi industry. The authors emphasize that TNCs have brought disruptions to the traditional industry and pose various sustainability and equity issues despite their popularity with users. They confirmed driver focus on travel "hotspots," where rides are in frequent demand but congestion can be heavy, as well as driver disinterest in serving low-income or outlying areas where fewer trips are requested. Most users traveled alone in a TNC vehicle and would have made the trip by taxi, transit, or even walking had a TNC not been available. People with disabilities found that accessible vehicles were not always available or a long wait was required. Recognizing these pros and cons, some cities and transit agencies have experimented with subsidizing TNC services or contracting with TNCs to provide service in thin markets or for special purposes, such as access to remote parking and to rail and bus hubs (Schwieterman et al., 2018). TNCs also have been engaged to provide services targeting seniors, low-income residents, and people with disabilities, (Deakin, Halpern, and Parker, 2020). Results have been generally positive.

However, recent events have raised questions about TNCs' economic sustainability. Because the TNCs haven't released formal data on their economic performance, it is difficult to assess TNCs' prospects in detail, but reports indicate that the companies have been experiencing significant losses (pre-COVID). Financial issues have been further complicated by controversies over the labor status of drivers; for example, in California, a state law that provided benefits and other worker protections to gig workers (AB 5) was overturned by a 2020 voter-approved ballot measure (Proposition 22), which in turn was declared unconstitutional by a California court; further legal action is anticipated. Similar legal wrangling over worker status has occurred in Massachusetts and in the United Kingdom. Meanwhile the COVID-19

pandemic has made drivers scarce. The worker compensation issue has led to higher labor expenditures and, together with COVID impacts and, presumably, investor pressures for better financial performance, TNCs have significantly increased fares in a number of markets. Many users recently have reported concerns, such as Uber rides from the airport to their homes, exceeding their airplane fares (Conger, 2021).

The long-term future for TNCs is also linked to a larger issue: whether TNCs and taxis will become automated in the future. Since labor is currently a major cost for these systems, automation has the potential to greatly alter costs of transport. Automation will not only impact shared mobility systems but will also be an issue for the trucking and bus industries.

Future of Autonomous Vehicles

AV technology is a highly contested yet highly promising innovation, one that has been the center of attention in transportation technology discussions for at least 30 years. While AVs could provide extensive benefits to the environment and improve mobility for many, skepticism still surrounds the future adoption of AVs and the uncertainties surrounding the long-term impacts of AVs (Gruel and Stanford, 2016; Sperling, 2018). The implementation of AVs is likely to affect travel patterns, fuel efficiency, the number and characteristics of road users, and parking.

Automation technologies are already in use in many of the vehicles being driven today. Early automation technology included cruise control, a driver convenience. Over the past several decades, additional technologies have been added to motor vehicles that increase safety. As the USDOT's National Highway Traffic Safety Administration (NHTSA) reports, "A number of today's new motor vehicles have technology that helps drivers avoid drifting into adjacent lanes or making unsafe lane changes, or that warns drivers of other vehicles behind them when they are backing up, or that brakes automatically if a vehicle ahead of them stops or slows suddenly, among other things. These and other safety technologies use a combination of hardware (sensors, cameras, and radar) and software to help vehicles identify certain safety risks so they can warn the driver to act to avoid a crash."

Preparation for increasing automation has led to the development of formal descriptors of automation levels and the capabilities and driver responsibilities that they would entail. As shown in Figure 2, these range from no automation, wherein the driver is responsible for all driver tasks, to full automation, where the vehicle can perform all tasks and the driver might or might not be able to take over. In between are various levels of automation with which the driver must remain engaged or be ready to take over operations. Current vehicles in common use range from no automation to partial automation, although driverless vehicles of various types have been successfully demonstrated.

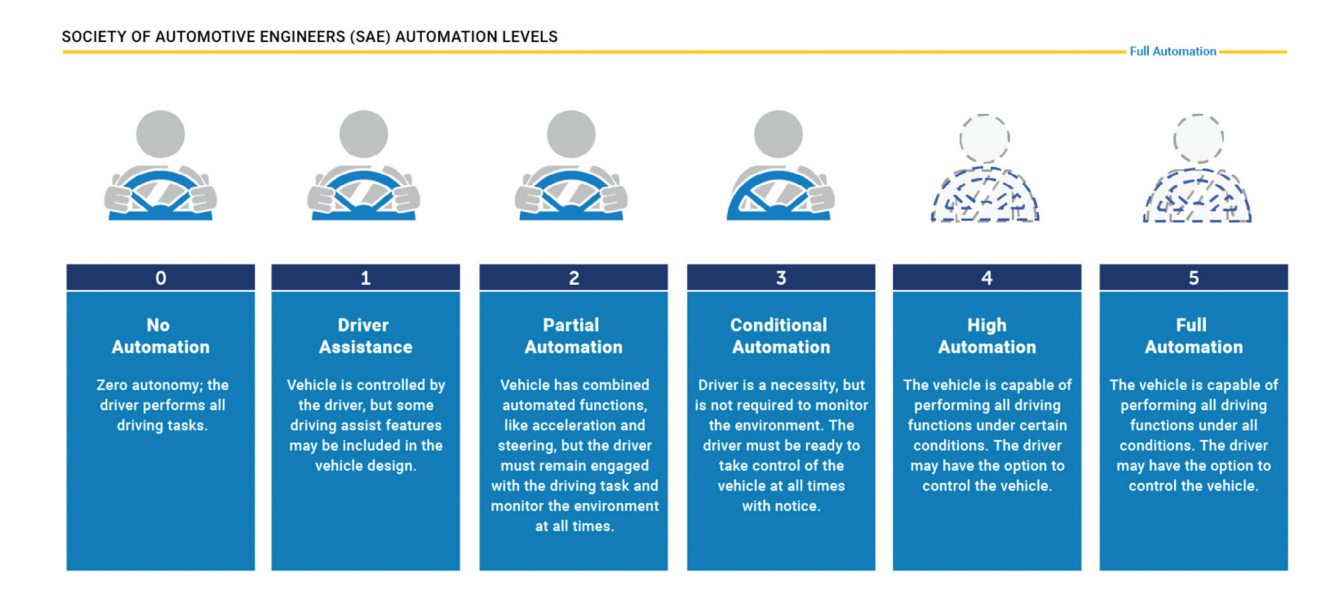
NHTSA emphasizes that a major benefit of automated vehicles would be to reduce or even eliminate deaths and injuries in motor vehicle crashes. Currently over 94 percent of the serious crashes in the United States are due to driver error, for which economic losses add up to hundreds of billions of dollars each year. In addition, automated vehicles could smooth traffic flow and reduce congestion and delays, freeing up time for other uses. If automated vehicles were widely available, they also might increase mobility for those who cannot drive themselves and extend access to jobs, housing, goods and services, and social and recreational activities across a broader area.

Depending on how automated vehicles are deployed, however, they could exacerbate existing issues with traffic congestion and land use while transforming travel behaviors and mode choices (Gruel and Stanford, 2016). Using a scenario-analysis approach, Gruel and Stanford explore the possible changes in travel behavior in the long term. They make the point that if AVs operating without human intervention start to proliferate, time originally dedicated to driving

could be utilized for something else, which raises the prospect that willingness to travel by car will increase, which could encourage sprawl and subsequent increases in traffic congestion and vehicle miles traveled (VMT). On the other hand, the ability of AVs to move to remote locations and be called for use when needed could allow valuable urban land currently used for parking to be repurposed for other uses.

Millard-Ball (2019) raises another concern: where and even whether AVs will park, especially for trips in dense city centers. Since fully automated vehicles would not necessarily have a human on board, they could be dispatched to park in an unregulated area some distance from where their passengers boarded or alighted, or even drive back home. Alternatively, they could cruise around the city, not parking at all. This additional VMT could further exacerbate congestion within the city. Millard-Ball uses a traffic microsimulation model based on data from downtown San Francisco to argue the importance of establishing congestion pricing to mitigate these externalities. However, another option would be for AVs operating in urban areas to be shared, a strategy that if workable could reduce the number of vehicles on the road and increase their productivity.

Figure 2. Automation levels



Source: "The Evolution of Automated Safety Technologies," NHTSA, 2021. Copyright 2021 NHTSA.

In another paper, Millard-Ball (2018) investigates the potential change in pedestrian travel behaviors should the vehicle fleet be automated and designed to avoid collisions with pedestrians. The author uses game theory to examine potential behavioral changes, positing that pedestrians will learn to use the safety and cautionary nature of AVs and therefore cross streets wherever and whenever they please. While this scenario would cause further complications given current laws, it could also impel legal changes. Millard-Ball argues that it would likely reduce AV speeds and foster more human activities within the city by giving more of the streets to bicyclists and pedestrians. This is in contrast to arguments made by others (generally without accounting for pedestrians or bikes) that average speeds would increase due to smoother traffic flows (cf. NHTSA, 2021).

A significant issue in light of the disagreements and uncertainties in the literature about the VMT impact of AVs is what type of fuel they will be using and in what quantity. Fuel and consumption levels would also significantly impact emissions

of GHGs and other pollutants. Based on an analysis of peer reviewed research, Mersky (2019) points to AVs' capacity to drastically improve fuel economy, but also notes that fuel economy could either increase up to 46 percent or decrease up to 14 percent. The benefits would result from the implementation of connected autonomous vehicles (CAV); connection technology "allows vehicles to send and receive information to and from other vehicles and pieces of infrastructure, such as traffic signals" and hence smooth traffic flows and minimize stops and starts. The author emphasizes that the additional fuel economy benefits from AVs are most likely going to result from the hybridization and electrification of vehicles in the long term. The paper concludes with a call to action for proper emissions and fuel economy regulations to maximize the benefits of AV adoption in the future.

However, because there are different types of electric vehicles—battery-powered, hybrid, and fuel cell—the various technologies are likely to play different roles in different modes and markets. For example, long-haul, heavy-duty trucks are likely to use fuel-cell technology rather than batteries.

Sperling (2018) takes the view that the real transformation will come through the convergence of new shared mobility services with automated and electric vehicles. He argues that this convergence could reshape lives and communities for the better—or for the worse. In his "dream" scenario, he foresees huge public and private benefits, including more transportation choices, greater affordability and accessibility, healthier, more livable cities, and reduced GHG emissions. His "nightmare" scenario would find sprawled development with longer trips, more energy use and emissions, and a decline in public health. Public policy choices would make the difference between whether the US lands in heaven or hell.

Many research papers on changing transportation technologies focus on technology performance scenarios, and some focus on the rules needed to achieve the positive outcomes. However, users and their viewpoints—consumer acceptance of new technological offerings—will be an important determinant of outcomes. Some factors that consumers consider in making choices are rational—that is, they weigh costs and benefits against their budgets of money and time. However, money and time are not the only factors in decisions. Sovacool and Griffiths (2020) present a wide-ranging review of cultural barriers to a low-carbon future, discussing six mobility and energy transitions across 28 countries, including the United States. They link cultural dynamics to technology choices and show that such factors as conceptions of masculinity and success (dominance, social status), perceptions of safety and privacy, and ethnic biases affect behaviors ranging from speeding to vehicle type choice and willingness to share a ride. In the case of AVs, they cite literature showing that culture is essentially embedded in computerized systems that will determine how the vehicle interacts with passengers, pedestrians, and other motorists. Such systems might even have biases based on skin tones and culturally determined patterns of dress (among other embedded values) and could be extremely difficult to fix (Chang et al., 2017; Wilson and Morgenstern, 2019; Awad et al., 2018; Hao, 2019).

3. Role of New Technologies in the California Transportation Plan: Research Approach

The goal of this paper is to investigate how the technologies mentioned in the CTP 2050 relate to the established goals and recommendations of the plan (Figure 1), identify which specific technologies are being highlighted and prioritized, and flag areas with limited information to supplement with future research.

The initial step of the research involved a close reading of the CTP text, flagging discussions of new technologies and assumptions about their future application and impacts. Based on the topics of previous studies in literature reviews and

topics emphasized within the CTP, a set of frequently occurring words (keywords) were identified: new technologies, zero emissions vehicles (ZEV), electric vehicles (EV), autonomous vehicles (AV), intelligent transportation systems, transport technology, micromobility, e-commerce, new mobility, MaaS (Mobility as a Service), connected and autonomous vehicles (CAV), and transport network companies (TNC).

A textual analysis was then carried out. We used the qualitative text analysis software, MAXQDA 2020, to aid with the process of identifying keywords and analyzing them throughout the lengthy document. Using the software's Word Frequencies function, one of our research team members entered the list of keywords as search terms and ran analysis. To ensure that all discussions of each topic were identified, all synonyms and abbreviations associated with each term were included in the list. The frequency of each flagged topic that was discussed in the plan was identified, as were sections that gave priorities to these terms. Finally, each incidence was reviewed through a second close reading of the text and tables to identify how technologies are being framed in the plan.

4. Findings

The CTP 2050 establishes a long-range vision that appears to depend heavily on new technology to address its goals. The CTP outlines transportation technologies as one of the opportunity areas that could help achieve its vision: "California's safe, resilient, and universally accessible transportation system supports vibrant communities, advances racial and economic justice, and improves public and environmental health" (CTP 2050, p. 4). Some of the most promising examples of emerging transportation technologies are listed as: zero-emission vehicles (ZEV), shared mobility services, big data, information technology, CAVs, and goods movement innovations (CTP 2050, p. 16).

The textual analysis shows that of the document's 127 pages, 31 pages mention the keywords identified in Table 2. Approximately 24 percent of the document includes discussion of some sort of new technology. The greatest emphasis is given to EV and AV technologies, which are framed as the most promising technologies for reducing emissions in the future. Furthermore, the results show that the discussion of EVs and AVs are thought of as linked, as they are often discussed together, especially in the Recommendations Element.

Table 2 lists the word frequency. ZEVs and CAVs account for 33.3 percent and 28.7 percent of the search term counts, respectively, or more than half of the total. In contrast to other keywords, the discussion of CAVs were not only found in the plan's Recommendations Element but also weaved into different chapters, illustrating their future importance.

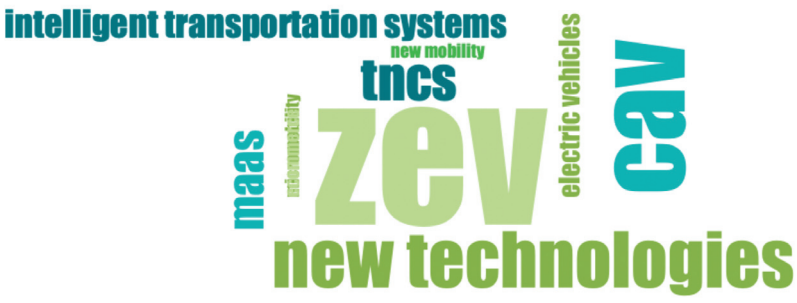
Table 2. Transportation technology term frequency

Search Term	Frequency	Percentage
Zero-Emissions Vehicles (ZEVs)	29	33.3%
Connected and Autonomous Vehicles (CAVs)	25	28.7%
New Technologies	8	9.2%
TNCs	7	8.1%
Mobility as a Service (MaaS)	5	5.8%
Intelligent Transportation Systems (ITS)	4	4.6%
Electric Vehicles (EVs)	3	3.5%
E-commerce	2	2.3%
Micromobility	2	2.3%
New Mobility	2	2.3%
Transport Technology	0	0%

Source: Generated using MAXQDA 2020.

Figure 3 presents a word cloud from the textual analysis of the CTP 2050. As the word cloud illustrates, ZEVs were the central technology discussed in the plan, with CAVs also prominent. Both occur in the context of new technologies. In comparison, operations-oriented topics, such as TNCs, intelligent transportation systems, and MaaS, received far less attention. Lastly, topics of e-commerce, micromobility, and new mobility were given the least attention, with only two occurrences each. The term "transport technology" was not mentioned in the plan, most likely because it could be considered as a synonym to new technologies.

Figure 3. CTP 2050 new technology word cloud generated with MAXQDA 2020



A brief look at the technologies that were discussed in the CTP 2050 follows.

Zero-Emission Vehicles

The CTP identifies ZEVs as a promising technology that has been making successful strides in reducing GHG-related emissions in California. According to the plan, EV market penetration in the US shows an upward trend, and California has been leading the EV market with about half of the entire ZEV sales in the US (CTP 2050, p. 68). The plan also refers to current efforts to expand the ZEV market by executive order (EO N-79-20), which targets year 2035 to require all vehicles sold in California to be ZEVs. Other measures include EO B-48-18, which is related to improving and expanding ZEV-related infrastructure. Although the extent to how ZEVs will be implemented and the economic impacts are not analyzed in the CTP, the CTP points to California's ZEV Action Plan to further expand ZEV's market growth and strategies for implementing proposed goals (p. 118). Despite the continued growth in ZEVs and their potential to significantly decrease GHG emissions, the plan also acknowledges that if not properly regulated, congestion and delay might continue to increase. (p. 68).

Another ambitious goal related to ZEVs within the CTP is promoting clean transit through adopting ZEVs in shared mobility and public transportation systems. One of the new proposed action items for Recommendation 8 (Advance Zero-Emissions Vehicle (ZEV) Technology and Supportive Infrastructure) states, "Require TNCs and other car-sharing services to transition to electric vehicle fleets" (CTP 2050, p. 118). It is not clear how this would be accomplished without a major restructuring of the TNC business model, which currently relies on driver-provided vehicles subject to reviews for safety and state of repair and cleanliness. Regarding transit, the California Air Resources Board (CARB) passed the Innovative Clean Transit Regulation in 2018, which set a goal of transitioning public transit vehicles to ZEVs by 2040. If implemented successfully, the plan emphasizes that this transition has the potential to reduce GHG emissions up to 19 million metric tons between 2020 to 2050.

Connected and Autonomous Vehicles

The CTP cites previous studies to make the assumption that "20 percent to 95 percent of miles travelled on U.S. roads could be in automated vehicles by 2030" and "fully automated taxi fleets could become a reality between 2023 and 2030" (p. 67)—a very short time from now. This is an area where more precise terminology could clarify the assumptions. While some levels of automation are already on some new cars being sold in the US and more is anticipated by 2030, most experts would be dubious that full automation would be ready by then. Recommendation 9 (Management of the Adoption of Connected and Autonomous Vehicles) proposes an action item that expects AVs to be shared and electric rather than personally owned and gasoline fueled (CTP 2050, p. 120). Due to the uncertainties of the technological impacts on land use, emissions, and mobility patterns, the section maintains a cautious tone in providing recommended action items with respect to these considerations. Likewise, although there are no specific discussions of how CAV technology will be employed in low-density suburbs or rural areas, the action items emphasize the need for collaboration across state, local, and regional level to better prepare for CAV future demands and operations.

The plan acknowledges that although CAV technology has a potential to create a safer traveling option and reduce GHG emissions, it also poses a significant risk of increasing VMT (they say by 33 percent) and causing equity concerns (p. 120). Moreover, the recommendations line up with the CTP's overall vision of advancing economic justice in the transportation system by recognizing the rising concerns about accessibility issues encountered by underserved communities and populations of all ages. Here again, the plan appears to rely on other agencies' programs to make CAVs (or more immediately, EVs) available to the currently underserved.

The CTP mentions potential behavioral changes among road users and notes risks associated with CAV implementation but offers few specifics. CAVs are mentioned in Recommendation 6 (Enhance Transportation Safety and Security). This section posits that behavioral changes, like those explored by Millard-Ball (2018), could result from the adoption of CAVs but recommends future study, including additional research into cybersecurity threats associated with CAVs.

Transport Network Companies and Carsharing

TNCs received mention in the CTP but the plan does not go into detail on how it is preparing for the future of ride-hailing services like Uber or Lyft. Only one discussion of TNCs was found in the recommendation section of the CTP (p. 118). Although the plan states an ambitious intention to "require TNCs and other car-sharing services to transition to electrical vehicles fleets" (pg. 118), it does not provide information on which programs or policies would be entailed to accomplish this. The plan refers to CARB's plans and programs, but it is vague regarding which programs are being implemented and the time frame in achieving this goal.

The impacts of Proposition 22, the court decision that found Prop. 22 unconstitutional, and the probability of additional litigation over TNC labor issues casts considerable uncertainty over what TNCs will look like in coming years. The uncertainties have been exacerbated by the decline in users due to the COVID-19 pandemic (CTP 2050, p. 25), as well as by current labor shortages and higher fees.

Carsharing, another form of shared mobility that enables occasional, non-exclusive use of a vehicle, receives little attention in the plan although it preceded TNCs in a number of urban markets and has been highly successful in some of them.

Mobility as a Service

MaaS refers to apps or other programs that allow users to find out about, plan, request, and pay for a trip using multiple modes, often combining public and private providers. MaaS is discussed in the CTP 2050 five times. Although MaaS isn't discussed in the Recommendations Element of the plan, it is suggested as an opportunity to improve transit access and provide an alternative to existing transit options in all urban, suburban, rural, and tribal areas (CTP 2050, p. 30). Other parts of the plan discuss MaaS being integrated with transit and rail systems to improve accessibility and improve desirability of public transportation (pp. 63–64).

In recent years, several companies, including Uber and Lyft, have been expanding their offerings to enable MaaS, but this is not discussed in the plan.

Intelligent Transportation Systems

ITS is an emerging data-driven set of technologies that can assist in managing transportation systems. While experts in the field would argue that ITS includes automated vehicles and smart highways, the CTP focuses on operations-oriented ITS technologies. Some examples of ITS mentioned in the plan are "transit signal priority, automatic passenger counter, and real-time traveler information systems" (p. 48). These technologies are already implemented in many locales. Future applications of ITS are mentioned in the discussion of freight systems, where ITS could help "improve the reliability of goods movements on California Roads" (p. 61). Although the plan does not go into detail in explaining how California is

preparing to implement ITS into the freight system, it does point to the California Freight Mobility Plan and Sustainable Freight Action Plan for further discussion. ITS also is mentioned as a strategy to support employment of CAVs, which could use road space more efficiently than current vehicles (p. 45). There are no specific discussions of ITS within the Recommendations Element.

Micromobility

Micromobility refers to small vehicles, such as e-bikes, dockless bikeshare, and scooters. The term "micromobility" appears only two times in the plan. The CTP 2050 assumes that active transportation investment will increase (p. 47), and micromobility is generally considered a form of active transportation. Shared micromobilities, such as e-bikes and scooters, combined with new technologies, are suggested as a strategy to boost active transportation and promote non-motorized travel (p. 16). The plan also asserts that public transportation will become more desirable as "zero emission rail is paired with advancements in micromobility" (p. 47).

Other Discussions of Emerging Transportation Technologies

The CTP makes the assumption that goods movement will also be impacted by emerging technologies, especially by electrification and automation of vehicles. It acknowledges that emerging technologies are transforming goods movement and land use, with the rise of "e-commerce, 3D printing, and same-day deliveries" (p. 67). Chapter 2 highlights that "truck trips are expected to increase by 40 percent" and stresses that freight system could pose a significant impediment in reaching the 2050 emissions targets (p. 60). However, this section makes the assumption that delivery vans and larger trucks will become automated in the coming decades and that the freight rail system will become electrified, which could significantly reduce GHG emissions. It also lists "drones, bicycle couriers, and other automated delivery technologies" as an option to improve last-mile connectivity in deliveries. The plan refers to the California Freight Mobility Plan and Sustainable Freight Action Plan for more details about the role of technologies in freight systems.

The plan also assumes that buses will become ZEVs (p. 47), noting that the CARB's Innovative Clean Transit Regulations, approved in 2018, sets up a target of transitioning all bus fleets in California to ZEVs by 2040.

5. Key Findings

1) For the next several decades, transportation planners will need to provide mobility and access to a growing population and economy while maintaining critical infrastructure in a state of good repair and increasing its resilience to storms, fires, and sea-level rise. Equally urgent, transportation planners will need to redress social exclusions and inequities in transportation, housing, and other essential services and to take aggressive steps to protect and improve the health of people and the planet. New technologies can play an important role in these endeavors.

2) The CTP 2050 relies heavily on new transportation technologies to achieve its goals. Overall, the CTP maintains an optimistic attitude toward emerging transportation technologies while acknowledging some potential risk areas, including potential conflicts with efforts to reduce congestion and encourage compact growth. The plan

acknowledges the fast-evolving nature of these technologies and emphasizes the importance of seamlessly integrating emerging technologies into the current transportation system while mitigating potential impacts. It does not, however, suggest clear paths toward achievement of its technology assumptions.

3) The CTP 2050 depends heavily on programs of allied agencies, particularly CARB, to advance deployment of new vehicle technologies, which are treated as key to future emissions reductions. It finds that to achieve mandated GHG reductions, additional efforts to implement new vehicle technologies will be needed.

4) Given the nature of the CTP as an "unconstrained plan" that continuously adapts to changing transportation needs, policies, and technologies, the plan explicitly states that it does not include specific analysis of the impacts of particular projects (CTP 2050, p. 9). Neither does it discuss how the environment or communities will be impacted given the uncertainties of emerging technologies. Thus, it is difficult to determine the benefits and costs that would result from the plan or to separate out the impacts due to emerging transportation technologies from those due to other planned investments and to larger changes in the population and economy. A deeper dive into modeling done in support of the plan but documented elsewhere might provide this information. We note here that the available documents on modeling for the plan treat many technology topics as inputs (for example, an assumption is made that the future fleet will be electric in accordance with state policies) rather than explicitly modeling fleet turnover and vehicle type choice.

5) The plan devotes relatively little space to new technologies for operations or connected highways. This omission is surprising because such measures could offer important alternatives to expanding capacity rather than through added lane miles.

6. Recommendations

Our assessment of the treatment of technologies in the California Transportation Plan 2050 leads us to make several recommendations for revising plan content.

- Evaluate an alternative with "trends extended" technologies (might be based on rest-of-US forecasts) to show the importance of California's initiatives in new technologies for transportation.
- Monitor and report on progress with new technologies, addressing their deployment, use, and performance.
- Analyze the risk associated with technology assumptions and performance evidence and for high-risk assumptions or performance, and develop contingency actions.
- Address operations strategies in greater detail.

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Author Contributions

Elizabeth Deakin served as the Principal Investigator for the project and is responsible for the overall structure of its reports, including this working paper. She took the lead on the statement of the problem and the literature review. Daisy Son conducted the analysis for the paper and contributed to the literature review. The two authors collaborated on the findings and recommendations.

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Key Informant Interviews on California's Transportation Plans and Their Prospects for Achieving State Goals

PART 3

Elizabeth Deakin
Professor Emerita of City and Regional Planning and Urban Design
University of California, Berkeley

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Abstract

This paper presents findings and recommendations on transportation planning in California, focusing on state transportation plans and their prospects for achieving state goals, including social equity, a healthy environment, a strong economy, and high-performing infrastructure. The work presented here is based on 86 interviews conducted by the author with key informants: current and former elected officials; federal, state, regional, and local agency leaders; advocates for low-income and minority communities; transportation, land use and environmental experts; developers and builders; economic development specialists; and representatives of nonprofit organizations specializing in civic, business, and environmental issues. Each interview lasted 45 minutes to an hour and was designed to allow the discussion to focus on topics of greatest interest and concern to the respondent. Respondents were offered anonymity so that they felt free to speak frankly. Interview notes were summarized and highlights were extracted and categorized by key issues raised, and the resulting compilation formed the basis for the analysis presented here.

A key finding is that while most of those interviewed were appreciative of the progressive goals and objectives laid out in the California Transportation Plan 2050 (CTP 2050), they also were disappointed that the plan did not provide a clear way forward. State modal plans received mixed reviews, with some seen as offering concrete strategies and others remaining largely aspirational. Specific criticisms were lack of an implementation plan with clear assignments of responsibility, performance measures, and deadlines for achievement; lack of a clear funding plan; insufficient attention to modal competition and markets for various services; and heavy reliance on regional and local action as well as the actions of other organizations to achieve goals. In addition, many commented that the assumptions about technological innovation and its diffusion were highly optimistic, as were assumptions about transit expansion and telecommuting. While recognizing that the CTP 2050 is fiscally unconstrained and is not expected to propose specific projects, many of those interviewed felt that this made it possible to avoid hard issues and recommended supplementing the aspirational plan with an alternative that illustrates what can be done with existing and reasonably anticipated funding and legal authorities. Many also noted that institutional complexity sometimes is a barrier to effective planning and conflict resolution, especially when multiple priorities are in effect.

Many interviewees were concerned that the plans do not acknowledge that goals can be in conflict and do not lay out clear priorities among goals or strategies for dealing with conflicts. Several commented that the current institutional structure gives the state and regional agencies only limited ability to steer investments. They further commented that contextual differences in user needs, available transportation services, and barriers faced were glossed over in the plans. Coordinating economic development strategies as well as housing with transportation was frequently mentioned as a planning gap. In addition, the sheer number of plans and their length and repetition were seen by many as making it impossible to get a full picture of transportation today or as proposed for the future, making it harder to participate meaningfully in transportation planning processes. Some commented that while giving residents and businesses a say in transportation planning is important, a proliferation of meetings, advisory committees, and materials for review could overwhelm the capacity of many interested parties and bias participation to larger, better resourced groups. Several commented that participation was meaningful only if it was clear what could and could not be changed through public engagement.

These findings are consistent with and confirm those based on text analysis in Parts 1 and 2 of this plan review. They suggest the following:

- Set policy priorities, and develop a process for conflict resolution.
- Supplement the aspirational statewide plan with an alternative that illustrates what can be done with existing and reasonably anticipated funding and legal authorities.
- Flesh out implementation details, including assignments of responsibility, funding sources, and measures of accomplishment.
- Review institutional relationships and make revisions to bring authority to act into alignment with assignments of responsibilities.
- Make user needs an essential element of problem identification and planned action, along with infrastructure delivery and preservation.
- Expand on the treatment of equity issues, and make change not just a pledge but a reality.
- Expand the discussion of and commitment to integrate transportation, land use, and environmental planning and decision-making, with particular attention to housing and economic development plans and programs.
- Reorganize state plans and the planning process to integrate and streamline the CTP and modal plans, and make participation in planning more inclusive and impactful.

1. Background and Overview

A 2018 assessment by the California Air Resources Board (CARB) found that the State of California is at risk of missing its 2030 greenhouse gas (GHG) emissions reduction target for transportation-related emissions, in part due to increases in vehicle miles traveled (VMT). Since then, CARB has taken steps to tighten its requirements, Caltrans has updated its plans and planning guidance, and metropolitan planning agencies and their partners (transit agencies, county transportation commissions, cities) have updated their plans and programs, which include both transportation and land use (specifically, housing) elements.

Planning for future transportation systems is a complex matter in the best of times, and today, two issues add to uncertainties. First, the COVID-19 pandemic has disrupted both passenger and freight movements for nearly two years now; transit ridership has plummeted, many more people are working from home, and much business activity has moved from in-person to on-line. Whether, to what extent, and how long these impacts will persist as the pandemic recedes remains to be seen, and the net effect on VMT is unclear. Second, transportation technologies continue to evolve—electrification and automation are examples—and new transportation options, from high-speed rail to bikesharing, are being added to California's transportation offerings. Such changes need to be considered in plans that aim to steer actions for 20, 30, or even 50 years, along with other driving forces, such as fuel prices, turnover rates for the vehicle fleet, and changing consumer preferences. How these factors are dealt with in plans can make a difference in how well the plans comport with actual experiences in the future.

The most recent statewide California Transportation Plan (CTP) 2050 offers a vision for a future integrated statewide transportation system that builds on regional transportation plans (RTP), sustainable communities strategies (SCS), and county transportation plans. It identifies a number of goals ranging from system preservation to environmental protection and environmental justice. It does not, however, identify specific projects that were implemented to achieve these goals or explain who must act and what resources are required to do so. Some observers see disconnects with regional and local plans and programs and with plans and programs for housing and community development.

More generally, concerns have been raised about the overall transportation planning process, from statewide to local. These concerns have shaped our inquiries in this paper, shaping the questions explored in stakeholder interviews. Concerns include the following:

- Plans that are overly general offer little guidance for determining project consistency and for programming projects (determining their priority and appropriate timing).
- Plans that are not constrained by funding realities often fail to lay out realistic strategies for securing necessary funding for implementing the networks and services that they envision.
- Projects that appear to conflict with state and regional planning goals, or that meet certain goals but conflict with others, are being funded.
- Projects are moving forward without having been subjected to a thorough benefit-cost analysis or an environmental analysis that adequately considers GHG emissions or environmental justice.
- Projects that have a local voter commitment attained before any regional or state commitment had been made for matching funds create pressures for matching funds, meritorious or not.
- A proliferation of planning documents, along with differences in time frame for plans (20 or more years) and programs of projects (5–8 years) make it difficult to understand the implementation process and the effects of project sequencing.

The next section of this paper presents our approach to the interviews. Section 3 discusses the findings from the interviews, and Section 4 presents recommendations based on the interview findings. The interview guide and the summary of comments made are presented in appendices.

2. Research Approach

Interviews were conducted with a variety of experts in the field, most of them from California. Interviews were held with current and former elected and appointed officials, staff of California agencies responsible for planning, funding, building, operating, and regulating transportation, staff of housing and environmental programs, metropolitan planning organization (MPO) staff members, county and city planners and engineers, and representatives of civic, business, environmental, and social justice groups throughout the state. In addition, a handful of interviews were held with federal officials and with national experts from other states who work and publish in the area of transportation, land use and the environment.

The purpose of these interviews was to ask the respondents to comment on issues identified in the documents reviewed and, if they chose to do so, offer recommendations for improving planning processes. Potential interviewees were identified through report authorship and published comments on reports, from staff listings on organizations' websites, and through other published and publicly available material as well as the author's personal knowledge of key actors in the field. In addition, a dozen organizations whose staff were thought to have informed views on California transportation planning were suggested by participants in a kick-off meeting for the study. A total of 103 potential interviewees were identified in this manner.

Potential interviewees were contacted by email or phone and were invited to participate in an interview of 30 minutes to one hour. A brief description of the study was provided with the invitation. If the person contacted agreed to be interviewed, an appointment was scheduled for a mutually agreed on time. All interviews were conducted by phone or videoconference.

To encourage frank discussion, we committed to keep the names of the interviewees confidential unless we were granted specific permission to quote the interviewee. We did not record the interviews and instead took detailed notes that we transcribed after each interview. Our assessment is that the names of the respondents are not relevant to the research and their general position (MPO board member, transit agency staff, environmental advocate, think tank expert, and so on) is a sufficient descriptor.

A total of 86 interviews were completed, with nearly all lasting an hour and covering a wide range of topics. Ten of those contacted did not respond and another five recommended another person in their stead. Two agreed to be interviewed but could not find a time to do so. Table 1 lists the job category of those interviewed and the number of interviews in each category. A comparison of those who did not respond or recommended someone in their place did not reveal significant differences in terms of the types of work done or organizational affiliation from those who participated in an interview.

Table 1. Interviews completed

Academics	5	Land use/housing/urban design experts	3
Advocate – automobile users	1	Legal experts	2
Advocate – bike, ped	4	Modelers	2
Business leaders	5	MPO officials	4
City planner/engineers	4	NGO staff – general	5
County planner/engineers	4	Other community leaders	4
Economic development experts	2	Rail experts	2
Elected officials	3	State agency officials	6
Equity advocate – general	6	State agency staff	8
Equity advocate – low income	2	Transit officials	2
Equity advocate – people with disabilities	1	Transportation experts	5
Federal agency staff	2		
Housing experts	4	**Total**	86

Interview notes were transcribed and anonymized, and a summary of key points was extracted. The summary comments were then coded for content. The author generated a preliminary list of keywords (themes) in preparing the summaries, and this list was used to assign a predominant theme to each comment. A second, independent review and coding was carried out for about half of the summary comments, using the keyword list. The second review also generated a few additional or modified keywords, which were felt to result in greater clarity.

The two coding results were then compared as a check on consistency of interpretation, and a combined list of keywords was established. Overall consistency exceeded 90 percent. A third reviewer conducted an additional coding check on a subsample of the comments, which was about 97 percent consistent with the previous coding.

Table 2 shows the topics that emerged from the coding of 240 summary comments. A few topics were combined in the final review. Some comments covered more than one topic, as indicated in the table. While some topics were discussed more than others, this should not be interpreted as an indication of importance of the topic, because some respondents focused their comments on the topics that are most relevant to the mission of the organization for whom they work.

The anonymized and category-coded summary notes are presented in Appendix 2. There are more comments than interviewees because the number of points made by each respondent varied. We observe that topics not only overlap but also cluster. For example, the topic "strategies" is related to "context" in that the appropriateness of particular strategies depends on where they are proposed. Also, "new technology" is a group of strategies that are frequently discussed in the plans.

In the remainder of this paper, we discuss clusters of related topics in terms of eight themes.

1) The planning process, including issues around participation
2) Problem definitions, including the assumptions, analyses, and modeling runs that inform and shape the plans
3) Plan content, including the strategies pursued, the role of new technologies, and the importance of context
4) Funding for the proposals in the plan, including assumptions about future funding
5) The treatment of equity in the plans
6) The relationship of the plans to land use, housing, and economic development
7) Issues associated with plan implementation, including mitigation strategies and the treatment or risk and uncertainty
8) Comments about the institutions that shape the plan and are responsible for action on it

The findings in the next section are organized by these eight themes.

Table 2. Main topics emerging from the coded summary notes

(See Appendix 2 for details.)

STRATEGIES	LAND USE; FUNDING
CONTEXT	ECONOMIC DEVELOPMENT
NEW TECHNOLOGY	FUNDING
PRIORITIES	FUNDING; ASSUMPTIONS
CONFLICTS	FUNDING; EFFICACY
PARTICIPATION	FUNDING; PROGRAM DESIGN
PLAN CONTENT	EQUITY
PLANNING PROCESS	EQUITY; ASSUMPTIONS
PLANS – SPECIFIC	EQUITY; HOUSING
PLAN CONTENT; PROCESS	EQUITY; INSTITUTIONS
PLANS; ANALYSIS	EQUITY; PRIORITIES
ANALYSIS; MODELING	MITIGATION
ANALYSIS; ASSUMPTIONS	IMPLEMENTATION
PROBLEM IDENTIFICATION, DEFINITION	EFFICACY
ASSUMPTIONS	EFFICACY; PLAN CONTENT
LAND USE	RISK
HOUSING; CONFLICTS	INSTITUTIONS; ACCOUNTABILITY
HOUSING; PROBLEM IDENTIFICATION, DEFINITION	
HOUSING; STRATEGIES	

3. Findings

This section summarizes the findings from the interviews.

Planning Process and Issues Around Participation

The sheer number of transportation plans produced at the state level—the CTP, eight modal plans, and many additional strategic planning documents—was raised as a problem. Together, these plans add up to thousands of pages. While the plans offer numerous details about policies and priorities, their length and repetitiveness make the overall content hard to digest. Several of the interview respondents commented that they found the number of plans to be a barrier to fully participating in the planning process. In addition to the volume of material, several commented that the number of meetings, the widespread use of advisory committees, and other aspects of the participation process (such as the topics covered) limited participation to well-resourced organizations; others could not afford to engage in every meeting. For low-income advocates, reliance on web postings and online meetings was a barrier.

The general policy and values statements of the CTP were widely seen as positive and moving in the right direction. At the same time, many respondents expressed concerns that implementation strategies and the legal and financial changes needed were not explicitly discussed. Several further commented that the treatment of goals one at a time avoided the need to resolve potential conflicts and that the broad-brush treatment of challenges failed to specifically identify high-priority problems and proposed actions to address them. Likewise, several commented that the treatment of modes one by one, while sometimes mandated by federal and state rules, did not facilitate a multimodal, user-oriented approach to transportation.

Modal plans vary in their specificity. Respondents viewed some as vague while others were praised for providing useful detail and direction. In general, however, those who had taken a close look at the modal plans were concerned that they do not discuss what was accomplished through the previous planning cycle, flag problems and risks, or set out clear targets and performance measures for future actions.

The CTP is not required to be fiscally constrained. The plans developed by the state's MPOs, in contrast, are generally expected to reflect the levels of funding that are reasonably expected to be available over the planning period, although the long planning horizons for the plans (30 years) and the lack of certainty about revenue streams from federal, state, and local sources makes fiscal constraint in this context an imprecise concept. The addition of SCSs to the MPO plans was seen as a step toward greater specificity with regard to goal attainment, but MPOs' limited authority to implement the SCSs was seen as a serious constraint.

The California emphasis on building plans from the local level up, with regional plans covering most of the state's population, and the state plans filling in the interstices, was seen as making it hard for the state to lead in new directions. Likewise, the commitment to continuing past project-level commitments and the desire to avoid reopening environmental reviews were seen as barriers to change.

Ultimately, over half of the interviewees questioned the overall utility of the state plans because they were not seen as making commitments to action. (Their role as required documents for certain federal funds was acknowledged.) Several respondents felt that the CTP offered important guidance for Caltrans employees, relaying values and signaling the broadening mission of the agency, but did not hold the same relevance for regional or local actors. Indeed, a number of

the interviewees acknowledged that they had not actually read the plans, even when they had participated in formal meetings discussing them. It is unclear to many of those interviewed that policies enunciated in the state plans apply to regional and local agencies or only indicate how Caltrans will act on those aspects of the transportation system where it has the lead. From the perspective of many of those interviewed, the CTP and modal plans ultimately don't really matter—what matters is what gets programmed and moved forward to implementation.

Defining the Transportation Problem and Priorities

A characteristic of California's goals and objectives for transportation is that they have accumulated over time. In early years, the impetus was to build a network of roads to support development and provide for safe, reliable movement. Over time, transportation systems have increasingly been expected to accommodate multiple modes of transportation, avoid environmental harms, provide services to those with special needs, respond to community preferences, and keep facilities in a state of good repair. Today's goals emphasizing project delivery, safety, equity, environmental quality, climate protection, and economic opportunity reflect a far more nuanced and sophisticated understanding of the transportation problem than that of earlier eras.

Addressing goals one at a time was seen by some interviewees as ignoring very real potential conflicts between, for example, promoting mobility and ease of motor vehicle travel and reducing GHGs and negative community impacts. Likewise, dealing with modes in separate plans was seen as downplaying potential tradeoffs between competing modes (short-haul air versus rail, for instance). Unconstrained, long-term plans were seen as allowing transportation agencies to duck this issue by claiming that they could do everything proposed, such as greatly expand transit services without identifying how operating costs would be handled. It was also seen as undermining creative thinking about alternatives, such as using traffic calming to improve highway safety or using pricing to manage congestion as an alternative to highway widening.

The long time frame for moving projects from initial concept to ready to build means that there is a long pipeline of projects under development, and without some prioritization of goals at the state, regional, and local levels, several interviewees felt that "legacy" projects could make contemporary goals and objectives harder to achieve. A number of interviewees called for prioritizing goals, identifying which ones needed to be given immediate attention, and which ones, while still important, could be addressed at a later time. Among those interviewed, there was no single proposal for how priorities should be set. Some felt it imperative to accelerate actions that addressed equity and climate goals, while others emphasized keeping past promises to maintain government credibility and avoid wasting the money that had been spent on project development (or in some cases, having to return it to the federal government). Many felt that the Legislature needed to provide clearer signals in this regard.

Plan Content

The CTP 2050 aims to identify "policies and strategies required to close the gap between what the regional transportation plans (RTPs) aim to achieve and how much more is required to meet 2050 goals" for the transportation sector. For a number of the interviewees, this was seen as a problem inasmuch as it limits the impact of state policies in influencing local and regional actions.

Most of those interviewed were disappointed that the CTP 2050 did not provide a clear way forward. Specific criticisms were lack of an implementation plan with clear assignments of responsibility, performance measures, and deadlines for

achievement; lack of a clear funding plan; insufficient attention to modal competition and markets for various services; and heavy reliance on regional and local action as well as the actions of other organizations to achieve goals.

In addition, a number of those interviewed commented that the plans focus on infrastructure, especially networks and nodes, rather than on users and their needs; modern views of systems recognize that operations and management are essential elements and that users and their choices are part of a system. This was especially an issue for advocates of disadvantaged communities, who identified a number of problems their constituents face (for example, reliance on marginal quality cars and trucks; high costs of car registration and insurance; limited or no transit service in outlying areas or midday, nights, weekends, and holidays, even in areas with peak-period Monday to Friday transit; poor performance of paratransit with canceled or hours-late service; car and truck traffic through neighborhoods; and reliance on owner-operated vans for farmworker transportation but limited assistance for these services).

Other interviewees also identified content gaps. Several commented that congestion was still a problem for many of their constituents and that the linkages to housing and economic development problems were underplayed. Others noted that the plans seem geared to long trips on state facilities, even though the majority of trips by car are under 5–6 miles, and many freight trips are short as well. Several complained that it was hard to find data on seemingly important considerations, such as the share of work trips that can be made by transit in 45 minutes or less, or the percent of on-time paratransit pickups.

Turning to specific strategies, the participants had many comments, ranging from specific proposals that they view as deserving more attention (put more money into bike and pedestrian facilities; find ways to increase funding for transit operations; increase emphasis on housing and redevelopment and revitalization; discuss the role of employers and businesses in managing congestion and encouraging telecommuting; document and prioritize successful projects; figure out how to reconfigure projects that create problems for goal attainment) to changes in the planning process, such as start with user needs rather than network focus, identify key problems, and focus plans on solving them.

Funding the Plans

A major frustration expressed by the interviewees for this study was that funding issues were not adequately discussed, with the result that the plans' credibility and relevance were undermined. Funding is committed to projects in the programming process rather than in long-range plans, for the most part. The CTP is not required to be fiscally constrained, and this allows the plan to express an ambitious vision for the future. But the lack of funding specificity comes at a cost. It is possible to prepare a fiscally constrained plan without listing the specific projects included; this, after all, is what MPO plans do (however imperfectly). It is also possible to create an alternative that is constrained to what is feasible under current law alongside an alternative that is unconstrained and aspirational.

A common theme among those interviewed was that available funding fell far short of the ambitions of the plans, but this was not addressed in the CTP. Interviewees cited funding shortfalls at the state level (for example, SB 1 was seen as a good start but not a full solution; small programs designated for bike and ped projects, innovative transportation land use plans, and so on were oversubscribed). Insufficient funding was also seen as a problem at the local level (for example, sales tax and bond measures were seen as providing partial funding for projects, leading to gaps in the ability to deliver projects and pressures for the MPOs or the state to provide matching funds). The interviewees were critical of the lack of explicit discussion of this issue in the CTP.

Another concern expressed by many was that the flexibility of spending the monies raised by voter-approved measures was unclear and that the emphasis on "promises kept" tended to lock in projects and funding categories that might no longer be the highest priority. Others pointed out that many other promises have not been kept, including promises that people with disabilities would be provided timely services and accessible facilities and that disparate impacts of transportation facilities would be mended; they would like to see a reconsideration of priorities. At the same time, several interviewees commented that making changes in funding plans would be a difficult and costly process, often requiring specialized staff or consulting assistance and potentially generating additional environmental reviews and political controversies.

Finally, several of those interviewed commented on the heavy reliance on new technologies and not-yet-authorized funding sources, such as road pricing for meeting goals. This struck them as risky.

Equity Issues

While the state has enacted several laws calling for greater attention to equity issues in transportation programs, many advocates believe that promises are still waiting to be fulfilled. Among the concerns raised are:

- Need for more attention to housing and economic development to create a context for greater equity overall
- Shortcomings of current services for people with disabilities
- More attention needed for the many short trips that make up most of the state's travel and VMT
- More attention to transit availability (access times, service frequencies) and affordability and not just to networks
- Need to move from recognition that past projects harmed communities, especially communities of color, to explicit plans for remediation, not just a promise to do better in the future
- Need to reduce GHGs but also address other environmental harms, including pollutant exposures, excessive noise, and harm to sacred lands and the natural environment

In the discussions of equity, a frequently expressed concern is that the state transportation plans focus on facilities rather than people and that this leads to a narrow view of the transportation problems that the state is facing as well as a limited perspective on potential ways to improve conditions. This critique is underscored by the previously noted concerns about planning processes and participation approaches, making it difficult for those with limited resources to fully engage in the planning process.

Land Use, Housing, and Economic Development Connections

The CTP, and especially the MPO plans, acknowledge the connections between land use and transportation. However, housing experts, developers, economic development specialists, and some transportation researchers interviewed as part of this study commented that the connections between transportation investments and land use (especially housing) and economic development could be more explicitly discussed in the state's transportation plans. The reasoning was that transportation is not only responsive to land use patterns but significantly shapes them. Unless the land use, housing, and economic development issues are more explicitly and firmly tackled, these interviewees argue that many transportation problems will persist long commutes, congestion, and the associated social and environmental problems.

While SB 375 and housing element and Regional Housing Needs Allocation (RHNA) rules are important ways to link transportation and land use in the state, many interviewees commented that a broader perspective is necessary. The gist of the many points made is as follows:

- The focus on transit station areas as locations for additional development is a good move, but there are many other locations that can support higher densities and housing affordable to a range of incomes, including urban arterials, aging malls, and small town main streets.
- Proposals like complete streets could be tied to housing and economic development strategies for greater mutual effect.
- Land uses in the vicinity of freight corridors need more attention from an equity perspective and because, in reality, the corridors serve person trips as well as freight movements.
- Development policies that give every city and county responsibilities and access to rewards (funding) are fairer than concentrating low-income housing in a few places.
- Land suitability is just one of many determinants of where development occurs, and land availability has not proven to be a very good indicator because there is an information void about what actually is or could be made available.
- Some state policies can have unintended consequences, for example, rezoning for higher density adds value and pushes up prices, and the ability to develop or convert units into fourplexes might result in speculation rather than affordability.
- The problem is not just identifying parcels and zoning for them, it includes lengthy review processes and uncertainties when it comes to developing those parcels.
- More funds are needed to support affordability for low- and middle-income groups—the market is not delivering it, and the available programs for affordable housing are too few and too small.

Several interviewees commented that policies that leave land use decisions to the discretion of local governments (with some exceptions) sharply reduce the ability of regional and state agencies to achieve integrated multimodal transportation systems, reduced VMT, an so on. On the other hand, several noted that contextual differences in user needs, available transportation services, and barriers might best be addressed locally and were glossed over in the plans.

Interview participants also noted that better databases would greatly improve the state's ability to plan for transportation, land use, and environment together. For example, there were calls for a statewide publicly available parcel map database.

Implementation, Mitigation, and Risk

The treatment of implementation as a stand-alone element rather than part of the CTP was a disappointment to many of those interviewed. By not focusing on implementation, the interviewees commented, the plan appears to be ducking critical issues of feasibility and reducing its own credibility.

Not dealing with implementation also meant that the need for mitigation was underplayed, and the risk associated with some of the strategies proposed was understated. On mitigation, interviewees commented that older projects often included little or no mitigation for VMT and GHG emissions, putting greater pressure for action going forward; that including mitigation in highway projects could greatly increase their costs; and that mitigation banks are a potential way forward but require considerable work on issues, such as scale of application and additivity of the mitigation over and above what is already planned.

Interview respondents also commented that many of the assumptions underlying the plans are risky. In particular, assumptions about new technology, transit availability, telecommuting prevalence, and road pricing were called out as being uncertain with regard to scope, timing, feasibility, and acceptability, not entirely under control of government, and therefore not a sure thing. Reliance on MPO plans was also questioned because the MPO plans also include ambitious assumptions about technology, transit, pricing, and telecommuting.

Institutional Issues

Many of those interviewed noted that institutional complexity sometimes is a barrier to effective planning and conflict resolution, especially when multiple priorities are in effect.

The CTP and modal plans do not clearly lay out assignments of responsibility, which in California is dispersed among many actors (CalSTA, Caltrans HQ, Caltrans Districts, MPOs, RTPAs, County Transportation Commissions, counties, cities, transit agencies, other special districts and authorities). Several commented that the current institutional structure gives the state and regional agencies only limited ability to steer investments; the CTP 2050 states that its aim is a fairly limited one: to close the gap between what the RTPs aim to achieve and what in addition is needed to meet 2050 goals for the transportation sector. However, by not more specifically tying problems, priorities, and strategies to responsibilities for action, the plans fall short of offering a convincing path forward. Several of those interviewed commented that greater accountability is needed, with specific review of what was and was not accomplished in previous plans and programs, tracking of assumptions, and progress reporting. Several also noted the absence of contingency plans in case some of the assumptions on which the plans rest prove inaccurate.

CAPTI was noted by a number of interview participants as a positive step forward in its identification of priorities for expenditures, although some argued that this should have been in the CTP itself.

Taking a broader view, several interviewees suggested that the governor and/or the legislature should take a step back and review the institutional structure that has been established for the state. Currently, several state entities have overlapping responsibilities (CalSTA, CTC, Caltrans HQ, the SB1 Inspector General) and this might not be the most efficient way to organize policy, nor the most transparent. California's hyper-local assignments of authority put government close to the people but also make it hard for the state to steer actions in new directions. MPO borders don't always cover the labor markets and commute sheds that help to define metropolitan regions, and cities and counties cover even less. Devolution of authority to Caltrans district offices may be making it slower and more difficult to implement cultural change and contemporary planning processes. State salaries are often below those of the competition (consulting firms, MPOs, cities) and this can make it hard to retain top staff and keep morale up.

4. Recommendations

The interviews presented in this report confirm the recommendations presented in Part 1 of this paper and elaborate on the rationale for the recommendations. Most of those interviewed were appreciative of the progressive goals and objectives laid out in the CTP 2050 but were disappointed that the plan did not provide a clear way forward. State modal plans received mixed reviews, with some seen as offering concrete strategies and others remaining largely aspirational. Specific criticisms were lack of an implementation plan with clear assignments of responsibility, performance measures,

and deadlines for achievement; lack of a clear funding plan; insufficient attention to modal competition and markets for various services; and heavy reliance on regional and local action as well as the actions of other organizations to achieve goals. Many interviewees commented that the assumptions about technological innovation and its diffusion were highly optimistic, as were assumptions about transit expansion and telecommuting. Many thought that equity issues and the interrelationships among transportation, housing, and economic development had been given short shrift in the plans.

While recognizing that the CTP 2050 is fiscally unconstrained and is not expected to propose specific projects, many of those interviewed felt that this lack of fiscal realism made it possible to avoid hard issues. Many also noted that institutional complexity sometimes is a barrier to effective planning and conflict resolution, especially when multiple objectives are being pursued.

Interviewees expressed concern that the plans do not acknowledge that goals can be in conflict and do not lay out clear priorities among goals or strategies for dealing with conflicts and finding ways to harmonize them. Several noted that the current institutional structure gives the state and regional agencies only limited ability to steer investments and does not mandate that local and regional agencies consistently follow state goals. Interviewees further commented that contextual differences in user needs, available transportation services, and barriers faced were glossed over in the plans. Coordinating economic development strategies as well as housing with transportation was frequently mentioned as a planning gap. In addition, the sheer number of plans and their length and repetition were seen by many as making it impossible to get a full picture of transportation today or as proposed for the future and making it harder to participate meaningfully in transportation planning processes.

These findings are consistent with and confirm those based on text analysis in Parts 1 and 2 of this review of state plans. They suggest in particular that the following actions would be desirable.

- Set policy priorities, and develop a process for conflict resolution.
- Supplement the aspirational statewide plan with an alternative that illustrates what can be done with existing and reasonably anticipated funding and legal authorities.
- Flesh out implementation details, including assignments of responsibility, funding sources, and measures of accomplishment.
- Review institutional relationships and make revisions to bring authority to act into alignment with assignments of responsibilities.
- Make user needs an essential element of problem identification and planned action, along with infrastructure delivery and preservation.
- Expand on the treatment of equity issues, and make change not just a pledge but a reality.
- Expand the discussion of and commitment to integrate transportation, land use, and environmental planning and decision-making, with particular attention to housing and economic development plans and programs.
- Reorganize state plans and the planning process to integrate and streamline the CTP and modal plans, and make participation in planning more inclusive and impactful.

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Author Contributions

Elizabeth Deakin served as the Principal Investigator for the project and is responsible for the overall structure of its reports. She is the sole author of this paper. She conducted all interviews and carried out the analysis.

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Appendix 1.
Interview Guide: AB 285 Study for SGC

NOTE: The interviews were conducted as discussions rather than questions and answers. The interview guide is just that—a guide, not a survey. While the guide covers the topics we expect to examine, interviews will focus on the topics that are most relevant to the respondent. Interviews were anonymous unless permission to quote a respondent is requested and granted.

A) Introductions; verbal confirmation of agreement to be interviewed (overview of study and invitation with disclosures/human subjects protections presented beforehand)

B) Brief description of study:
Researchers from UC Berkeley, UC Davis and UCLA are working with the Strategic Growth Council on a response to AB285. That state law requires that SGC submit a report to the Legislature in Jan. 2022 discussing the key transportation plans in the state, their relationship to housing and sustainable communities programs, and their potential for achieving long term state goals. Our report will assess the planning processes and the plans themselves, and will cover the California Transportation Plan, the state's modal plans, and MPO plans.

We are looking for your candid views on the plans, their strengths and weaknesses, and

C) Questions

1) Respondent's experience with transportation plans and related plans

- How long and it what capacity have you been working on this topic? Please tell me about yourself. (Job history, length of time, degree(s) (engineering planning, other...))
- Please tell me a bit about your work with the development of [relevant plan (s – what have you been doing?
- Have you also worked on other plans? Which ones?
- What do you see as the biggest strengths of [specific plans mentioned]?
- What do you see as the biggest challenges or barriers to their successful implementation?

2) Plans' goal attainment

The state has established a number of goals for transportation, which are called out in the most recent California Transportation Plan:
(a) Mobility and accessibility.
(b) Integration and connectivity.
(c) Efficient system management and operation.
(d) Existing system preservation.
(e) Safety and security.
(f) Economic development, including productivity and efficiency.
(g) Environmental protection, air quality, and quality of life.
(h) Environmental justice.

a. Which of these would you say are the most important / highest priority from the perspective of your agency/organization?
b Are there some goals on this list that you see as being in potential conflict with others? Are there any goals missing from this list?
c. What do you see as the most important ways to achieve these goals? Do you believe that there are specific factors that may prevent the attainment? [What are they?]
[discuss list]
d. To what extent is [plan on which respondent worked] being implemented as proposed? Why or why not? Which goals are being implemented most effectively, which less so?
e. Are their specific projects/types of projects whose implementation- or perhaps the failure to implement them in a timely fashion – undermines goal attainment?

3) Statewide integrated multimodal transportation system

AB 285 asks for us to report on the extent to which implementation of key state and regional plans will "influence the configuration of the statewide integrated multimodal transportation system." We would broaden this to ask about the extent to which the system or systems we are developing are best serving the people and enterprises of the state.

- What in your view would constitute a statewide integrated multimodal transportation system? [criteria, level at which integration is most important]
- Are there current practices that you believe are barriers to an integrated system? [or a system that has a better chance of goal attainment]? What are they?
- [ask open ended, probe about funding issues, hands tied by popular votes on specific transportation projects, consumer preferences for mode of travel, consumer preferences for type of motor vehicle used, quality of service offered by transit..., ...}
- What are the biggest challenges / problems / barriers? (cost/funding, mismatch of timelines for plans, program, funding, process inertia (e.g., continue to pursue projects conceived years earlier under different circumstances and with different understandings of social, economic and environmental imperatives), uncertainty about future technological options, high level of decentralization of decision-making in CA, many levels of govt w/ complex rules at each level, public and private elements, ...)
- Are there programs or activities that are NOT on this list that in your view could make a big difference in system coordination and performance? [more activity on pricing, more attention to induced travel in project evaluation, review of environmental impacts of projects for which the EIR is older than the TIP, ...}
- What would you say are the key lessons learned from the experience to date?

4) Coordinating across programs

AB 285 asks for us to review the potential impacts and opportunities for coordination of the following funding programs: the Affordable Housing and Sustainable Communities Program, the Transit and Intercity Rail Capital Program, the Low Carbon Transit Operations Program, the Transformative Climate Communities Program, and the Sustainable Transportation Planning Grant Program.

- What level of engagement has your organization had with these programs? (Get details)
- How important do you see each of these programs being for state goal attainment? Which goals? Why so? Are there programs or activities that are NOT on this list that in your view could make a big difference in system coordination and performance? [existing programs, programs that do not currently exist]
- What are the biggest challenges / problems / barriers to coordinating these programs?

- Do you see advantages for having these programs be run separately? If so, what are they?
- What would you say are the key lessons learned from the experience to date?

5) Participation and the institutional framework

An issue with planning of all sorts is whether the process is transparent/comprehensible and inclusive /lets people participate meaningfully. A related issue is whether the way we have structured our laws, organizations, and processes for planning are serving us well – delivering projects and programs that are equitable, environmentally sound, economic.

- To what extent do you think the current process is understandable? Who understands it and who does not? What are the impacts of this complexity? Who participates and who does not? Who benefits and who does not? What changes, if any, would you recommend?
- Although California must comply with federal laws and some state rules apply to local plans, much of California planning system is devolved regional or local levels or to private actors. The same is true for land use (including housing). What are the pros and cons of this approach? How does it affect state goal attainment?
- Should regional transportation improvement plans (RTIPs) and longer term regional plans and state plans be better coordinated? If so, how so? Are there examples from other states, countries, domains of practice that offer potential examples for California to consider? (Project list requirements, consistency reviews, ...)
- Are there institutions or practices that come to mind that are "policy fossils" – leftovers from an earlier era that no longer make sense? What would you change, eliminate?
- Are there legislative changes that you believe are necessary or would be helpful? (discuss)

6) Other comments

Are there additional thoughts in this topic that you would like to share with us?

Appendix 2.
Interview Summaries Sorted by Topic

The 86 interviews yielded 260 comments. There are more comments than interviewees because the number of points made by each respondent varied. Themes listed in capitals in the Comment column were coded by two reviewers to confirm consistency in coding. Some comments were viewed as responding to more than one theme, as noted in the entries.

THEME	COMMENT
ACCOUNTABILITY	Agencies are changing, recognition that we need to focus more on what is being accomplished. Look at CAPTI as an example - only climate action but a start. (State agency staff 1; similar comments state agency staff 5 and 6; elected official 3)
ACCOUNTABILITY	ACCOUNTABILITY. The biggest problem with the state's transportation plans is their lack of accountability. It is one thing to say they don't need to be fiscally constrained but that is not a reason not to set performance measures and track accomplishments and shortfalls. This should not be waiting for CARB; Caltrans and the MPOs should be doing annual performance reports. (Researcher – transportation 2)
ANALYSIS	ANALYSIS. Available models can capture economic development potential but are not always used to their full capability. (Economic development expert 2)
ANALYSIS	ANALYSIS. Simplistic assumptions are often made e.g., X% increase in price, or dial up growth in some areas but not others; these could be replaced with location-specific info and analysis of market potential at each location — but this would require more data, more work. (Economic development expert 2)
ANALYSIS	ANALYSIS. Trucks pay a lot of money but also do a lot of the damage to pavements. Old studies indicated they were not covering the costs they imposed, haven't seen a dispassionate analysis since then. (Business leader 2)
ANALYSIS	ANALYSIS. More attention needs to be paid to user needs, analyze levels of service they experience on commutes or other vital trips, problems users face. (NGO staff 4)
ANALYSIS	ANALYSIS. Combined LU, T strategies did far better than either alone even though consultants made simplistic assumptions about where growth would occur and at what levels. Tools are available to do more sophisticated analysis, e.g., looking at development potential throughout the state PUMA by PUMA or whatever geog. level you want, but budget for this was limited. (Transportation modeler)
ANALYSIS	Rural highways (whether at edge of highly urbanized area or in non-MPO areas) are likely to see slower growth so spot improvements might alleviate congestion without much of a VMT change (very gradual over many years). But there are exceptions where VMT change can be larger, e.g., highway improvements that allow people faster access to jobs centers a ways away or ones that make travel to recreational areas much faster. These projects may not have a local land use change but as part of a larger network can make a difference in accessibility and so need to be looked at as part of that larger network. (Highway modeler 1)

ANALYSIS; ASSUMPTIONS	ASSUMPTIONS. Many of the assumptions [that underlie the analyses of the plans] in the plans are high risk or worse – not likely. Concern about major increases in transit with no identification of money to pay for it. Results from not setting priorities and then saying you need to do everything AND reduce emissions and VMT while you are at it. Leads to assumptions like, large share of the workforce will work from home and transit will improve so much that many people will find it preferable, esp since car operating costs are going to skyrocket due to road pricing and cordon pricing around job centers. (State official)
ASSUMPTIONS	Somebody should put together a list of all the funding assumptions being made for 2030 or 2035. (City planner 4)
ASSUMPTIONS	How good are our estimates for gas tax and sales tax revenues? (Business leader)
ASSUMPTIONS	It is not just modeling that is suspect, so are a lot of the assumptions that go into the models. The differences in population forecasts should raise a red flag. Maybe slower population growth (more out-migration, less in-migration and immigration) will be what makes the difference. Studies are increasingly reporting that people want to leave, but that may be the fires and droughts - but the question is, are those a permanent feature of California living or just a bad run? (Economic development expert)
ASSUMPTIONS	Some assumptions state is making are sketchy, e.g. All EVs by 2035. I hope so, but a lot could go wrong. (Rail expert 1)
ASSUMPTIONS	Some assumptions MPOs are making also are sketchy, e.g., share of telecommuters, transit recovery (riders may come back but they only cover a part of the budget). Need to deal with what happens as recovery funds are spent, track what is happening with parking and sales tax elements of funding (differs by operator). (Rail expert 1)
CONFLICTS	CONFLICTS. Goals are evaluated one at a time and conflicts are not addressed. Distaste for acknowledging areas of debate, disagreement, dissent (partly because of fear of speaking out?). (State agency staff 4)
CONFLICTS	CONFLICTS. If we could acknowledge past shortcomings or oversights without fearing negative repercussions, could probably use delay, amendments, reprogramming to change direction or wait until needed. (State agency staff 4)
CONFLICTS	POLICY CONFLICTS. Need to recognize that there are conflicts between minimizing vehicle delay (measure of congestion) and transit priority, pedestrian safety, etc. (Advocate for bike ped 2)
CONFLICTS	Little or no discussion of what tradeoffs we should be considering in spending state money for e.g., HSR or air or N-S highway improvements. (Researcher – transportation 3)
CONFLICTS	Conflicts with old policies: complete streets vs freeway relievers on arterials, claims that HOT lanes, auxiliary lanes, etc don't increase VMT — but PEMS data suggests the opposite. HOT lane only works if more people are willing to pay than to carpool. Model all the projects in the TIP and see what you have... areas are frontloading highways and putting transit investments into year 8 or 10. (Academic 2)
CONTEXT	CONTEXT, PREFERENCES. One size fits all approach is problematic; TOD requires market conditions that don't materialize in inland areas; transit is not well utilized in most low-density areas for people who have a choice because it is too infrequent and too slow compared to driving and most people do have cars. (Automobile advocate 1)

CONTEXT	CONTEXT. Highway network is skeletal in outlying areas, need more roads to handle growth. (Automobile advocate 1)
ECON. DEV.	EC DEV. Should be concerned about the quality of jobs – transit can be good blue-collar jobs. Not so clear about TNCs. (Legal 1)
EFFICACY	EFFICACY. A lot of projects are just rearranging the problems, e.g., move bottleneck upstream. (Traffic engineer – transportation expert 2)
EFFICACY	EFFICACY. Capacity expansion at the fringe of a region is likely to create both transportation and land use [impacts]. (Researcher – transportation 4)
EFFICACY	EFFICACY. Regional plans are supposed to be constrained fiscally but they aren't always realistic either. For example, there is no real planning for what to do if anything goes wrong, bumps in the road toward electrification, for example. (Researcher – transportation 4)
EFFICACY	EFFICACY. It should be clear to us at this point that Housing Elements and other existing housing programs are insufficient to overcome the housing crisis in California. Also, that building on former ranch and farm properties on the urban fringe or beyond it leads to longer trips. (Researcher – land use, housing 1)
EFFICACY	EFFICACY. Housing policies are too focused on TOD, too hyper-local – compare potential sites to transit availability. Need a broader strategy. (Researcher – land use, housing 1)
EFFICACY; PLAN CONTENT EQUITY	PLAN CONTENT. Take a look at CAPTI. This is a strong way forward even though many of the commitments are [to do more studies] (State agency 3) Equity has to be black and brown people first because they have been discriminated against worst, but don't kid ourselves that other colors and races and genders and people with special needs aren't also discriminated against by the way we invest or fail to. How about identifying what is actually needed as a first step? (NGO planner – equity focus 3)
EQUITY	EQUITY. Indifference to delay for paratransit is unequal treatment for people with disabilities. (Equity advocate – people with disabilities)
EQUITY	EQUITY. People with disabilities need to be given more attention. Walking 15 min. is not an option for people who need a walker. Wheelchair access is problematic when sidewalks aren't available or maintained...travel in the paved street [in a wheelchair] can be dangerous because of the speed difference. (Equity advocate – people with disabilities – similar comments, 3 respondents)
EQUITY	EQUITY. Not good enough to write mea culpas about past sins. Need to correct past sins. (NGO staff 3, similar comment NGO staff 4)
EQUITY; ASSUMPTIONS	ASSUMPTIONS. Concerned about future of transit, local retail sales, and while some work on this [referring to stated preference surveys etc.] it is largely a wait and see proposition. (Equity advocate 3)
EQUITY; HOUSING	Housing seems to be the key place to focus going forward [in order to create the context for greater equity overall]. Equity advocate 3)
EQUITY; INSTITUTIONS	INSTITUTIONS. Simply having a bunch of apologias for past sins is not enough. We need real reform in agency attitudes toward the disadvantaged and putting funds into remedies. (NGO planner – equity focus 1)

EQUITY; PRIORITIES	PRIORITIES. GHG is clearly a top priority but not the only environmental issue related to transportation for people of color and people with low incomes. Traffic through neighborhoods is still an issue, especially for communities of color. Air pollution is still an issue. Exposures around ports and highways are a big problem. EVs are better than ICEs but they still add to problems since tire, brake particulates are toxic. Vehicle disposal sites also create exposures. Even e-bikes can be a problem if the batteries wear out fast. (Equity advocate 2)
FUNDING	FUNDING. There is not enough money available in County tax plans, regional plans, or state funding to handle what we need in pedestrian and bike facilities much less transit operations. (Local elected official 1)
FUNDING	FUNDING SB 1 helped but is just a start. (Transit agency official 1)
FUNDING	FUNDING. Sales tax measures are a big source of overall transport funding – most include specific projects although increasingly we are using less specific language so that we are not as tightly bound. Still, these are promises to the voters and if you want to get voter approval the next time, better do what you said you would. (County planner/engineer 1)
FUNDING	FUNDING. We spent most of our transportation funding for generations on highways and now think we might rebalance that with something like 5% of the transportation budget and no mandate for locals to change their It won't work until the state redirects funds, delays highway projects, pays for affordable housing OR goes the other direction and says do what you will but you have to do it with an EV car or van or truck if you don't do it with SB 375 strategies. (County planner/engineer 2)
FUNDING	FUNDING. We have made progress implementing transit, bike and pedestrian facilities, but could use more funding for these projects. (MPO 1)
FUNDING	FUNDING. For other funds we can negotiate fund swaps or other strategies that allow joint projects but this is complicated and we often are at the mercy of a consulting contract to get the work done because we don't have the inhouse staff. (MPO 2)
FUNDING	FUNDING. On the other hand, for tax measures, some incentive to be general to avoid 2/3 vote requirement. (State agency staff 4)
FUNDING	FUNDING. Not enough money for transit, bike, ped projects and some of the funds are costly to apply for (costly: not clear there are staff to apply for them in smaller and lower income cities). (Advocate for bike ped 2)
FUNDING	FUNDING. We have made progress implementing transit, bike, pedestrian projects but could use more money for these projects. (MPo 2)
FUNDING; HOUSING	FUNDING. Infill housing is more costly to build than large scale tract development (land costs, fitting into urban fabric, etc) even if the net social impact is positive. Fund the added costs. (Researcher - land use, housing 1)
FUNDING; ASSUMPTIONS	ASSUMPTIONS. Ballot measures for housing and transportation 2024 (2022 doesn't seem to be polling well). (Equity advocate 1)
FUNDING; EFFICACY	FUNDING, EFFICACY. New sources of revenue are very useful but requires a staff person to keep on top of them all, have to think about what the chances are of succeeding (10-15% of staff time is chasing grants in large city: it takes a big staff to get the money which in itself is an equity issue. (Local transportation official 1)

FUNDING; PROGRAM DESIGN	PROGRAM DESIGN. Advocacy groups spend a lot of time scrambling to apply for grants – consolidation might be in order. (Advocate for low-income households 2)
FUNDING; PROGRAM DESIGN	PROGRAM DESIGN. There are a lot of small programs and while I get it that competition is a way to sort out the stronger from the weaker proposals, there is just not enough funding for some of the state programs. (MPO 4)
HOUSING	Need to develop strategies to slow down speculation in housing (Biden – slower to release housing portfolio to general bidders) – state could do more. (Equity advocate 1)
HOUSING	Find ways to preserve affordable housing as contracts expire. Maybe tie to social housing program or agency. (Equity advocate 1)
HOUSING	Speculators are short circuiting self-help options. (Housing expert 1 (advocate))
HOUSING	Fourplexes are a step forward and can easily fit into single family neighborhoods. Need examples of how to do it made available to developers to reduce costs, speed approvals. (Housing expert 2 – researcher)
HOUSING	Other housing types that would fit into residential areas need to be documented – e.g., sixplexes or fourplex conversions plus second unit in back. (Housing expert 2 –researcher)
HOUSING	Arguments for half acre min. and 30 units/acre [for affordable housing] are to get the scale that can pull down costs —but also may lock out opportunities. (Housing expert 2 – researcher)
HOUSING	Preservation of affordable housing where contracts are about to expire needs attention. Not a new issue for US but not solved. (Housing expert 3 – advocate)
HOUSING	Biden [has instituted a] longer time for affordable housing advocates to step up; helps but need to have funds to do it. (Housing expert 3 – advocate)
HOUSING	Speculator buying [if housing] is a big part of the problem (Housing expert 3 –advocate; other community leader 4)
HOUSING	Builders come in various sizes, policy tends to favor bigger ones who have the time and resources to assemble multiple parcels, get the local govt. approvals, handle impact fees, etc. before the project is even on the way (Housing expert 3 – advocate)
HOUSING	HOUSING. Paper looking at housing element parcels and zoning vs. where housing was built shows just about no relationship. So, designating enough parcels with zoning isn't sufficient to induce housing to be built and doesn't focus housing on those parcels either. Need a more nuanced approach and will probably need govt intervention on a larger scale to get housing for people making less than six figures. (Housing expert/developer, consultant)
HOUSING	HOUSING. California housing is expensive because CA has high land costs, high labor costs, a tight construction industry labor market, payment for housing-related infrastructure though exactions and impact fees, discretionary approvals that add time to the project, restrictive zoning, and public opposition to change. The legislature has been addressing the last two but these are only a small part of the problem. Also, there has been resistance to prefab which potentially could lower costs. (Researcher – land use, housing 2)

HOUSING	Mapping where housing development occurred vs. where RHNA parcels were [showed that there was] not much relationship to one another. This is because development occurs on parcels that no one thought would be redeveloped (neither city planners nor HCD have an inside track to what the property owners may be thinking or talking to developers about) and because quite a lot happens on smaller lots and lots that are already built. (Housing expert 2 – researcher)
HOUSING	Need to find ways to make second units affordable, maybe pre-approved manufactured housing options so no need for design or design approval. (Housing expert 2 – researcher)
HOUSING; CONFLICTS	Current policies treat housing as a hyper local issue (local housing elements and within them focus on RHNA allocations with a ton of ever-changing rules for sites to be included, etc.) This is unrealistic – doesn't match markets or submarkets which are regional and subregional and only deals with a part of the reason housing is so difficult in current markets. MPOs or regional authorities could deal with this better but would probably be resented by locals — but then locals already resent RHNA and ultimately the state needs to decide what to leave to locals and what is best handled elsewhere. (Academic 1)
HOUSING; CONFLICTS	HOUSING, CONFLICTS. HCD RHNA policy getting more and more restrictive but not producing housing on the ground. Issue is not just land availability and suitability, also zoning (SB9 as a start) and upfront costs (getting permits, reviews, etc. etc.) (Equity advocate 1)
HOUSING; PROBLEM IDENTIFICATION, DEFINITION	HOUSING, PROBLEM DEFINITION. Trickle-down takes too long to work [in housing markets]. (Equity advocate 1)
HOUSING; PROBLEM IDENTIFICATION, DEFINITION	HOUSING, PROBLEM ID. Modest price on existing housing often due to seniors moving on, passing away where house wasn't updated for years and needs some repairs, maybe big-ticket items like a new roof and a new HVAC system and updates to wiring, sewer connections, etc. This has been a way for first time buyers to get into market and modest price is often temporary because of homeowner improvements over the first few years. If price stays modest for longer term, it is often due to being bought by a speculator [who is extracting rent while assembling parcels or ignoring conditions as absentee landlords] or by slumlord – bad options since they do the minimum to skate by health and safety codes and housing is likely to continue to deteriorate. (Housing expert 1 – advocate)
HOUSING; PROBLEM IDENTIFICATION, DEFINITION	HOUSING, PROBLEM ID. Some buyers use teardown and rebuild but more use variations on tear down to rebuild gradually (e.g., redo the baths and kitchen from studs out, replace warped plywood and renew floors, longer term rewire; raise roof to add more BRs, etc. – long term. Easier to accomplish this if housing was solid in first place and not yet ravaged. A lot of this goes on in cities and inner suburbs. (Housing expert 1 – advocate, other community leader 3)
HOUSING; STRATEGIES	HOUSING, STRATEGIES. Good to build high density and large scale housing near transit and to get to the densities transit deserves the half acre makes sense, but outside transit station areas there is room for smaller scale infill that cumulatively could make a big difference. (Housing expert 2 – researcher)
IMPLEMENTATION	IMPLEMENTATION. State policies talk the talk but action is still to be proven. (Equity advocate – low-income households 1)

IMPLEMENTATION	IMPLEMENTATION. Current plans do call out equity and climate change but not very specific about the changes that will be made—are plans mandates or just aspirations that can be ignored? (Equity advocate – low-income households 2)
IMPLEMENTATION	Implementation and monitoring: what was accomplished, what not? What was successful, what not. (Advocate for bike ped 4)
IMPLEMENTATION	IMPLEMENTATION. Need to refocus plans on implementation and monitoring: what was accomplished, what not? What was successful, what not? (Other community leader 2; similar comment, state agency staff 4, state agency staff 5)
IMPLEMENTATION	IMPLEMENTATION. And no serious emphasis on implementation or where we have serious problems/barriers that need attention. (Researcher – transportation 3)
IMPLEMENTATION	PLAN CONTENT. Pathways to get things funded could be part of the plans but are not now clearly articulated. (State agency staff 4)
INSTITUTIONS	INSTITUTIONS. Caltrans districts are more concerned about delay than multimodal options – complete streets get a lot of hassle because they cause traffic to slow or require narrower lanes than Caltrans prefers. (Advocate for low-income households 1)
INSTITUTIONS	INSTITUTIONS. Caltrans districts need to own up to induced travel. Many did not adequately analyze this on highway projects. They don't want to reopen CEQA review but maybe Caltrans HQ could take responsibility for all old projects and fund their mitigation. (Researcher – transportation 1)
INSTITUTIONS	INSTITUTIONS. Need to think about restructuring transport agencies. Not clear why we need STA and CTC and Caltrans. Legislators also create transportation programs in CARB, SGC, and occasionally other state agencies - adds complexity though there is some value in having agencies that are invested in the outcomes give out the money and target it to likely successes. It does seem however that funds get distributed to make constituents feel they got their fair share, rather than strictly based on likely success and impact. This would be a reason to make the grants to the MPOs or otherwise apportion it (even if it earmarked) and not go through a supposed "competition." (Researcher – transportation 1)
INSTITUTIONS	INSTITUTIONS. Caltrans has reformed itself considerably and is more attuned to fix it first, manage it better, consider multiple modes approaches than it was a decade ago. Still Caltrans will come to meetings, not say anything, then at the very last meeting say that they will not support what has been negotiated. This is not helpful. (MPO 1)
INSTITUTIONS	INSTITUTIONS. Caltrans adherence to design manuals that don't reflect contemporary concerns about slowing traffic for pedestrian and bike safety and community livability: Conflicts have ranged from trees in medians to pedestrian crossing times. (Comment is about District office) (City planner/engineer 1)
INSTITUTIONS	INSTITITUTIONS. We are a small MPO and our borders don't coincide with our residents' commute patterns and this issue is growing. We do work with neighboring MPOs to coordinate plans but there are some funds that have to be spent within county boundaries. (MPO 2)
INSTITUTIONS	INSTITUTIONS. Staff are adding energy, new ideas, desire to move in new directions. But also, many senior officials who are set in their ways, think changes will be a flash in the pan, don't want to change, and a high level of decentralization of decisions (to Caltrans District offices, to MPOs, to County Transportation Authorities, etc.). (State agency staff 3, MPO county planner 4)

INSTITUTIONS	INSTITUTIONS. MPO structure could be reconsidered: 1) cover entire commute sheds 2) more population representative (now geographic). (State agency staff 6)
INSTITUTIONS	PLAN. State transportation plans need restructuring. Could go top down or bottom up but right now not doing either. Either let MPO plans be the framework and state fill in interstices or direct MPOs to follow state policy plan and show how they are implementing state policies. (Researcher – transportation 1)
INSTITUTIONS	LOSTs. County sales tax measures should be written to allow for contingencies, new information, some flexibility. (State agency staff 6, county planner 3)
INSTITUTIONS	CA EXCEPTIONALISM. One factor that affects state planning is how much of the transportation system is owned and operated by the state. While California's state highways carry a little more than half of the traffic in the state, the state doesn't own the majority of the roads or operate them. This creates a need for coordination that exceeds that of many other states. States that own most of the roads can do more (or actions are more visible.) (Federal agency staff 2)
INSTITUTIONS	PROGRAMS. Projects are often slice and dice - broken up into little pieces so big picture is not so apparent (e.g., add breakdown lane, then widening... pretty soon whole road is widened). (Advocate for low income households 2)
INSTITUTIONS	A study about five years back showed that Caltrans needed to modernize. What happened to that study? That would be an important place to start. (MPO official 2)
INSTITUTIONS	MPOs are a difficult level of governance. They are not very visible to the average person. But counties are too small and the state is too big to be better ways to do planning. (NGO transportation staff 1; similar comment city planner 3)
INSTITUTIONS	Importance of advocacy in Sacramento and in DC: HSR support in Washington depends on state commitment; Valley Link seems to have good support (shows importance of leadership); State supported rail services costs need to be unpacked – AMTRAK is charging more. (Rail expert 2, state agency staff 5)
INSTITUTIONS	Bay Area MTC is 9 counties but feds say that the region (CSA) actually is at least 12 (include Stockton, Modesto and Merced as well as Santa Cruz) – another reason for linking CV better by rail. (Rail expert 2; similar comment city planner 4)
INSTITUTIONS; ANALYSIS	Highway expansion program sponsors are defensive and in denial that they are increasing VMT but the additional demand will render their projects ineffectual in short order. Need to get over it. Now trying to carve out exceptions e.g., HOT lanes but not credible. HOT lanes will initially sort out carpools that are already out there but if they are going to generate revenues, they need to have a substantial shortfall in HOVs so they have room to sell to SOVs. Initially the extra room will mean general lanes go faster, but over time and probably in a short time, that gets eaten up. Some trips are deterred due to congestion or scheduled for other days or times of day and they will go back to preferred ties if they have better travel times. May have a minor positive impact on willingness to carpool but have to offset pickup and dropoff time per passenger (5 min cost?) and must be on a steady schedule which does not work for many. Kidding ourselves that these are not just a capacity increase. Impact depends on number of lanes available, operating rules e.g., 1500 -1700 in the lane max., hours of operation, whether outside hours of ops (lane could be closed, continue to be only for carpools, or GP laneo Also whether can enter/exit anywhere or only at designated points. (Highway modeler 1)

INSTITUTIONS	Lack of institutional memory at some agencies – revolving door of young professionals who are good but also ambitious and they are lured away or choose to move on to greener pastures (state salary levels don't help). Results in reinventing the wheel in some cases. (Academic 1)
INSTITUTIONS	Some projects under development or at least proposed for 15-20 yrs. and don't address GHG, equity, even current knowledge of environmental issues. Some reframing of arguments for projects from congestion relief to safety after 743 passed – reflects local expectations that projects will be delivered. (State official 1)
LAND USE	LAND USE. Need to get serious about land use and that probably means looking for ways to fund housing for low and moderate income households throughout the state. (Other community leader 1)
LAND USE	LAND USE. More investment in town centers and shopping districts could make them more walkable, but also need parking. Should not crusade against parking. (Business leader 1)
LAND USE	LAND USE. Complete streets policies should be facilitated – create better shopping districts, etc. (Business leader 2, city planner 3)
LAND USE	LAND USE. Housing dies from excessive reviews that drag on for years. Need admin review only for housing that includes an affordable component (don't limit to projects that are affordable entirely, aka low-income housing, or to transit areas) – we need affordable housing in rural areas too. (Business leader 3)
LAND USE	LAND USE. The state legislature investigated farmland protection and passed the Williamson Act years ago. It has not been entirely effective and with climate challenges – drought, fires – we should do another major revamp. This sometimes seems like it is not related to urban growth but if your almond grove has failed because of the drought selling the land for housing might be your next step. But that housing may also require more transportation (VMT) than average because it is located outside the urbanized areas. (Researcher – land use, housing 2, state agency staff 4)
LAND USE	State can't track LU because it has never stitched together parcel map data that the counties have, related it to actual building footprints and FARs, etc. This is embarrassing as other states have done it just as a way to manage their school contributions, environmental monitoring, public utilities regulation, etc. Counties should not treat this as their data – it's public records. Researchers are buying data from private providers when it should be public data. (Equity advocate 2)
LAND USE	LAND USE. Land costs in PDAs make it hard to deliver affordability and lack of funding for operations makes it hard to deliver competitive transit services in areas where affordable housing could be built. (Economic development expert)
LAND USE; FUNDING	FUNDING. SB 375 implementation could be sped up by matching funds but real problem is the locals don't have to change land use and PDA sites are limited, often in costly areas, often complex to redevelop. (Urban designer – city planner 4)
MITIGATION	MITIGATION. Might cost twice as much for some highway projects if fully mitigated but we don't have a good handle on that yet. (State agency staff 5)
MITIGATION	MITIGATION. Mitigation banks are under discussion and could be the solution for many (until we have them expect a lot of claims of no realistic options available therefore overriding considerations). (State agency staff 6; county planner 3)

MITIGATION	MITIGATION. One Q for mitigation is at what scale and timeframe, localized to project sponsor area or regional or statewide, pay upfront or over time. (State agency staff 6)
MITIGATION	MITIGATION. Mitigation needs to be revamped. Too many projects are approved with little mitigation and overriding considerations. Need to think about regional or statewide mitigation banks and payment for impacts. (Legal 1)
MITIGATION	Mitigation never works as well as avoiding the problem in the first place. (Rail expert 1)
MITIGATION	What they are trying to do is claim no need for mitigation because they know mitigation is costly. (Highway modeler 1; county planner 4)
MITIGATION	Mitigation needs to be a key item moving forward. Maybe counties should have to set aside money for maintenance of the highway projects they advocate, share costs with other sponsors/contributors. (Equity advocate 1; elected official 3)
MITIGATION	Mitigation could be funds or could be mandated measures considered to be available everywhere – put burden on showing they CAN'T be done (opposite of today). (Equity advocate 2; equity advocate 4)
MITIGATION	Mitigation banks being proposed as way to move forward but not clear what will be counted as already promised (programmed? Fully funded? Or in plan/SCS?). (Academic 3)
NEW TECHNOLOGY	NEW TECHNOLOGY. Reliance on new technologies as a potential half-solution: Automated vehicles might still leave us in congestion and with safety problems but maybe automated vehicles will deal with those problems, too, and be our salvation. (County planner/ engineer 2)
NEW TECHNOLOGY	NEW TECHNOLOGY. Invest in clean vehicles in light of overwhelming preferences. (Automobile advocate 1)
NEW TECHNOLOGY	NEW TECHNOLOGY. Not moving fast enough on automation, electrification. (Automobile advocate 1)
NEW TECHNOLOGY	NEW TECHNOLOGY. Transportation experts may be technologically focused but they think we will have automated vehicles fairly soon. Pay more attention in the plans to what that would mean for transit, trucking, taxis, TNCs where labor is a big part of the operating costs. (Researcher – transportation 3)
NEW TECHNOLOGY	ROLE OF TECHNOLOGY. Wobbling between reliance on technology and pushing for land use changes. Land use is more visible to most so politics get ugly and agencies back off. We have seen cycles of this for 50 years. (Legal 2)
NEW TECHNOLOGY	The question we need to be asking is, will transportation technology improve fast enough that it can offset population growth and the growth of cities? (MPO staff)
PARTICIPATION	PARTICIPATION. A lot of outreach but to the point where it becomes its own barrier to engagement (overwhelming). (Advocate for low-income households 1; state agency staff 6)
PARTICIPATION	PARTICIPATION. "Stakeholders" but who says who they are? (Advocate for low-income households 1)
PARTICIPATION	CONSULTATION. Agencies have gone to a representative consultation approach that doesn't actually include very many people or interests. (Other community leader 2; state agency staff 6)

PARTICIPATION	PARTICIPATION. CARB does a good job of announcing workshops and hearings but it would be preferable to issue a few hundred words on what is being proposed and its pros and cons. Most won't have the time and resources to attend a workshop and while you can find the materials on the website something more like the Legislative Analyst's summary of legislation would be far more useful. (Business leader 4)
PARTICIPATION	PARTICIPATION, FUNDING. Small cities often depend on consultants to do their traffic engineering and planning, OR they have just enough staff to keep the lights on. They are not in good position to go after discretionary grants. Maybe should make more of the funds for GHG reduction apportioned rather than competitions. Could tighten use, e.g., bike paths have to go somewhere, not just be recreational trails. (City planner/engineer 2)
PARTICIPATION	Plans and planning process have become so complex that despite substantial spending on outreach, most people in the state have no idea what the transportation agencies do or even who they are. Read the plans: can't find what they are actually going to do, how they will determine whether they are succeeding or failing. Etc. Need to edit down transportation plans – CTP and modal plans with many pages of slightly differing background – not good. Also, length is a deterrent to participation. (Other community leader 2)
PARTICIPATION	Working with communities rather than just holding listening sessions would be a step forward. And then putting funds into the proposals that result... (NGO planner – equity focus 2)
PARTICIPATION	Lots of talk about transparency and lots of meetings but we have to be selective on what we can do (Small transit operator 1)
PARTICIPATION	PARTICIPATION. Stakeholder model of participation can lead to hearing mostly from widely recognized and well-resourced sources. (Equity advocate – people with disabilities)
PARTICIPATION	PARTICIPATION. In the old days there used to be outreach though churches, senior centers, etc. – places where people would go and a presentation could be scheduled. (Equity advocate – people with disabilities)
PARTICIPATION	PARTICIPATION. Nighttime meetings are well intentioned but can be problematic for people with limited incomes. In many areas transit quits running. Also, people have kids who need to get their homework done and get to bed, paying for a sitter is a burden and dragging them out to a meeting means they don't get their homework done and get to sleep on time even if there is childcare provided at the meeting place. (Equity advocate – people with disabilities)
PARTICIPATION	PARTICIPATION. Should listen to people and businesses to determine their problems and also look at operators (highway, transit, others) and their problems and put the two together. Systems include users, demand side and not just supply side. (Economic development expert)
PARTICIPATION	PARTICIPATION. Zoom meetings and internet postings are good for some but don't work for people with limited access to internet at home, smart phones (10% of CA adults.) Meetings held in daytime don't work for people with jobs then. (Equity advocate – people with disabilities)
PLAN CONTENT	PLAN CONTENT. Some really bad ideas left over from previous eras are still being pushed forward based on focus on "project delivery" and "promises kept" even if that is counterproductive to current understandings of needs and desires. (City planner/engineer 2)

PLAN CONTENT	PLAN CONTENT. If you look at the state plans it seems like no one wants to make a decision or to criticizing anything that has been done in the past. I remember my professors saying that picking a technological winner is dangerous or even foolhardy and it is true that if you look back some people were advocating more natural gas vehicles and now, we are worried about phasing out natural gas even for heating. We now are doing a little of everything and seem unwilling to say this mode is better than that one for our long term future or this is not something we should continue. (MPO 3)
PLAN CONTENT	PLAN ORGANIZATION. Almost impossible to get arms around all the transportation plans – CTP, strategic management plan, modal plans, and more. Would be useful to rethink these and go to one background/context rather than rewriting it for every plan. Would be useful to expressly discuss priorities and strategies that address each of the goals. Not clear what is a commitment if anything. (Advocate for bike ped 3)
PLAN CONTENT	PLANS TOO VAGUE. What would a transportation plan designed to redress inequities look like? You can't tell from the CTP or the MPO plans. 710 has been notorious for decades, but change has been slow to come. (Other community leader1)
PLAN CONTENT	PLANS. Another issue is that the plans are endlessly long and overlapping. All this redundancy can and should be eliminated so there is a more readable set of documents that are consistent with one another. (Researcher – transportation 2)
PLAN CONTENT	PLANS. Planning documents seem well intentioned but not particularly efficacious. Not clear that MPOs specifically address statewide goals or document what they have done goal by goal (but so many plans that it is hard to get a good overview of them all. Redundancy is off-putting – each plan writing pages about growth in California and basic description of the system which could be in one place and referenced. (Researcher – transportation 4)
PLAN CONTENT	PLANS. State plans are indigestible – this reduces participation despite all the efforts to do outreach, webinars, have task forces. Creates insiders and everyone else. Many cannot afford the time to be involved and overburdens those who are involved – redundant engagement. (Researcher - land use, housing 1)
PLAN CONTENT; HOUSING	PLAN CONTENT. Need a ledger of sites, their accessibility, drawbacks. Researcher – land use, housing 1)
PLAN CONTENT; EQUITY	PLAN CONTENT. Transportation plans seem too focused on the infrastructure and inadequately focused on the people who need access and mobility. (Researcher – land use, housing 2)
PLAN CONTENT	Relevance of CTP: Took a look at CTP in preparation for this interview. Had not seen a need to look at it earlier which may say something about how relevant (irrelevant) it is to most local plans. (City planner/engineer 2)
PLAN CONTENT	PLANS. Not familiar with CTP or modal plans, regional plans seem more relevant and where we engage more, also counties. State could do more to match the elements that advance environmental and equity policies by putting their discretionary money there but not clear they are doing this. (Local elected official 2)
PLAN CONTENT	PLANS. Thousands of pages of transportation plans. (Researcher – transportation 3)
PLAN CONTENT	PLANS. Why don't we require progress reports at least annually for every plan? (Advocate for low-income households 1)

PLAN CONTENT	PLANS. Hard to get arms around all the modal plans and it realistically doesn't matter – what matters is what gets programmed (projects). (Advocate for low-income households 2)
PLAN CONTENT	Big visions in all the plans are not focused on problem solving. E.g., diamond lanes that are not maintaining 45 mph for years but no strategy for fixing. (Small transit operator 1)
PLAN CONTENT	Plans could provide more direction if built on one another more and if they were succinct. CA is a big state but it should not take thousands of pages to discuss its statewide transportation policies, modal objectives, their relation to land use and the environment, and the import for regional and local plans. (Academic 1)
PLAN CONTENT	Need to quit planning mode by mode and start looking trip by trip (trip purpose and trip length) – create options that are practical for users. (Academic 3)
PLAN CONTENT; PROCESS	PLAN CONTENT, PROCESS. Who is the audience for the CTP and modal plans? Many are required by the feds but the plans themselves don't always make that clear... (Researcher – transportation 3)
PLAN CONTENT; PROCESS	PLAN CONTENT, PROCESS. Too many documents, often repetitive, often on the vague side. (Equity advocate - low-income households 1)
PLANNING PROCESS	PLANNING PROCESS. Need to stay eligible for federal money and if cancel projects could be in a repay situation... (State official 2)
PLANNING PROCESS; IMPLEMENTATON	PLANNING PROCESS. No one wants to open up NEPA or CEQA again. So: changing project design or adding new measures to a package is not comfortable by the time an EIR is prepared. But some things that do not change basic purpose and needs but do add mitigation can probably be done with a supplementary document which is much less hassle. Need to clarify this through CEQA guidance (also clarify NEPA aspects). (State official 2)
PLANNING PROCESS; IMPLEMENTATON	Projects in the pipeline are a problem. By the time they are advanced though environmental review a lot of money and time and political capital has gone into them. It is very hard to then say no, we shouldn't continue. (State agency official 1)
PLANNING PROCESS	California appears to make its situation difficult by trying to lead from the grassroots. Voter initiatives, local tax measures but do they add up to coherent state policy? State controls rule book if it chooses to do so. (Academic – policy 1)
PLANNING PROCESS	California undermines its own efficacy by creating processes that at once are opaque and unnecessarily complex. (Academic – policy 2)
PLANNING PROCESS	Aspirational goals in plans vs. what's happening on the ground. Need to monitor the latter and reflect accomplishments or lack thereof in next plan. (Equity advocate 2)
PLANNING PROCESS	PROCESS, PRIORITIES. Agencies go way out of their way to avoid CEQA updates/revisions/supplements even when previous EIRs are embarrassingly deficient. Need to find a way to update projects without starting over. Pressures for delivery overwhelm concerns about environment, social justice unless a new path is found. For example, need to address impacts from adding highway capacity in old EIRs that did not use best practice methods for analyzing impacts – emissions and equity both affected. (Legal 2)
PLANNING PROCESS	More flexibility in SB 375 than critics claim – putting more emphasis on what can be accomplished and follow-through than on analytical tools. (State official 1)

PLANNING PROCESS	Evaluating goals one at a time is problematic since they sometimes conflict and this doesn't lead to resolution. (State official 1)
PLANS – SPECIFIC	Haven't read the CTP until today. MPO plans are more relevant. Maybe CTP is important to try to change Caltrans districts, giving them a push. (Rail expert 1)
PLANS – SPECIFIC	State rail plan is helpful. Other rail lines that will connect to HSR get a boost from HSR plans. Can turn stations into TODs as services are improved and new services are initiated. Parking can be a way to pay for land banking at these stations but risky because it creates a constituency for park and ride and taking it away is troublesome. (Rail expert 1)
PLANS – SPECIFIC	Don't pay a lot of attention to CTP because it is not a commitment to action but rather a statement of values. Fuzzy on details. Important to the extent that it directs Caltrans staff but extent of impact is a personnel management issue. Does the message get down to the engineers who are reviewing projects or developing them? (Small transit operator 1)
PLANS – SPECIFIC	MPO plans are more relevant but still can be distanced from action. TIPs are real, move projects forward esp in 2-5 yr. programs. (Small transit operator 1)
PLANS; ANALYSIS	Have not read CTP, think of it as a federal requirement but not clear what its relationship is to the MPO plans which seem somewhat more relevant. Real issue is programming and whether the lofty goals are reflected in what is programmed. Hard to use models to test. (Highway modeler 1)
PRIORITIES; HOUSING	Need to have a serious discussion about state stepping in to preserve affordable housing, partner to build more of it. (Equity advocate 1)
PRIORITIES	Legacy projects seem likely to create headaches for years to come. Building more roads means long term maintenance issues – it is not just GHG that is at stake. (State agency staff 2)
PRIORITIES	PRIORITIES. Enough money for transit and too much emphasis on long distance travel, rail. We need to have a world class bus system. (Advocate for low-income households 1)
PRIORITIES	PRIORITIES. We have a well-established process for developing projects and it takes time. Nobody is enthusiastic about reconsiderations but maybe we need to look at projects that were not thoroughly analyzed and see what they imply, for greenhouse gases or equity for example. Maybe a mitigation process could offset concerns, but maybe not...(MPO 6)
PRIORITIES	REPRIORITIZING PROJECTS. Should be prioritizing low carbon strategies – more money is discretionary than most transportation agencies want to admit because they don't want to undo previous commitments. (Legal 1)
PRIORITIES	Modal plans don't seem to have been coordinated with each other and overlaps and conflicts are not addressed. E.g., will we invest in regional airports or promote HSR? (Legal 2)
PRIORITIES	PRIORITIES. But there is a long pipeline of projects that will keep moving forward and it is not clear to (the speaker's own opinion) that many or any of these will advance climate goals. Some most likely should be modified to add pricing or restrict use to real HOVs or redirect funds to some other need. (MPO 1)
PRIORITIES	PRIORITIES. "Promises kept" emphasis can clash with new priorities. (State agency staff 4)
PRIORITIES	I would like to know more about generational differences in priorities. Studies by academics are uncertain about this but is it getting clearer or has the pandemic added to the uncertainty? Are driving, partnering up, buying a house, etc. just delayed because of the recession and student loans, or is there a value change? (MPO official 1)

PRIORITIES	Emphasis on delivery of projects stops otherwise sensible people from asking, why are we doing this? Does it still make sense? Find ourselves going begging for money for projects that would meet priority goals but still spending money on items that support old and IMHO outmoded goals. (Equity advocate 2)
PRIORITIES	Fix it first policies have limitations. Need to set priorities. Might not be right to assume everything we have ever built has to be kept going or at least kept going by state. Maintenance is a growing share of the budget and will only get bigger if we keep building projects that will need major fixing in 15 years – we keep tying up future funds. Maintenance now can reduce overall costs but need to be on a schedule and to set priorities based on risk of loss and value to users – better asset management. (Academic 2)
PRIORITIES	PRIORITIES. As long as the plans are not constrained to funding likely to be available and authority to act, agencies won't sort out priorities. (Transportation modeler)
PRIORITIES	PRIORITIES. Could reprioritize some things at state, county levels but need to distinguish projects in outyears from projects where EIR is done, etc. Define the point of no return for projects. Other projects can be fair game for recall, revision. (State official 2)
PRIORITIES	PRIORITIES. Goals are in conflict but agencies can duck this by claiming that we can do it all – because no budget constraint and such a long timeframe. (State official 2)
PRIORITIES	PRIORITIES. Legislature has added goals but not taken any away. Still expects delivery of projects promised in years past AND congestion relief AND equity AND VMT reduction AND climate change etc. Some agencies are claiming that climate and equity trump everything else but legislature has not said that specifically nor has the gov. (State official)
PRIORITIES	PRIORITIES. Still many state-owned arterials in urban areas that are not well designed for multimodal operation. (Advocate for bike ped 1)
PRIORITIES	PRIORITIES. Keeping prior commitments is locking in projects that are heading the wrong direction. (Advocate for bike ped 1)
PRIORITIES	PRIORITIES. Geographic equity leads to investments in recreational bikeways in rural/outlying areas. (Advocate for bike ped)
PRIORITIES	PRIORITIES. Keeping prior commitments (highway projects) is crucial – for govt. credibility as well as for effective transport. (Automobile advocate 1)
PRIORITIES	PRIORITIES. Legacy commitments e.g., use arterials as freeway relievers can conflict with more recent policies, e.g., complete streets. (Researcher – transportation 4)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM DEFINITION. Congestion is still a problem to our residents and businesses, even if businesses, even if 743 downgrades its legal importance and says to focus on VMT. (MPO 5)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM IDENTIFICATION. May overemphasize long trips when state is responsible for them and short trips happen on streets and highways owned and operated by cities and counties. May underemphasize highway solutions for freight where rail is not even in surface transportation act and is (mostly) private. (Federal agency staff 2)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM IDENTIFICATION, EQUITY. Need to give more attention to the on-the-ground realities of low-income households: e.g., farmworkers get a lot of transportation from vans operated by one of the workers or the field manager, why not help them as a form of transit or paratransit. (Advocate for low-income households 3)

PROBLEM IDENTIFICATION, DEFINITION	Low-income households spend a lot of money on marginal quality cars because there are no realistic alternatives where they live and work and/or at the times of day they work. (Advocate for low-income households 3)
PROBLEM IDENTIFICATION, DEFINITION	HOUSING. Increasingly impossible for low- and moderate-income households to live in central areas and if they do, overcrowding is a big issue equity. (Advocate for low-income households 3)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM DEFINITION. Car registration, insurance are big costs for low-income households – another area for marginality. (Advocate for low-income households 3)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM IDENTIFICATION. Not enough money for bike, ped projects. (Advocate for bike ped 1)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM IDENTIFICATION. If we mapped travel times by transit vs travel times by car for each OD pair what share of transit travel times would be within 5 min. of car travel times? If equity is an issue need to look at when low-income people actually go to work, some work night shifts etc. (Business leader 3)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM IDENTIFICATION. State modal plans should call out egregious examples – Larkspur gap for SMART and ferries, rail service Bakersfield to LA Basin – but plans seem to be unwilling to offend anyone (business leader 3)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM. Rezoning for higher density results in higher land prices if done in places where people would like to live or can be sold the dream. (Urban designer)
PROBLEM IDENTIFICATION, DEFINITION	PROBLEM. Need to start with what people need not with needs as imagined by agency staff. (Equity advocate – people with disabilities)
PROBLEM IDENTIFICATION DEFINITION	PROBLEM. State arterials could become community assets, points of pride. Now many are problems. Right now, many of them are in some half-baked shape – the result of former use as the main interstate highway before the interstates, in some cases designated for through traffic or truck routes by state engineers over objections of communities through which they ran. Some are also shopping streets and some of the shopping streets could use a boost so this could be an opportunity. But needs a program, money, staff, examples that resonate, and policy direction from Caltrans HQ to support the street redesigns. Current standards and permits are barriers to context-sensitive design. (Housing expert/developer, consultant)
PROBLEM IDENTIFICATION, DEFINITION	Highway advocates are hiding behind safety now that reducing delay is not the priority problem to be solved (743). Safety is important but added lanes still will make room for more speed and more travel so that needs to be addressed. (Rail expert 1)
PROBLEM IDENTIFICATION, DEFINITION	State efforts to support small operators have been useful but focus on long trips is not reality driven – long commutes to city center are most impacted, also feeders into rail. Short local bus trips have remained in demand and are recovering faster because the long trip riders tend to be more affluent, have more options for travel or work at home. (Small transit operator 1)
PROBLEM IDENTIFICATION, DEFINITION	Unifying the rules has merit but creates headaches for some of the operators, e.g., may make rule that is consistent across transit operators but then no longer consistent with other city programs re age, income, ability rules. (Small transit operator 1)

PROBLEM IDENTIFICATION, DEFINITION	Electric buses will cost three times to operate what diesel costs – need to think about utility rates, solar roofs, onsite storage and not just vehicles. (Small transit operator 1)
RISK	RISKS. Uncertainty due to COVID 19 impacts: will telecommuting stick? Will transit recover? Transit took a big hit but it was declining as a percentage for years and even in actual numbers in some markets, before the pandemic. Some people think we are kidding ourselves... (MPO 3)
RISK	UNCERTAINTIES. It is hard to know what the next ten years will be – if infrastructure bill passes that will make a difference in federal relevance and role but if it gets cut back to a continuation of current programs then changes will most likely be at the margin rather than direction-changing. Last direction-changing act was ISTEA and that is now thirty years past. (Federal agency staff 1)
RISK	RISK AND UNCERTAINTY. A lot of risky assumptions in some of the plans, e.g., that TNCs will be available (at least by contract), affordable in suburbs, that telecommuting/ work at home will be well used in the future. (Legal 2)
STRATEGIES	PRICING. toll roads are a good revenue source; first priority has to be to spend the money on road improvements (user pays) but extra revenue could be a good source of mitigation funding for greenhouse gases. (Business leader 2)
STRATEGIES	County programs sometimes include only a share of the funding but then assert that state match should be the priority because the voters have spoken. Maybe projects need to add funds to mitigate impacts. (State agency staff 2)
STRATEGIES	It would be useful to document the experiments, field studies etc going on and evaluate their efficacy at achieving various state goals (greenhouse gas reduction, congestion relief, VMT reduction, etc.). Then the effective innovations could be prioritized for funding elsewhere. An example: whether TNCs reduce VMT when used as a first- last-mile service, are they actually shared, costs, number of deadhead miles, etc. (Researcher – transportation 4)
STRATEGIES	STRATEGIES. If transit is going to be a big part of the solution to GHG reduction we need to find ways to fund it, using federal, state and local resources. (Transit agency official 1)
STRATEGIES	Bus priority on freeways is good for long trips, but for shorter trips it often makes more sense to go on local streets and arterials. But you get opposition because usually you are removing parking to create the bus lane. (Transit official)
STRATEGIES	We keep spending money to build new infrastructure and not putting aside money to maintain it. This is madness. (MPO engineer)
STRATEGIES	When we were looking into transportation control measures as an air quality strategy, we generally could get single digit reductions in emissions. Now we are looking at much the same set of transportation measure to reduce greenhouse gases and we are looking for reductions of several times more than we could get earlier. This is unrealistic so basically, the analyses lie about it. We are putting emphasis on modes of travel that currently carry a few percentage of the trips and making up the difference with imponderables like the share that will work at home.
STRATEGIES	Increasing transit in the suburbs is difficult because the access problem is difficult. Maybe driverless vehicles will solve the problem, but when?

STRATEGIES	If telecommuting stays high, chances are it will be the professionals and office workers. Retail and restaurants are hands on. But if the office workers are at the workplace 20–30–40% less, that will be a hit on other local businesses. There are wider repercussions that need to be thought through. (NGO transportation staff 1)
STRATEGIES	The most important thing we could do would be to pause highway building. Even if all cars are electric, there are brake and tire emissions, noise, crashes.... let's wait until all the promises of new technology are actually real things. (NGO planner – equity focus 2)
STRATEGIES	Complete streets are not a panacea – many times they are opposed due to concerns about parking. (Local official)
STRATEGIES	HSR as backbone of rail system gives our constituents enthusiasm about local investments in our services. Also gives us added long term benefits to justify our investments. These investments will expand HSR reach as soon as HSR is open so there is a broader benefit to the state. (Rail expert 2)
STRATEGIES	Parking reform needs to be more holistic (tie on street regs and requirements for off-street together) – on street can protect from problems from infill development. (Equity advocate 1)
STRATEGIES	Transit operating funds re a big concern – Muni will go off a cliff because so much depends on parking revenue and sales tax, and Rescue and CARES funding will run out (also has a high cost of ops compared to others). (Equity advocate 1)
STRATEGIES	375: plans include fantasies about share of telecommuting, share of transit use. Run without highway capacity expansion and plans do better but MPOs don't adopt the highway changes. (Equity advocate 1)
STRATEGIES	Q: Would CARB allow MPOs to mandate EVs locally or provide EV subsidies over those from state as an alternative response for SB 375? (Equity advocate 2)
STRATEGIES	State could work with MPOs to identify high impact projects that would reduce GHG and improve equity and prioritize their development, programming, funding. (Equity advocate 2)
STRATEGIES	EV acceleration is good but other options such as hydrogen are probably better for buses, trucks for longer trips – even passenger cars since many people want to go on a trip to the beach or the mountains or to see Grandma and short range (lose range if cold, hot, hilly) can make day trips of over 80 miles each way (160 mi RT) difficult. Can lose 40% of range in adverse weather or topography – improving but not there yet. You would not be able to drive to Sacramento for the day from South Bay and be sure you are OK to get home. Recharge halfway would help but not always available (also changing but not there yet) or charge up fast enough. (Academic 1)
STRATEGIES	Blind spots in plans – competition among modes e.g., invest in airports in Fresno or HSR as links to larger airports; not much attention to economic development as an element in reducing jobs housing imbalance and competition among cities for jobs, tax revenues; not much attention to user side (focus on facilities and operations but no attention to e.g., figuring out what consumers want, potential of social marketing, role of employers in shaping commutes, modes chosen, traffic, etc. (Academic 1)

STRATEGIES	Focus on transit areas puts a lot of pressure on a limited number of areas – not an argument to stop doing this, good to continue with high density Scandinavian string of pearls ideas (also see Washington DC which has done this quite well) – but don't let other areas off the hook. Small towns have town centers that could be reinforced by town center housing options within walking distance of businesses, sidewalks added where they don't exist now, etc. (Academic 1)
STRATEGIES	Pay more attention to trips in the "difficult" range – too far to walk but too short for express services, rail etc. (depends on location, but roughly 1 mile to 5 miles). Roles for newer options like ebikes and other soft-impact mobility options. (Academic 3)
STRATEGIES	15 min. city ideas deserve attention. (Academic 3)
STRATEGIES	STRATEGY. International examples are not that useful because people don't think they are comparable to their own experience of daily life. Sick of hearing what has been done in rich white tiny European cities like Copenhagen which is the capital and biggest city but only half a million people in the city proper, 2 M in metro area, 6 M in whole country. We have a very different scale, a different history and timeline of development, and also far more diversity of population. Rather hear what grittier cities like Oakland have been able to do and how they did it. (Housing expert/developer, consultant)
STRATEGIES	STRATEGY. Housing element focuses on having land available and zoned but doesn't seem to stop continued discretionary reviews which then lead to cuts or developer walks away because too much delay. (Housing expert/developer, consultant)
STRATEGIES	STRATEGY. As of right would help – specify required contributions to infrastructure and mitigation as well as FAR, setbacks etc. in zoning and then projects that meet the rules can be administratively approved. (Housing expert/developer, consultant)
STRATEGIES	STRATEGY. Could look at destinations near distressed communities and think about how to create access to daily needs within an easy walk. Might be helping to redevelop a failing main street or outdated shopping center. Need to think about how to keep the small businesses and low rents though. People do want the small restaurants, nail salons, and even the check cashing services. (Economic development expert)
STRATEGIES	STRATEGY. Many outmoded strip malls around CA that could be redeveloped – use business improvement districts or tax increment financing options along with planning assistance to make it happen – again, comprehensive planning rather than complete street here, housing somewhere else, retail and services a third place. Need to modernize approach so businesses can stay in place or in neighborhood while redevelopment proceeds. Examples in some cities in CA but need to document them as examples for others. (Urban designer)
STRATEGIES	STRATEGY. Town center plans should be specific plans that cover street designs for cars, transit, freight/deliveries, bikes, pedestrians; appropriate speed limits for multimodal designs (25 mph or less); plans should specify building heights and footprints (could include design guidelines), then discuss permitted land uses including housing for range of households sizes and incomes; also address other infrastructure, landscaping, parks or parklets, and then once plan has been through public debate and approved, building permits approved as of right. (Urban designer)
STRATEGIES	STRATEGY. Freight is mostly truck and we need to make sure trucks can move. BUT we need to plan for cars and trucks on shared facilities, not mode by mode. (Business leader)