California TRANSPORTATION PLAN 2040

Appendix 4

Trends and Opportunities

Integrating California's Transportation Future

Caltrans

APPENDIX 4 | TRENDS AND OPPORTUNITIES

TRANSPORTATION FUNDING

The expected rise in transportation needs and decline in transportation funds present a fundamental problem for California. For nearly 30 years, transportation spending has been underfunded. Caltrans is working closely with the regional transportation agencies and the United States Department of Transportation (US DOT) to maximize every dollar of investment in a multimodal system. Nevertheless, a recent assessment prepared for the California Transportation Commission (CTC)[1] highlights deep gaps in funding available for basic transportation system maintenance and operation, not to mention addressing population growth and need to accommodate and encourage transportation preference shifts. At the same time, the transportation system must support the mobility needs of California's growing population and underserved groups–such as those with disabilities, veterans, and the elderly–and to address climate change. The aging physical system needs modernization, upkeep, and maintenance to meet expected demand increases. This is impossible without adequate funding.

The traditional approach to funding transportation projects in California is based on user fees, including fuel taxes, sales taxes, vehicle weight fees, transit fares, and tolls. However, these revenues are becoming increasingly unreliable. Excise taxes on gasoline and diesel fuels are primary revenue sources for federal and State governments. The State has struggled to raise funds to maintain and improve the transportation infrastructure because these sources have not been indexed for inflation or adjusted for technological advancements and trends. Fuel taxes are collected on a per-gallon basis, which means that lower revenues will be generated as we encourage people to drive fewer miles and as vehicles become more fuel efficient (**see Figure 1**).

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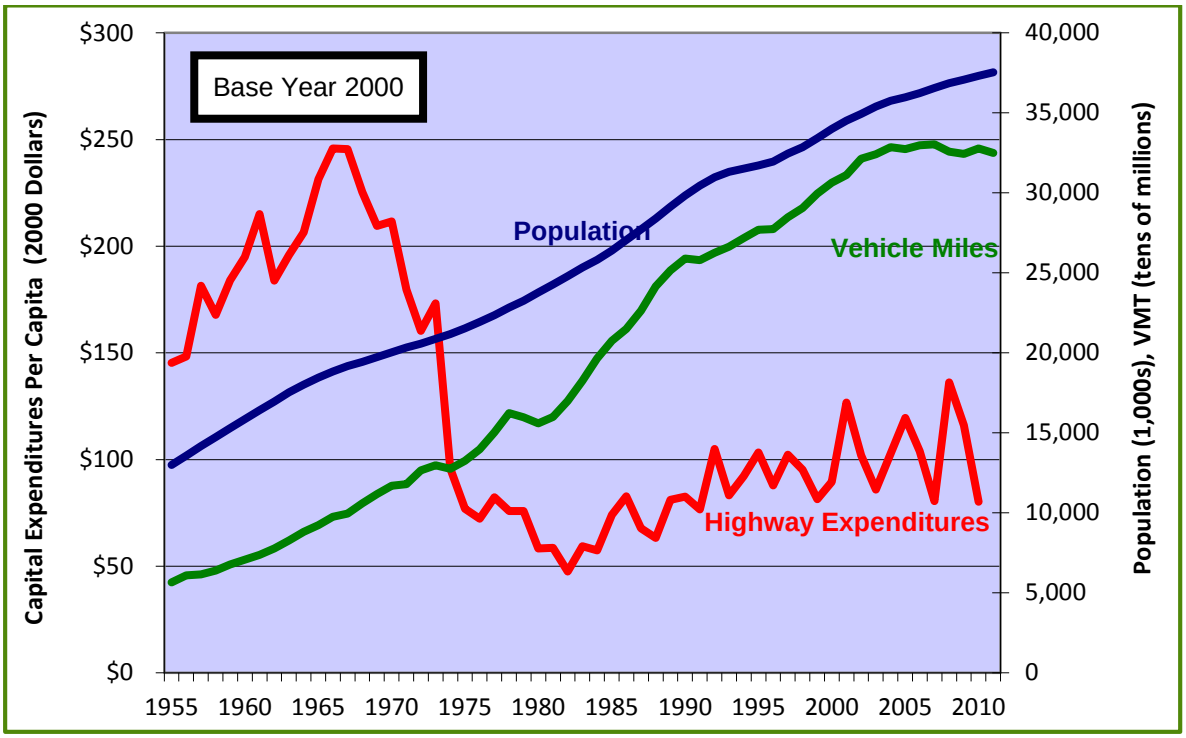
[1] Leiter, B., et al., "2011 Statewide Transportation System Needs Assessment," 2011, http://www.catc.ca.gov/reports/2011Reports/2011_Needs_Assessment_updated.pdf.

FIGURE 1. HISTORICAL POPULATION, TRAVEL, AND PER CAPITA HIGHWAY CAPITAL EXPENDITURES 1955-2010*



* Includes expenditures for local assistance and State highway capital outlay.
Source: Office of State Planning-Economic Analysis Branch, 08/2013

The reliance on transportation funding from motor vehicle fuels, the primary source of greenhouse gas (GHG) and criteria pollutant emissions in California, is incompatible with our climate and air quality goals. Legislative efforts, such as Assembly Bill (AB) 32 and Senate Bill (SB) 375, reduce GHG emissions from transportation sources by promoting active transportation and transit, requiring cleaner fuels, mandating cleaner vehicle technology and encouraging better land use policy. As a result, household expenditure on fuel purchase is on the decline, and with transportation funding primarily based on motor vehicle fuel sales, money available for transportation maintenance and improvements is also declining. Individuals can reduce their "carbon footprint" by purchasing vehicles that are more fuel efficient or zero-emission, reduce driving by bundling trips, take public transportation more often, or choose to live in communities that offer transportation, housing, and land use options. All of these choices will lessen negative environmental impacts associated with transportation; however, with transportation funding based on user fees, these choices can negatively impact the resources available for transportation maintenance and improvements. Thus, new or modified sources of revenue must be developed.

When inflation is taken into account, the buying power of revenue from fuel and excise taxes decreases. Due to this decrease in purchasing power, the California State Legislature has utilized general obligation bonds in the past to assist with transportation financing. The largest infusion of funds came from the voter approved Proposition 1B (Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act), a $20 billion transportation bond authorized in 2006. Bonds are loans that provide temporary financial relief, but they also create additional debt to the State's General Fund. Thus, bonds can

decrease the amount of available funding, for other programs or transportation projects, in the long run and are not a sustainable option.

Transportation funding has been an even greater challenge for Native American tribal communities since most of their funds come from the federal government. Native American tribes do not have a dedicated funding stream from the State, and they do not receive any direct allocation from the Highway Trust Fund (HTF) as other states. Moreover, tribal transportation projects are rarely included in Regional Transportation Plans (RTPs), even if they overlap with other local agency projects. California tribes historically receive only one to two percent of the $450 million of available federal funding, even though they represent about 20 percent of the nation's tribal population.

Transportation funding in California has increased nominally over time, but not in real economic terms. The gas tax has lost almost 37 percent of its buying power since 1993 according to the U.S. Department of Labor's statistics inflation calculator. At the federal and State levels, revenues generated from excise taxes on gasoline and diesel fuels will continue to decrease. Road pricing strategies are being explored to replace fuel taxes to better reflect the cost of driving by charging users by the actual number of miles driven.

At the local level, government entities fill this funding gap by supplementing transportation with local revenue sources such as sales tax measures. However, a two-third majority voter approval is required to pass a dedicated transportation tax measure, which represents a hurdle for counties, often depriving them of much-needed funding.[2] Yet, local funding makes up nearly half of California's transportation revenue. Revenue sources include taxes and fees such as local sales taxes, property taxes, transit fares, and development impact fees. Moreover, new locally funded projects increase the financial burden to the State, as the California Department of Transportation (Caltrans) does not receive additional funding to maintain them.

Transit receives about 20 percent of available federal transportation funding, but this trend may change as the physical space available to expand roadway and highway infrastructure reaches its limits. For example, the Bay Area Metropolitan Transporatation Commission's (MTC's) recent RTP predicts the Commission will spend about 62 percent of its anticipated revenues maintaining and expanding its transit system in the coming decades. In addition, the most recent RTP from the Southern California Association of Governments (SCAG) estimates that transit will account for 47 percent of its expenditure plan–20 percent for capital projects and 27 percent for operations and maintenance. Although transit expenditures in other areas of the State may be lower than in the Bay Area or Los Angeles, other regions are also expected to increase their investment in transit.

Active Transportation and Demand Management

Active Transportation and Demand Management (ATDM) is a concept where travel demand, traffic demand, and traffic flow are all dynamically managed to improve the efficiency and productivity of our transportation facilities. The word "dynamic" in these strategies refers to the great impact and efficiency created through constant change or activity. For example, dynamic lane use and shoulder control monitors shoulder lanes by effectively opening or closing them based on current traffic demands

[2] Taylor, M., "A Look at Voter-Approval Requirements for Local Taxes," 2014, http://www.lao.ca.gov/reports/2014/finance/local-taxes/voter-approval-032014.pdf.

through overhead message signs and ramp metering to guide drivers at on-ramps. The "Active Transportation" part of ATDM refers to traffic management, which is not to be confused with active modes of travel. ATDM builds off three approaches, which include Active Traffic Management (ATM), Active Demand Management (ADM), and Active Parking Management (APM).

The first approach is ATM, which is where traffic congestion is dynamically managed based off current and predictive traffic conditions. Increasing safety and throughput are key elements that ATM approaches look to accomplish by improving our integrated highway systems through the adoption of new technologies, and dynamic strategies. Some examples of these dynamic strategies include: lane management, speed limits, and rerouting.

Promoting a sustainable multimodal transportation system requires optimizing the existing system. Currently, transportation agencies are finding Traffic Management System (TMS) approaches to be the most effective and economical way to improve system performance. Caltrans defines TMS as *"business processes and associated tools, field elements, and communication systems that help maximize the productivity of the transportation system."* The ATM approach is similar because it anticipates traffic conditions, allowing the system to act accordingly prior to any nuances that may arise, ultimately improving the performance of our state highway system (SHS).

ATM approaches also include coordination of adaptive traffic signals along a corridor, changeable message signs that display real-time road and weather information, adaptive ramp meters that control the timing of vehicle entry onto highways, and traffic incident management. ATM can also refer to lane management strategies, such as high occupancy vehicle (HOV) lanes and dynamic lane use and shoulder control. Optimizing multimodal system performance through ATM strategies will offer increased potential to serve future mobility needs than has previously been leveraged. By investing in more ATM infrastructure and by better maintaining existing devices, system management can move from reactive to active, and eventually to predictive traffic management–relieving congestion before it even occurs.

A critical aspect of traffic management provides travelers with real-time data about traffic conditions via their mobile phones, allowing them to select the optimal mode of travel or reroute on a moment's notice. Accurate, real-time information allows travelers to become partners in multimodal system management. Another new technology that supports predictive ATM is the innovative concept of vehicle-to-vehicle communication or "connected vehicle" (V2V)/ autonomous vehicles (CV/AV), currently in testing stage. CV/AV will be able to communicate with one another as well as with the TMS itself in order to warn drivers and the system to avoid potential hazards. One other idea currently undergoing exploration is automated vehicle platooning, in which frequently updated sensor-generated information allows clusters of vehicles to drive very close together at "cruising" speed without colliding. ATDM is built upon the concept of Integrated Corridor Management (ICM), which is also in development to improve traffic flow from highways to surface streets. Certain ICM strategies will also be considered within the Connected Corridors Program Pilot in order to discover opportunities that most efficiently move goods, services, and people.[3] Together, these technologies should pave the way for widespread deployment of fully automated vehicles which have the capability of making our system more dynamically performance driven.

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[3] Caltrans, "Transportation Management Systems Business Plan Update Final," 2013, http://traffic.onramp.dot.ca.gov/downloads/traffic/files/sd/Apr_16_2013_Final_Business_Plan.pdf.

Another method for enhancing system management is to implement the Corridor System Management Plans (CSMPs). CSMPs outline the multijurisdictional and multimodal management of congested corridors. A CSMP results in a listing and phasing plan of recommended improvements and strategies such as ramp metering; changeable message signs; transit; rail, port, and airport facilities; and system expansion projects to preserve or improve performance within the corridor.

The second approach is ADM which dynamically manages travel demand by influencing traffic behavior in real-time. Some examples of how the ADM approach can be achieved are through either of the following dynamic strategies: fare reduction, pricing, and ridesharing. These strategies can be implemented to ultimately help drivers choose a mode choice that best suits their current situation. Ideally, this approach can help planners across the State to gather data and predict traveler information. As this method increases in popularity, the gathered data can be used to design roadways to be more accommodating of other travel modes such as walking/bicycling, transit, and the most frequented rideshare pick-up/drop-off points.

Similar to Transportation Demand Management (TDM) strategies, ADM focuses on how travelers use the system. Using new technology, ADM allows travel demand to be managed dynamically by re-routing drivers to travel at less congested intervals through the day. With incentives or disincentives of different types of travel, ADM measures often encourage travelers to reduce or eliminate single occupancy vehicle (SOV) trips, by influencing a new mode choice. ADM strategies urge travelers to consider alternatives such as dynamic ridesharing options, using on-demand transit, telecommuting, working flexible hours, and biking or walking. Dynamic pricing strategies are one of the most effective but controversial demand management methods. When faced with direct trip costs, travelers often consider modes such as transit and other transportation options. Some more examples of ADMs include tolling, pricing, parking strategies, and integrated park-and-ride lots with freeway interchange bus stops. An interesting concept to take into future planning consideration is Mobility Hubs, which are a form of transit-oriented development (TOD). These hubs provide an integration of multimodal travel choices all in one amenity filled facility which can include: transit (light-rail/bus), high-speed rail (HSR), Electric Vehicle (EV) charging stations, bikeshare, and ride share. This facility can be used as a first mile/last mile destination to determine which mode of travel is suitable for the person traveling within their region.

The third approach is APM, which is where regional parking facilities are dynamically managed to influence travel through real-time parking information, which allows the full utilization of parking facilities that are open and near a traveler's location or end destination. Parking management can encourage travel demand through mode choice, trip time, and convenient parking facility choices, which would dramatically reduce time spent to locate available space to park vehicles. Through real-time information (e.g. wireless communication) parking management can influence a driver's travel behavior by finding them a convenient open parking space prior to their arrival. This also acts as an economic benefit by having people park in areas which allow exposure to more businesses, leading to less congestion, pollution, and more effective use of our roadways.

Optimizing the existing system is critical for achieving transportation system sustainability as well as accomplishing our vision of providing a performance-driven and transparent highway system to the public. This system must also be truly multimodal through promoting viable, safe, affordable, and easily accessible multimodal options, which can serve to reduce vehicle miles traveled (VMT) and lower GHG emissions. In addition, it must accommodate those who cannot or choose not to drive, thereby establishing a more equitable transportation system for users of all income levels.

For more information on ATDM, Reference section of the CTP 2040 website: www.californiatransportationplan2040.org.

SUSTAINABILITY IN RURAL COMMUNITIES AND SMALL TOWNS

Over five million Californians, 13 percent of the State's populations live in areas considered rural.[4] Twenty-six of the State's 58 counties are considered rural–each has a population of less than 250,000 with no single urbanized area having more than 50,000. Additionally, many predominantly urban counties such as Los Angeles, San Bernardino, and San Diego also include large non-urban populations. Rural California provides excellent recreational opportunities and plays a vital role in the economy, with billions of dollars in local, national, and international food supply exports.[5]

The vehicle fatality rate in rural areas is more than twice than that of urban areas.

Providing sustainable transportation services and active transportation options to a sparsely and widely distributed population presents special transportation challenges that must be considered when planning for a balanced, interconnected, and interregional system. Many State highways act as main streets for these rural towns and provide important bicycle and pedestrian access for residents within the community. One of the most important transportation concerns in rural areas is maintaining the existing road system. With approximately 71 percent of California's highway miles located in rural areas,[6] the proportion of highway miles to population creates a far larger responsibility without the economic means to address it. Weather issues accelerate the deterioration of roadways, particularly where flooding, landslides, and snow removal can quickly jeopardize pavement integrity. Rural roads also have additional pavement distress from heavy commercial truck and recreational traffic.

Safety is another significant concern in rural areas. Nationally, over 58 percent of motor vehicle-related fatalities occur in rural areas. The vehicle fatality rate in rural areas is more than twice that of urban areas.[7] The higher fatality rate could be attributed to many factors, including rugged terrain; shortened sightlines; unforgiving roadways; driver irresponsibility, including speeding or alcohol use; and longer response time to accidents and distance to medical treatment centers which creates the challenge for our system to have robust emergency response system.

Rural area airports provide vital access for lifeline medical emergencies, firefighting, and agricultural operations. These airports also provide links to larger urban airports for passenger and air cargo service. As commercial airports reach passenger and cargo capacity, demand will shift to regional and rural airports to provide general aviation services. Many rural airport runways need to be extended to accommodate larger aircraft. Putting emphasis on rural airports can also bring about economic benefits

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[4] Stanford School of Medicine, "Rural California: Demographics," http://ruralhealth.stanford.edu/health-pros/factsheets/.

[5] California Department of Food and Agriculture, "California Agricultural Production Statistics," 2013, http://www.cdfa.ca.gov/statistics/.

[6] Caltrans, "Caltrans Executive Fact Booklet, 16," 2014, http://dot.ca.gov/hq/tsip/data_library/EFB/2014_EFB-revised.pdf.

[7] Federal Highway Administration, "Rural Fatalities, table 1," 2012, http://safety.fhwa.dot.gov/local_rural/rural_fatal.cfm.

such as tourism. It would give the rural areas another platform to attract people into their community by having another means of transportation to travel there.

For some rural residents, transit service is the only means of transportation. Rural entities are often challenged to provide transit and paratransit services to customers that are sparsely distributed over considerable distances. Regional and intercity bus service can be difficult to provide due to low demand, fare box return requirements, and limited resources for operating and maintaining the system.

To date, much of the State's focus on reducing GHG emissions has been on light duty vehicles (LDVs) in metropolitan areas where the majority of the State's population resides. Rural areas that are not covered by the requirement to adopt a RTP/Sustainable Communities Strategy (SCS) under SB 375 are undertaking their own efforts to plan more sustainably, and the CTP 2040 supports these rural sustainability efforts. An innovative way to address rural sustainability is to look at the connections of urban and rural parts of a region and plan for the region's future as a whole, rather than considering them as separate entities. Sacramento Area Council of Governments (SACOG) is taking this approach through their successful Rural-Urban Connections Strategy (RUCS) program (see sidebar).

The CTP 2040 sets goals that encourage rural communities to continue embracing their unique values and character–whether on main streets or recreational lands–while offering travelers options to get around by bicycle, on foot, or on transit.

SACOG'S RURAL-URBAN CONNECTIONS STRATEGY (RUCS)

The RUCS project is looking at the Sacramento region's growth and sustainability objectives from the rural perspective. RUCS strives to be an economic and environmental sustainability strategy for rural areas.

HOUSING AND LAND USE

Despite the recent lows of the Great Recession from December 2007 to June 2009 and the current recovery, the cost of housing as a proportion of local wages in California continues to rank highest in the nation.[8] For more than 25 years, the State, local governments, and redevelopment agencies have helped facilitate availability of affordable housing and engage in community development. With the loss of redevelopment agencies in 2013, many local resources that promote the building of affordable housing are no longer available.

A challenge is to develop housing that is affordable, safe, and healthy. Housing in California is becoming an even more important issue as the State's demographics change.[9] It is increasingly important to consider location efficiency and compact development patterns as methods of restraining housing and transportation costs. Another challenge is promoting land use development patterns that align with where people live and work in urban, suburban, and rural areas. It is crucial that regions work together to provide housing and transportation options for all Californians.

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[8] City Rating, "California Cost of Living," http://www.cityrating.com/cost-of-living/california/#.Ui-t0NLksuc.

[9] Sacramento Area Council of Governments, "Changing Demographics and Demand for Housing Types," 2011, http://sacog.org/mtpscs/files/MTP-SCS/appendices/E-6%20Housing%20Demand%20White%20Paper.pdf.

Land use, housing, and transportation plans need to be coordinated between the cities and counties–the entities typically responsible for local land use decisions–and regional agencies and the State, which are responsible for regional and interregional transportation decisions. Planning and land use decisions have a tremendous impact on our communities. Historic land use practices have often contributed to increases in traffic congestion, commute times, and air pollution; the loss of open spaces; and a reliance on automobiles. Now, with the improvement of the housing outlook and new construction, a challenge is to provide residents with a mix of housing options. In more urbanized areas, demand for multi-unit housing near transit is expected to increase.

Past development trends included low-density growth planning, resulting in considerable land consumption and urban sprawl that required higher infrastructure investments. The SCSs and other legislation call for transportation planning, housing projections, and land use planning to be considered in concert, as opposed to separately. To help preserve open space and discourage sprawl, SB 375 encourages local governments and regions to consider alternative land use patterns that promote compact urban infill. Since each SCS program is part of a RTP effort and ultimately feeds the larger CTP 2040 plan, housing and land use are keys to developing the vision of the CTP 2040.

One solution to discourage urban sprawl and coordinate land use and transportation is to support focused housing development in locations close to transit and multimodal services, with consideration for noise and air quality issues. This is often referred to as "smart growth" or TOD and it has the potential to increase the accessibility, affordability, and diversity of housing, as well as to support new jobs.

Land use development that supports the viability of rural communities, agricultural operations, and natural habitats is essential. The CTP 2040 supports sustainable development to alleviate pressure to develop open spaces and agricultural lands. Location-efficient development within established urban growth boundaries or urban limit lines will help preserve the natural beauty of California, increase agricultural productivity, and promote habitat continuity. Infill development and mixed-used development promote multimodal transportation and encourage more walking, biking, transit use, and shorter auto trips. Mixed-use development typically results in shorter vehicle trips and higher rates of non-motorized travel.

Through the goals, policies, strategies, and performance measures established by this plan, public health, environmental justice (EJ), and social equity will be integrated into transportation planning and decision-making for transportation services and housing development statewide. To ensure success, it is critical to create partnerships, build relationships, and collaborate when making housing and land use decisions at local, regional, and State levels.