

The American Society of Civil Engineers CALIFORNIA'S SURFACE TRANSPORTATION REPORT CARD An analysis of roads, bridges, and transit







OUR GOAL

ASCE Region 9 represents over 19,000 civil engineer members within the state of California. The Report Card is released as a public service to citizens and policymakers to inform them of the infrastructure needs in their community. Because voters have the opportunity to protect road, bridge, and transit funding in the 2018 election by voting "No" on Proposition 6, this subset of the California Report Card is being released early to inform citizens before they head to the polls. This Report Card is an October 2018 assessment and grade of California's transportation network.

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EXECUTIVE SUMMARY

In November, California voters will have the choice to preserve a critical revenue stream needed to improve the state's aging and over-burdened infrastructure. The state is known for its iconic bridges like the Golden Gate Bridge, and roadways like the Pacific Coast Highway. Our ports are a gateway for the country, carrying freight from the west coast to the rest of America. But California is also known for crippling traffic congestion on its highways like the U.S. Route 101 and Interstate 405, and potholes on neighborhood streets have become as common to see as blue skies and palm trees.

In 2017, Senate Bill 1 (SB 1), also known as The Road and Repair Accountability Act, sought to reverse this trajectory of underinvestment in our transportation infrastructure by generating an additional \$5.4 billion a year, when fully implemented, dedicated solely to transportation funding. As this funding went into effect, projects that improve safety, repair bridges, relieve congestion, and increase transit offerings started moving and are already improving the safety and reliability of our infrastructure. To continue making progress, we must preserve this critical revenue stream by voting "No" on Proposition 6 in November 2018.









GRADE: C-

WHAT YOU SHOULD KNOW ABOUT CALIFORNIA'S BRIDGES

Progress has been made over the past decade to increase the percentage of California bridges in good condition and to reduce the number that are classified as structurally deficient. However, much more remains to be done, especially as it relates to seismic retrofitting to improve the safety of bridges in the event of an earthquake. Approximately 50% of bridges in the state have exceeded their design life and the backlog of recommended maintenance, repair and replacement work continues to grow. California is home to the second largest percentage of "functionally obsolete" bridges, or bridges with outdated designs that frequently contribute to congestion chokepoints. 6.2% of California's bridges are structurally deficient (SD) and California has the largest percentage of bridges in "Poor" condition in the nation by bridge deck area. In other words, some of our largest bridges, along corridors such as I-5 in San Diego, Highway 101 in Los Angeles, and I-80 in Sacramento need major repair and rehabilitation. Repairs on nearly 4,400 bridges have been identified that with costs estimated at \$12.2 billion.

California has fewer SD bridges than the national average, and this number is expected to continue declining thanks to the passage of The Road and Repair Accountability Act (SB 1), which increases funding for badly-needed repairs to the state's transportation system. However, there are still challenges facing the state's bridges, including many jurisdictions not having adequate resources to address their deteriorating bridges, the shortfall in the amount of money available in general to repair and rehabilitate bridges, the growing number of functionally obsolete (FO) bridges, and the growing need for funding to maintain and repair the State's aging bridges.



CAPACITY AND CONDITION

As of December 2017, there were 25,657 bridges in California, the fourth largest state inventory of bridges in the United States, behind Texas, Ohio, and Illinois. California's bridges cross a variety of terrains including arid deserts, marine environments, and mountainous areas with extreme winter snowfall. Each environment poses unique challenges to the service life of the bridges.

Roughly half of California's 25,657 bridges are owned and maintained by the California Department of Transportation (Caltrans). The remainder are owned and maintained by local jurisdictions.

A structurally deficient (SD) bridge is a bridge that requires significant maintenance, rehabilitation, or replacement because critical load-carrying elements were found to be in poor condition due to deterioration or damage. The number of SD bridges in California has decreased dramatically over the past few years from 2,769 in 2013 to 1,603 (6% of the state's inventory) in 2017. (See Figure 1.) While SD bridges do not pose an immediate danger to public safety, they must be inspected at least once every year.



FIGURE 1: STRUCTURALLY DEFICIENT BRIDGES IN THE STATE OF CALIFORNIA

Nearly 50% of California's SD bridges are state-owned and maintained. The remaining 50% of California's SD bridges are owned and maintained by local jurisdictions. While many local agencies have kept up with their bridge maintenance needs, some have not due to limited resources and funding. There have been instances where some local agency bridges have been closed to traffic due to disrepair.



In addition to identifying bridges as "structurally deficient," FHWA also collects data on the condition of bridges and classifies them as in good, fair, or poor condition. Bridge condition is determined based on the lowest condition rating assigned to various components of a bridge, including its deck, superstructure, and substructure. If the lowest rating is greater than or equal to seven, the bridge is classified as "Good." Bridges rated five or six are classified as "Fair." If it's less than or equal to four, the classification is "Poor."

In California, 16,586 bridges – or 65% of the total bridge stock in the state – are in good condition. 7,676 bridges – or 30% – are in fair condition, and the remaining 1,395 bridges – or 5% – are in poor condition. (See Figure 2.) The number of bridges in "Poor" condition roughly correlates to the number of structurally deficient bridges (1,603). The 30% of bridges in the state that are in fair condition require maintenance to ensure they do not slip down to the "poor" category.

Another measure of the overall condition and capacity of a state's bridge network is the number of bridges previously defined by the FHWA as Functionally Obsolete (FO). The term FO has been sunset by the FHWA. FO bridges were previously defined as having

FIGURE 2: DISTRIBUTION OF CALIFORNIA'S BRIDGES IN GOOD, FAIR, AND POOR CONDITION



substandard geometric designs such as not being wide enough, or having enough under clearance, to facilitate efficient movement of their traffic demands. The latest available data indicates there are about 4,400 FO bridges in California (approximately 17% of the total number of bridges in the state). The trend in the traffic on FO bridges has been upward since 2004. (See Figure 3.)

FIGURE 3: TOTAL DAILY TRAFFIC ON FUNCTIONALLY OBSOLETE BRIDGES IN CALIFORNIA





FO bridges are a source of congestion in California. Between 2004 and 2015, the total daily traffic on California's FO bridges increased by 47% (from 84,000 to about 124,000). As the population of California increases, traffic demands are expected to increase. While great strides have been achieved in reducing the number of SD bridges in California, less is being done to address FO bridges. This will lead to lost productivity due to longer travel times and higher levels of pollution and personal stress.

FUNDING AND FUTURE NEEDS

Funding for bridge improvements in California is done through a mix of federal, state and local sources. Federal revenue is provided through the Federal Highway Bridge Program (FHBP). During Fiscal Year (FY) 2016, \$296 million in federal funding was programmed to California bridges from the FHBP.

State revenue is collected through transportation-related user fees. In 2017, the California State Legislature took an important step to provide additional revenue to the transportation system. They passed The Road and Repair Accountability Act (SB 1), which is slated to provide \$4 billion for bridge projects over the next 10 years. The SB 1 transportation package is funded by increases in excise taxes on fuel and surcharges on vehicle registration fees. State and local agencies have already applied for \$1.8 billion in SB 1 funds to bridge rehabilitation, replacement, and maintenance projects.

SB 1 provides much-needed funding for bridges owned at both the state and local level, especially jurisdictions that have limited resources. These funds ensure bridges that were at risk of being closed will instead be repaired or replaced. Localities may still need to raise their own revenues to further close the bridge funding gap. Regardless of state funding, the federal government must also be a part of the solution as well by increasing the revenue it collects and distributes to the states.

According to the American Road & Transportation Builders Association, nearly 4,400 bridges have been identified as needing repair in California and it is estimated that these repairs will cost about \$12.2 billion.

OPERATION AND MAINTENANCE

One cannot overstate the importance of proper maintenance to extend the life of a bridge. Bridges are subjected to repeated truck loads, debris, severe weather conditions, and in the case of bridges in marine environments, have elements such as foundations and columns that are exposed to corrosive seawater. The joints, deck and elements that are near or under water are most vulnerable to wear-and-tear and require periodic maintenance.

In the FY 2017-18 State Budget, \$131 million was allocated to bridge major maintenance. However, the ongoing annual need for bridge maintenance alone is estimated to be about \$200 million. The shortfall in funding for maintenance will mean that the backlog of bridges requiring maintenance, and potentially, the number of bridges falling into the SD category, may continue to grow. Making maintenance a priority represents a better way to make use of the scarce amount of transportation funds available. According to the Legislative Analyst's Office, each dollar spent on maintenance can defer between \$4 and \$12 of cost needed for major rehabilitation.



State bridges are adequately operated and maintained but some local agencies lack the funding to properly maintain their bridges. In some cases, work recommendations from bridge inspectors are never implemented because of funding shortfalls. The failure to address such recommendations can lead to possible advanced sectional loss, which may substantially degrade bridge capacity. Proper bridge maintenance is required for a bridge to reach its expected lifespan.

Aging bridges are a growing concern. Many bridges in service today were designed for a 50-year lifespan. Today, over 50% of California bridges exceed 50 years in age and 13% are over 75 years old (see Figure 4). Preventive maintenance can extend the lifespan of a bridge, but most of the older bridges – particularly those that are SD – will need major rehabilitation or reconstruction. Whether a bridge can be rehabilitated or reconstructed is heavily dependent on the availability of funding. In the meantime, older bridges may require more frequent inspection and monitoring to ensure they remain safe for the public travel. Increasing shortfalls in funding resulting in deferring badly needed repairs will likely lead to more of California's aging bridges falling into "Poor" condition or SD category.



FIGURE 4: CALIFORNIA BRIDGES BY AGE



INNOVATION

Innovations in bridge design and materials have potential to increase the durability of a bridge or prolong its lifespan. Advances in material have made concrete stronger or more durable to withstand weather conditions. High performance steel has greater strengths, ductility, and fracture resistance. Electrochemical Chloride Extraction (ECE) treatment, by applying an electric field at the deck, prolongs the life of historic bridges.

Advances in Accelerated Bridge Construction, when properly implemented, have made construction in very challenging conditions possible. Innovative construction methods can also be used to overcome issues relating to limited space, environmental restrictions, or public safety in high traffic areas.

Innovation and new technology come with a price. Specialty products, services and construction are high ticket items and can escalate construction costs. While initial costs may appear to be prohibitive, the intangible benefits such as increased safety, reduced environmental and traffic impacts, and faster construction, can more than justify the added costs. Additionally, research and testing of new products need funding along with agency and industry acceptance.

PUBLIC SAFETY

Public safety is of paramount concern to all government agencies. In the aftermath of the 1989 Loma Prieta earthquake and 1994 Northridge earthquake, major strides have been taken to seismically retrofit vulnerable older bridges. However, there are still bridges requiring seismic retrofit. As of June 30, 2017, there are 241 locally owned bridges in the state of California that have been deemed eligible for funding from the Local Bridge Seismic Retrofit Account, but for which funding has not been programmed. Construction is underway and is expected to be complete by June 2019 on the last remaining state-owned bridge requiring seismic retrofit.

Vehicle heights and weights have increased over the years. Barriers on older bridges in service today were not designed to protect today's vehicles. Thus, barrier rail upgrade to current standards is also a public safety concern. However, limited funding has delayed implementation of needed upgrades.

RESILIENCY

In addition to earthquakes, California faces many different types of natural and man-made disasters, including fires, tsunamis, droughts and landslides. Structural resiliency is the ability to withstand unexpected loads brought about by climate change or natural disasters. Change in climate conditions has produced heavier rains, stronger storms and higher winds. This is the new normal.

Old bridges were not designed for these loads. As previously noted, 54% of California bridges are over 50 years old, making them vulnerable to such load increases. Bridges over waterways are most vulnerable. There are over 17,000 bridges over waterways in California. Risks are exacerbated in fire-ravaged areas that are vulnerable to landslides.

A consistent strategy on resiliency is needed for California bridges. New guidelines need to be developed to address the risk and safety issues associated with climate change. Prioritizing and strengthening vulnerable bridges will require major funding.



LET'S RAISE THE GRADE

- Vote "No" on Proposition 6 in the 2018 November election. A no vote will ensure the transportation package approved by the state legislature last year stays in place and the modernization of California's bridges can continue.
- Explore alternative revenue models, such as taxation based on vehicle-miles-traveled.
- Prioritize funding for maintenance on bridges the FHWA has deemed to be in "fair" condition to mitigate further deterioration and prevent these bridges from falling into the "poor" condition or SD category. This will be vital as California's bridges continue to age.
- Continue to explore and invest in innovations that provide better and more efficient bridge inspection, maintenance, and rehabilitation, leading to prolonged bridge lifespan and public safety.
- Continue to track the number of FO and SD bridges to get a better understanding of the condition of the State's bridge transportation network.
- Have funding earmarked to address specific issues such as substandard railings.
- Make bridge maintenance a major priority.



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GRADE: D

WHAT YOU SHOULD KNOW ABOUT CALIFORNIA'S ROADS

Driving on deficient roads costs Californians \$61 billion annually due to congestion-related delays, traffic collisions and increased vehicle operating costs caused by poor road conditions. The condition of California roads is among the worst in the nation, ranking 49th according to the latest US News & World Report Ranking. Meanwhile, Southern California and the Bay Area are the second and third most congested urban areas in the nation, respectively. Repair and improvement to these roads is vital to California's economic health and public safety. The Road and Repair Accountability Act (SB 1) passed in April 2017, provides \$52 billion in additional funds for local and state roads over the next ten years. However, a total of more than \$130 billion over that same time is needed to bring the system back to a state of good repair. A good transportation system enables efficient movement of goods and people and is critical to California's economic well-being.

CAPACITY

Safe and reliable roads are critical to meeting the demands of California's growing population and maintaining the state's status as the world's fifth largest economy. California's population is nearly 40 million in 2018, a 17% increase since 2000. As population increases, so does vehiclemiles-traveled (VMT). According to TRIP, a national transportation research organization, VMT in California increased by 11% from 2000 to 2016, from 307 billion miles to 340 billion miles travelled each year. The average driver now spends over three full days stuck in traffic, and congested roads cost Californians \$29.1 billion

AVERAGE DELAY (HRS) PER COMMUTER





each year from lost time and wasted fuel. This equates to drivers losing between \$299 and \$1,774 in annual costs per driver. The Los Angeles-Long Beach – Anaheim region area is the second most congested area in the nation, according to the Texas Transportation Institute's 2015 Urban Mobility Scorecard, and the San-Francisco-Oakland region was the third.

CONDITION

According to the California Legislative Analyst's Office, California has almost 51,000 lane miles of state highways and 335,000 lane miles of local streets and roads. According to the 2018 TRIP's analysis of Federal Highway Administration (FHWA) data, only 19% of California's major roads and highways are in good condition, whereas 68% are in mediocre or poor condition, and 13% are in fair condition.

On the Pavement Conditions Index (PCI) a scale of zero (failed) to 100 (new), California's average local street and road PCI has continued to deteriorate over the years and was at an "At Risk" number of 65 in 2016. The average PCI in 52 of the state's 58 counties are categorized in the "At Risk" or "Poor" categories.

Additionally, most California roads today are at least 40 years old, which means they have exceeded their design life. While roads may be resurfaced, they will continue to age and reach a point of deterioration where reconstruction is necessary for roads to be safe.



CALIFORNIA HAS THE SECOND WORST ROADS IN THE COUNTRY. 51% OF THE MAJOR URBAN ROADS IN CALIFORNIA ARE IN POOR CONDITION.



FUNDING

The primary funding source for transportation infrastructure is the motor fuels tax levied by both the federal and state governments. The federal motor fuels tax is 18.3 cents-pergallon and has not been raised since 1993. Increased vehicle fuel efficiency, hybrid and electrical vehicles, and a failure to index the tax to inflation has reduced the federal fuel tax's purchasing power by more than half in the last 25 years. At the state level, the California legislature acted in 2017 to shore up transportation revenues and provide additional funding for the state's road network. The Road and Repair Accountability Act, Senate Bill 1 (SB 1) transportation package provides an estimated \$52 billion in transportation revenue over the next 10 years to repair some of California's subpar infrastructure.

While SB 1 provides much-needed revenue, more must be done. As of 2018, roads face an \$85 billion funding gap over the next 10 years. To fill the gap, cities and counties must raise and continue to invest their own revenues, and the state must explore new and innovative funding models including increased participation from the private sector. The federal

10-YEAR MAINTENANCE BACKLOG Total Backlog: \$137B SB 1 Funding: \$52B

Funding Gap: \$85B

government must also be a partner by providing significant, sustainable funding, ideally through an increase in the federal gas tax.

FUTURE NEED

The California Department of Transportation's (Caltrans) California Transportation Plan 2040 (CTP 2040), adopted in June 2016, identifies goals and recommendations to achieve a safe, sustainable, universally accessible, and globally competitive transportation system. CTP 2040 acknowledges highway and road investments alone will not solve congestion problems exacerbated by the more than five million people added to California's population every decade. The plan recommends new methods focusing less on specific projects and more on improving corridors through holistic approaches. The Federal Highway Administration estimates each \$1.00 spent on road, highway and bridge improvements can return \$5.20 in benefits by reducing vehicle maintenance costs, traffic delays, fuel consumption, road repair costs and vehicular emissions, resulting in improved safety and traffic flow on our roads.

OPERATIONS AND MAINTENANCE

Caltrans has an approximately \$57 billion deferred maintenance backlog, by far the largest such backlog in the state. Projections suggest this deferred backlog will increase over the next decade due to chronic underfunding.

SB 1 and California's 2017 Five-Year Infrastructure Plan (FYIP) begins to address these deferred maintenance issues by directing the largest percentage of money from SB 1 to be spent on maintenance of state highways and local streets and roads. SB 1 allocates \$1.8 billion annually toward Caltrans' Highway Maintenance Program (CHMP) and State Highway Operations and Protection Program (SHOPP). CHMP performs maintenance on highways in good or fair condition while SHOPP delivers capital projects to rehabilitate or reconstruct highways when they have reached the end of their useful lives. Additionally, the FYIP will provide an annual \$1.5 billion for local road maintenance and rehabilitation. However, the average annual funding of \$2.3 billion for SHOPP repair and rehabilitation work is insufficient to address the annual \$8 billion needed, and localities themselves need to direct additional funding to these projects to help close the investment gap.





PUBLIC SAFETY

Between 2012 and 2016, 16,185 people were killed in motor vehicle accidents in California (an average of 3,237 fatalities per year). Statistically there is one fatality for every million vehicle miles traveled, which is slightly better than the national average of 1.16 fatalities per million vehicle miles traveled. Since 2014, California has seen increases in fatalities among motorcyclists (+5%), bicyclists (+14%) and pedestrians (+22%), which emphasizes the needs for improvements in roadway safety. Highway improvements such as removing or shielding obstacles, adding or improving medians, improving lighting, adding rumble strips, widening lanes, widening and paving shoulders, upgrading roads from two lanes to four lanes, and providing better road markings and traffic signals can reduce traffic fatalities and crashes while improving traffic flow. Improving safety on California's roadways can be also be accomplished through further enhancements in vehicular safety and advancements in vehicle automation.



MOTOR VEHICLE FATALITIES



RESILIENCE

Most urban areas in California have robust networks of alternate roadways, for use if primary roadways were inoperable due to emergency events such as earthquakes, wildfires, flooding or tsunamis. However, the main intercity north-south and east-west roadways have limited alternate routes of comparable capacity for most of their routes.

California's transportation infrastructure is vulnerable to the effects of climate change including extreme weather conditions and sea level rise (SLR). The effects of SLR will have impacts on all modes of transportation located near the coast. If greenhouse gas emissions continue undiminished, it is possible for SLR to accelerate thirty to forty times faster than during the last century. Aggressive reductions in greenhouse gas emissions may substantially reduce, but not eliminate the risk California will face from extreme SLR. According to the National Oceanic and Atmospheric Administration (NOAA), the global sea level continues to rise at the rate of 1/8 inch per year. California Climate Change Center forecasts that if the rate of SLR continues to accelerate, and combined with major storm events, a resulting sea level rise of 4.5 feet by the year 2100 may cause risk of flooding to approximately 3,500 miles of California roadways.

INNOVATION

In recent years the automobile and technology industries have made significant advancements in autonomous vehicular (AV) mobilization. Two of the 10 U.S. Department of Transportation Designated Automated Vehicle Proving Grounds are located in California. California must now prepare for the implementation of AVs as well as other mobility technologies including vehicle-to-vehicle and vehicle-to-infrastructure communications deployment. New technologies have the potential to fundamentally alter transportation systems by reducing crashes, providing critical mobility to the elderly and disabled, increasing road capacity, saving fuel and lowering emissions. Trends in shared mobility may lead to shared ownership of vehicles and increased reliance on on-demand mobility services. Testing of fully AVs on California's public roads began in April 2018 but, pending sufficient legislation, may take a while to be widely adopted.

There have been recent trends toward sustainable road design and construction, with projects certified for sustainability using rating systems such as Greenroads, Envision, and INVEST. Also, Intelligent Transportation System (ITS) technologies such as adaptive signal systems and electronic toll collection systems, and Regional Integration Systems of Intelligent Transportation Systems such as LA Metro's RIITS are common on many of California's urban and rural highways. In addition, numerous programs have been developed to incentivize and accelerate the adoption of zero and near-zero emission vehicles.



ROADS

- Vote "No" on Proposition 6 in the 2018 November election. A no vote will ensure the transportation package approved by the state legislature last year stays in place. If The Road and Repair Accountability Act (SB 1) were to be repealed, California state and local governments will face a deferred maintenance backlog of \$137 billion over the next 10 years. SB 1 provides \$52 billion to address this backlog; in order to raise the state's roadway grade to the desired level of "B", long term, dedicated and consistent transportation funding is vital.
- Invest in future mobility technologies to increase capacity, enhance safety, improve the quality of life, provide a heathier economy and engender a sustainable California.
- Policymakers should consider the findings and recommendations made in the Road Charge Pilot Program completed in March 2017 and continue progress towards using a mileage-based user fee approach to pay for transportation improvements.
- Continue development, adoption and implementation of advanced multimodal transportation systems and ITS technologies to increase safety, improve mobility, reduce greenhouse gas and air pollution emissions, and minimize energy demand.
- Improve the adaptability and resilience of the road network against natural and man-caused events.



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ROADS

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GRADE: C-

WHAT YOU SHOULD KNOW ABOUT CALIFORNIA'S TRANSIT FACILITIES

California needs robust, flexible and reliable transit systems to reduce peak congestion on our highways, provide options for citizens who do not drive, and improve air quality. Public transit in California provides nearly 1.5 billion trips annually on 139 transit systems throughout the state. The California Transportation Commission estimated in 2011 the state needed approximately \$174 billion for expansion and state of good repair transit projects over the next 10 years, but at the time only 45% funding of funding had been identified, leaving a shortfall of \$96 billion. Fortunately, recent legislative initiatives and ballot measures are attempting to close the funding gap, including an additional \$750 million annually for transit agencies across the state provided through The Road and Repair Accountability Act (SB 1). Adequate resources must be provided to our transit systems or we risk retreat on sustainability gains as well as the current state of good repair.

CAPACITY

California has 139 transit systems, including urban, small urban and rural systems serving a population of over 38 million. Transit services include Light Rail, Bus and Demand Response with the breakdown of ridership shown in Figure 1.



FIGURE 1. TRANSIT SERVICE TYPES



Public transit in California provides nearly 1.5 billion trips annually. Approximately 5.3% of Californians commute to work using public transit. The population in California is projected to grow to 48 million by 2040. The millennial generation has shifted away from owning individual cars and the older baby boomer generation is aging and either in retirement or approaching retirement. These two groups make up the largest portion of the population and will increase the need for alternative modes of transportation.

Transit ridership increased from 2.2% in 2000 to 4.4% in 2012. Since 2015, the national trends have shown approximately 6% decrease in transit ridership. In late 2017, LA Metro was operating 5% fewer bus hours than in 2005 and 20% fewer bus miles. Likewise, most major providers were forced to cut service in response to the 2008 recession and have continued to cut service as ridership decreases. Factors leading to lower ridership include a decrease in service caused by inadequate funding for operations, resulting in eliminating routes and increasing headways, making transit less convenient. The improved economy has also likely contributed to additional private passenger vehicle trips and further increasing traffic congestion in many California cities.

Caltrans' California Transportation Plan 2040 includes goals and strategies to reduce congestion, move people and goods efficiently for economic growth and reduce greenhouse gases. All strategies presented include significant increases in public transit ridership. Keys to increasing ridership include providing convenient and reliable service with first mile/last mile connections readily available.

CONDITION

Significant progress has been made by most major transit agencies in recent years to upgrade older systems to a state of good repair. San Diego Metropolitan Transit System (SDMTS) has rehabilitated the Blue Line and Orange Line and Los Angeles (LA) Metro has been updating the Blue Line (with significant improvements yet to come). The average age of San Diego's bus fleet in 2015 was 6.58, or slightly below the national average. The Bay Area Rapid Transit (BART) recently passed a \$3.5 billion measure to complete long overdue state of good repair improvements. Currently, BART reports owning the oldest big-city fleet in the U.S.; its cars are on average 30 years old, and funding will go towards replacement. According to the 2016 California State Transportation Plan and the 2011 California Transportation Commission Needs Assessment, there will be a shortfall of \$74 billion for state of good repair improvements needed through 2020. Funding from the 2017 transportation package (SB 1) is essential to addressing the shortfall.

OPERATIONS & MAINTENANCE (O&M)

Transit O&M includes staff labor costs, property, contract labor, parts, materials and supplies for vehicles and facilities and fuel and power costs as shown in Figure 2. O&M costs have held steady since 2009 with total maintenance costs of \$8 billion in 2015 as shown in Figure 2. Approximately 25% of the total funding is from the fare box. A decline in ridership generally starting in 2009 lowered fare box revenue. Transit agencies were forced to decrease costs by reducing service and raising fares. Restoring and improving transit services and increasing ridership will require increased funding for operations and maintenance, at least in the shorter term until ridership grows and fare box revenues increase.



FIGURE 2. COMPONENTS OF O&M EXPENSES



FUNDING & FUTURE NEED

Transit in California is funded by fare box, state, local and federal sources. In 2015, \$7 billion was provided to transit systems, as shown in Figure 3.



FIGURE 3. SOURCES OF TRANSIT OPERATING FUNDING



The California Transportation Commission (CTC) completed a 10-year needs assessment to identify state of good repair and expansion funds needed by transit between 2011 to 2020. The report showed an estimated cost of \$174 billion with only 45% funding available leaving a shortfall of \$96 billion. The SB 1 transportation package passed in 2017 stands to provide some of the much-needed funding for transit. SB 1 is slated to provide \$750 million annually in new revenue, including \$25 million for local and regional planning as well as \$7 million in transportation research.

The California Air Resources Board is proposing a requirement for all transit vehicles to be zero emission by 2040. Limited funding is identified to purchase new buses as well as upgrade or construct maintenance facilities for the new buses. Electric or hydrogen fuel cell technology would comply with the new requirements, however the technologies are still emerging, very costly, are not currently reliable, and have unknown infrastructure requirements. The higher implementation costs are adding to the capital funding gap.

Capital project funding identified in the CTC 10-Year Needs Assessment included state, federal and local sources as shown in Figure 4.



FIGURE 4. SOURCES OF CAPITAL FUNDING

Several new local funding sources have been added as a result of voter-approved tax initiatives in 2016. These initiatives provided funding to LA Metro, BART and Santa Clara Valley Transportation Authority (VTA). Similar initiatives in San Diego, Ventura and Contra Costa Counties were not successful. While the new taxes are significant for the Bay Area and Los Angeles, the overall deficit for the state through 2020 will be more than \$80 billion.

SB 1 will generate an additional \$1 billion for transit annually for all of California. Increasing transit ridership plays a significant role in decreasing congestion on our highways and local streets. While this is a good step toward funding, more investment is still needed to meet future need.

As an example, in 2014 California generated \$2.26 billion for transit or \$58.23 per capita compared to New York, Illinois and Pennsylvania that generated between \$242.38 to 299.92 per capita transit investment in California is well below other states with large metropolitan cities.



PUBLIC SAFETY

California transit agencies have prioritized maintenance and replacement of vehicles even when funding is limited to provide safe public transportation. In 2017 there were 25 fatalities associated with rail transit as shown in Figure 5, down slightly from a 6-year average of 26 fatalities. Most of the fatalities were not passengers. The total number of fatal accidents involving buses and large trucks (reported together) has been decreasing since 1979. In addition, the total number of fatal accidents per 1,000 miles driven and per registered owner has decreased significantly as shown in Figure 6.



FIGURE 5. STATEWIDE REPORTED INJURIES AND FATALITIES









RESILIENCE

California transit systems are critical to the overall resiliency of a region as they provide critical alternatives for efficiently transporting or evacuating large numbers of people during natural disasters or other incidents. The Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans) provide guidance for transit emergency response plans. Transit operates as both dedicated guideway and vehicles on surface streets, providing the flexibility of bridging damaged infrastructure to provide continued service. The system uses alternative fuel types providing redundancy should some fuels not be available as a result of an emergency.

Transit agencies in California have been at the forefront of clean energy. Most rail transit systems use clean electricity. Many agencies including SDMTS and North County Transit District (NCTD) have transitioned to 100% non-fossil fuel buses. Alternative fuel (CNG and electric) is used for 60% of bus transit in California compared to the national average of 47%. Even smaller agencies such as Antelope Valley Transit and Porterville Transit are embarking on aggressive plans to transition to 100% electrical buses by 2019.

INNOVATION

Rapid Bus Routes are successfully implemented on freeways and local streets using traffic signal priority and other technologies, offering a higher level of service with significantly less capital investments than LRT systems.

Use of technology for automated fare collection is implemented by many of the transit agencies in California along with real-time communication and wifi to improve rider experience. Multi-agency fare collection systems are in the planning stages for most regions, with implementation partially completed in LA.

Autonomous and connected vehicles have the potential to dramatically change transportation. Driverless vehicles are currently being tested in San Ramon. Contra Costa County may be deploying as many as 100 vehicles by 2020.



TRANSIT

- Vote "No" on Proposition 6 in the 2018 November election. A no vote will ensure the transportation package approved by the state legislature last year stays in place and facilitate completion of state of good repair, restoration of service and sustainability improvements that are critical to the California economy. Elimination of this funding source will reverse positive trends and negatively impact quality of life.
- Encourage local ballot initiatives to provide additional tax revenue to support transit systems. Self-help counties provide funding and control prioritization of improvements.
- Increase funding for demonstration projects to test new technologies and research and development to expedite electric / hydrogen fuel options as cost-effective alternatives to fossil fuels.

DEFINITIONS

Unlinked Passenger Trips (UPT)

The number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.

Farebox Recovery

the percentage of transit operating expenses that are covered by revenues from passenger fares.

Fixed Guideway (FG)

Fixed Guideway is a public transportation facility

- Using and occupying a separate right-of-way for the exclusive use of public transportation;
- Using rail;
- Using a fixed catenary system;
- For a passenger ferry system;
- For a bus rapid transit system.



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