# California's Unmet Transit Funding Needs

## Fiscal Years 2011-2020

Prepared For:
**California Transit Association**
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# Executive Summary

This report updates the original *California Unmet Transit Funding Needs FY2011 – FY2020* study developed in 2010 for the California Transit Association (CTA). In the three years since the original study, operating expenses have continued to increase while transit agencies in California face budget constraints that present challenges to preserving California's transit services. In order to understand the impact of constrained funding, a state-wide transit inventory for California was updated to allow for analysis of capital reinvestment needs, i.e. for rehabilitation and replacement of aging assets.

In addition to the capital needed for "Preservation" FTA's Transit Economic Requirements Model (TERM) was used to determine the capital needed to maintain services along with increasing ridership demands, known as Service Expansion needs. The operating and maintenance expenses (O&M) associated with Preservation and Service Expansion were also estimated based on updated operating cost inflation and funding growth assumptions.

Finally, the recently released Regional Transportation Plans/Sustainable Communities Strategies (RTP/SCSs) which represent the major regions in California were reviewed for projected capital and operating funding needs for Major New Service projects. These projects either expand capacity into new areas or new modes, or enhance existing performance.

The summary of the findings are presented below and show that in all categories there is greater projected need than projected funding. Under such constrained scenarios the condition of existing assets will decline over time as reinvestment actions fall outside of agency budgets. In addition, if not met, the Service Expansion needs will begin to erode the reliability and performance of existing services.

| Type of Funding | Investment Type | 10 Yr Funding Needs (YOE $B) | 10 Yr Funding Trend (YOE $B) | Funding Gap | Ratio: Funding to Needs |
|---|---|---|---|---|---|
| Capital | Preservation | $35.10 | $14.53 | $20.57 | 41% |
| | Service Expansion | $5.63 | $10.10 | $29.56 | 25% |
| | Major New Service | $34.03 | | | |
| **Total Capital** | | **$74.76** | **$24.64** | **$50.13** | **33%** |
| Operating | Existing Service Levels (Preservation) | $90.33 | $85.39 | $21.68 | 80% |
| | Service Expansion | $12.52 | | | |
| | Major New Service | $4.22 | | | |
| **Total Operating** | | **$107.07** | **$85.39** | **$21.68** | **80%** |

*Note: Totals may not match due to rounding*

# 1. Introduction

This report serves as an update to the original *California Unmet Transit Funding Needs FY2011 – FY2020* study performed in 2010 for the California Transit Association. The original study addressed the funding issues facing California's transit operators due to increasing operating costs and capital reinvestment needs (i.e. investment in rehabilitations and replacements of existing assets). Since that time, the recession-induced funding cuts have continued to present challenges to California's transit agencies. Unless otherwise noted, the methods and data sources used in the original report are still utilized in this update.

This update refreshes the information used in the original study with two more years of actual data, and improves on the original inventory with more recent inputs from California's major transit agencies. Since the original study, a new version of FTA's Transit Economic Requirements Model (TERM), TERM Lite, allows for more detailed analysis of asset conditions based on the improved inventory. Additional insight has also been gained through careful analysis of the recent Regional Transportation Plans/Sustainable Communities Strategies (RTP/SCSs) developed by California's Metropolitan Planning Organizations representing:

- Southern California Association of Governments (SCAG)
- Sacramento Area Council of Governments (SACOG)
- San Diego Association of Governments (SANDAG)
- Metropolitan Transportation Commission (MTC)

Funding projections and funding needs are divided into their intended usage categories in this study. These categories include:

1. Preservation – which includes reinvestment and the cost of operating and maintaining (O&M) existing assets for existing service levels
2. Service expansion – which includes investments and O&M costs for projected growth in service levels based on projected growth in ridership
3. Major new service – which includes investments and related O&M costs to significantly improve transit performance via enhancements to core capacity or extension of services into new areas or modes

# 2. Funding Estimates

CH2M HILL updated the expected funding capacity for California transit over ten years, from FY 2011 to 2020, using data reported to the National Transit Database (NTD) for funding levels in FY2010 and FY2011. These additional years were included beyond the FY 2009 baseline generated for the original study.

## 2.1 Capital

While the level of operating funding tends to remain stable from year to year, the level of capital funding can vary significantly based on the number of major capital projects in any given year. Hence the FY 2009 baseline was established to represent a 'typical' funding level for capital. The actual FY2010 and FY2011 figures reported to NTD were used for the backlog year and first year of analysis respectively.

The trend rate of increase in capital funding was based on the FY2009 baseline and weighted average growth rates for State funding represented in the RTP/SCSs for the relevant time period. For agencies not represented by an MPO, "Other" rural and urban operators, the historical rate of capital growth reported to NTD since 2001 was applied. The expected funding growth in State sources reported in the MPOs were averaged for each region and then weighted by the proportion of capital needs (see Attachment) to generate a 3.13% annual growth rate in total capital funding.

This growth rate was applied to the FY2009 baseline to generate the ten year capital funding levels for both preservation and expansion, with the exception of FY2011 actual value reported to NTD. The actual capital for 2011 was reported as a total and divided between preservation and expansion based on past expenditure levels – about 59% of capital is spent on preservation. The results for expected capital funding are reported below with a statewide total of $14.5 billion for preservation and $10.1 billion for expansion, for a combined ten-year projected capital funding of $24.6 billion.

*Table 1: Forecast Total Transit Capital Funding FY 2011 to FY 2020 (YOE$)*

| Region | Type of Capital Funding | Total Capital Funding (YOE $B) | Share of Total Funding |
|---|---|---|---|
| SACOG | Preservation | $0.446 | 2% |
| | Service Expansion + Major New Service | $0.829 | 3% |
| SCAG | Preservation | $5.695 | 23% |
| | Service Expansion + Major New Service | $5.187 | 21% |
| SANDAG | Preservation | $0.859 | 3% |
| | Service Expansion + Major New Service | $0.835 | 3% |
| MTC | Preservation | $6.684 | 27% |
| | Service Expansion + Major New Service | $3.188 | 13% |
| Other | Preservation | $0.848 | 3% |
| | Service Expansion + Major New Service | $0.066 | 0% |
| *Statewide Subtotals* | *Preservation* | *$14.53* | *59%* |
| | *Service Expansion + Major New Service* | *$10.10* | *41%* |
| **Statewide** | **Total** | **$24.64** | **100%** |

*Note: Totals may not match due to rounding*

## 2.2 Operating

A similar approach was taken to updating the expected operating funding levels for the ten year analysis period. However, funding projections were updated based on the average growth in operating funding reported to NTD from 1991-2011. The two additional years of funding data decreased the expected growth rate in operating funding to 4.91% annually which was then applied to the FY2009 baseline to generate a ten year funding expectation as reported below. The total ten-year project operating funding for the state is $85.4 billion.

*Table 2: Forecast Total Transit Operating Funding FY 2011 to FY 2020 (YOE$)*

| Region | Type of Operating Funding | Total Operating Funding (YOE $B) | Share of Total Funding |
|---|---|---|---|
| SACOG | Preservation + Service Expansion + Major New Service | $2.56 | 3% |
| SCAG | Preservation + Service Expansion + Major New Service | $32.07 | 38% |
| SANDAG | Preservation + Service Expansion + Major New Service | $4.05 | 5% |
| MTC | Preservation + Service Expansion + Major New Service | $29.69 | 35% |
| Other | Preservation + Service Expansion + Major New Service | $17.01 | 20% |
| **Statewide** | **Total** | **$85.39** | **100%** |

*Note: Totals may not match due to rounding*

# 3. Capital Needs Estimates

The new version of TERM Lite was used to update the capital funding needs associated with preservation of assets. In addition the inventory used for the preservation analysis was updated based on recent agency submissions to the FTA for TERM studies (most operators) or recent uses of TERM Lite by participating agencies (LA METRO). Inventory data for smaller operators, generally in the "Other" category for rural and urban operators outside of the MPOs, were only updated if agencies submitted new inventory data to TERM federal (see Attachment for details on the California statewide inventory).

The service expansion capital needs were updated based on new growth rates in costs and the original TERM outputs for expected growth in ridership and related capacity needs. CH2M HILL documented all proposed major investments in bus services, BRT, light rail, commuter rail and heavy rail projects as well as expanded ferry services identified by MPOs in the RTP/SCSs for major new service needs.

## 3.1 Preservation

TERM Lite's estimates of the total level of reinvestment needed to reach and maintain a state of good repair (SGR) are presented below for each MPO and statewide. SGR for a transit agency refers to having assets that are fit for purpose. For this analysis an asset is in a "state of good repair" if it does not exceed its useful life and does not require rehabilitation. If no reinvestment action can be taken for an asset that is due for replacement or rehabilitation due to constraints, that asset will go into the SGR backlog.

To project reinvestment needs TERM Lite determines the age and condition of assets each year of the projection and uses life cycle profiles (useful life, rehab policies) to determine if rehabilitation or replacement is needed, and the associated costs. The cost inflation assumed for these projections (2.69% annually, see Attachment) is also based on a weighted average of cost inflation factors reported through MPOs for their RTP/SCSs, with an average of transit industry Producer Price Index growth applied to "Other" operators. With current funding projections the overall ratio of funding to needs is 41% as shown in Table 3 below.

*Table 3: Preservation Unmet Capital Summary FY2011 to FY2020 (YOE$)*

| Type of Capital Funding | 10 Year Funding Needs ($B) | 10 Year Capital Funding Trend ($B) | 10 Year Funding Gap ($B) | Ratio: Funding to Needs |
|---|---|---|---|---|
| Preservation | $35.10 | $14.53 | $20.57 | 41% |

The $35.10 billion the total unconstrained capital preservation need, and is an update of the original 2010 study. In this case, unconstrained means unlimited funding available and the ability to procure/replace during the ten year time period.

It is important to note that this analysis assumes it is possible to eliminate the current deferred maintenance backlog - estimated to be $8.25 billion – over ten years. In reality this is not likely to occur as each operator has restricted capacity to access right of way and passenger facilities for the purposes of construction and may not be able to expend the reinvestment capital shown below over ten years. It is also not realistic to assume that funding will be entirely unconstrained. Table 4 presents the breakdown by region.

*Table 4: Preservation Capital Funding Needs FY 2011 to FY 2020 (YOE$ B)*

| Region | Total Capital Need ($B) | Share of Total Need |
|---|---|---|
| **SACOG** | $1.657 | 5% |
| **SCAG** | $9.615 | 27% |
| **SANDAG** | $3.030 | 9% |
| **MTC** | $18.222 | 52% |
| **Other** | $ 2.571 | 7% |
| **Statewide** | **$35.096** | **100%** |

*Note: Original study analyzed needs from 2010 to 2019. This update analyzes 2011-2020 which explains the increase in current need as one more year of backlog has progressed.*

Given this limitation, more realistic scenarios of constrained funding and constrained capacity to expend that funding were developed. CH2M HILL generated projected revenue streams for the following two scenarios:

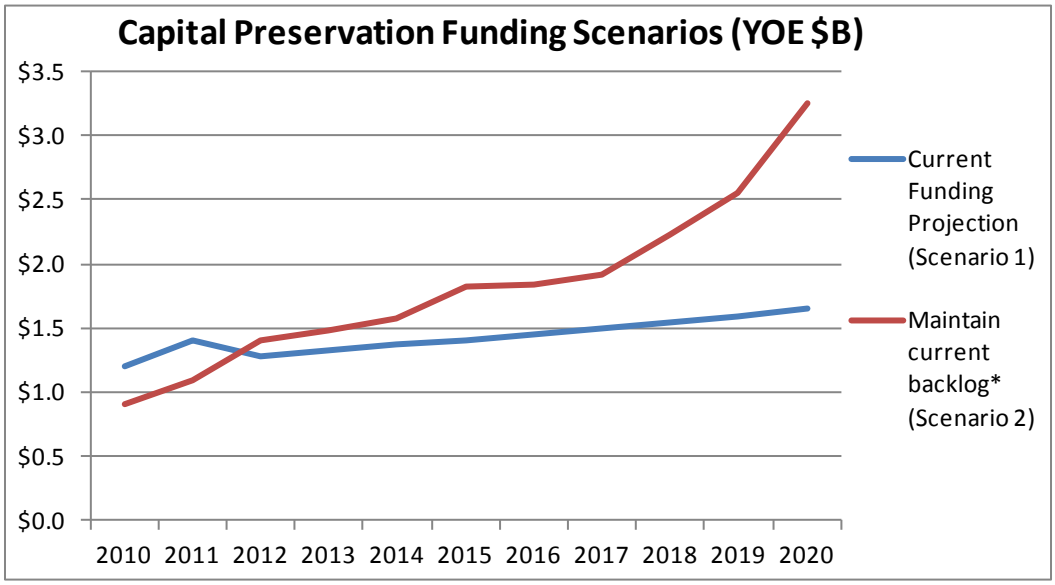
Scenario 1: Expected capital funding increases (current capital funding forecast)

Scenario 2: Funding required to maintain the current level of backlog

The first scenario is based on the growth in capital funding for California described above in Section 2. Actual capital funding totals reported to NTD for FY2010 and FY2011 were used for the backlog year and first year of analysis, which were divided into preservation and expansion funding based on past proportions of expenditure. The following year forecasts were based on a trend rate of increase in capital funding using a weighted average of growth rates for State funding over the relevant time period in available draft RTP/SCSs and the PPI rate of increase for transit related industries (see Attachment). The resulting 3.13% annual growth rate was applied to a blended FY2009 baseline to generate the funding levels beyond 2011. The yearly results for the current capital funding forecast for preservation are shown in Figure 1 with the blue line. This scenario results in a total $14.5 billion in year-of-expenditure dollars for preservation.

The second scenario is a ‘what if’ analysis based on roughly maintaining the current value of the SGR backlog. The current value in 2020 dollars is $8.25 billion. In order to determine the level of funding required to maintain that value the TERM Lite model was iterated with different levels of funding until the backlog remained roughly steady. The resulting level of funding totals $24.45 billion in year-of-expenditure dollars and the annual expenditure is shown below with the red line.

*Figure 1: Capital Preservation Funding Scenarios FY10 to FY20 (YOE$)*




**Note: Expenditures to maintain current backlog show a three-year rolling average as needs tend to spike in certain years which creates unrealistic spending patterns.*

As TERM Lite will not be able to reinvest in all needs in a given year with these constraints, those assets without action will enter the SGR backlog. The SGR backlog in the final year of analysis is shown below under each scenario. The first scenario illustrates the constraint of the current capital funding forecast described above and shows that the SGR backlog grows to more than double the current value over ten years.

*Table 5: Constrained Funding and Capacity Scenarios for Capital Preservation*

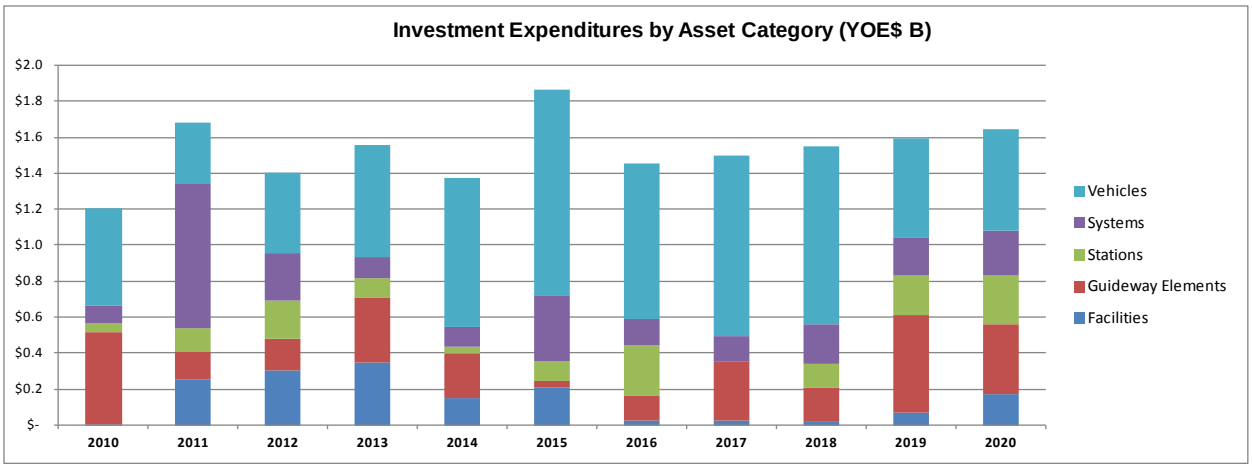
| | Cost Inflation | Funding Growth | 10 Yr Funding Trend (YOE $B) | Current Backlog (2010 $B) | Backlog in 2020 (YOE $B) |
|---|---|---|---|---|---|
| ***Constrained Scenario 1*** - *Current capital funding forecast* | 2.69% | 3.13% | $14.53 | $8.25 | $17.61 |
| ***Constrained Scenario 2*** - *Funding needed to maintain current backlog value* | 2.69% | 11.81% | $24.45 | $8.25 | $8.14 |

## Scenario 1 – Current Funding Forecast

The current capital investment needs forecast is shown below, by category of expenditure. Note that the allocation of reinvestment dollars by category is largely dependent on the weights assigned to TERM Lite's prioritization criteria (including asset condition, impact on safety, impact service reliability, and impact on O&M costs). Different prioritization weightings on these criteria will lead to different allocations of investment funds between vehicles, systems, stations, guideway elements (track and structures) and facilities. Note that TERM Lite's current criteria weightings are calibrated to emphasize overall attainment of a state-of-good repair while still ensuring higher overall scores for investments the contribute to safety, reliability and reductions in operating costs (see appendix for weightings used in this analysis).

Given that vehicles represent a significant share of all transit assets, have shorter useful lives than most other asset categories, and higher impact on safety, reliability and operating costs, they account for the majority of expenditures (nearly $8b in YOE$) in the constrained budget scenario shown below.

*Figure 2: Projected Investment Expenditures by Asset Category with Current Forecast Capital Funding*




The peaks in spending seen in 2011, 2013 and 2015 are due to expansion assets being acquired in the inventory. These expenditures fall outside of the preservation budget entered into TERM Lite, as seen in Figure 3. However, inclusion of known expansion assets in the inventory increases the accuracy of the backlog projection as new assets may require reinvestment, rehabilitation or replacement, within the 10 year analysis timeframe.

*Figure 3: Projected Investment Expenditures by Inventory with Current Forecast Capital Funding*

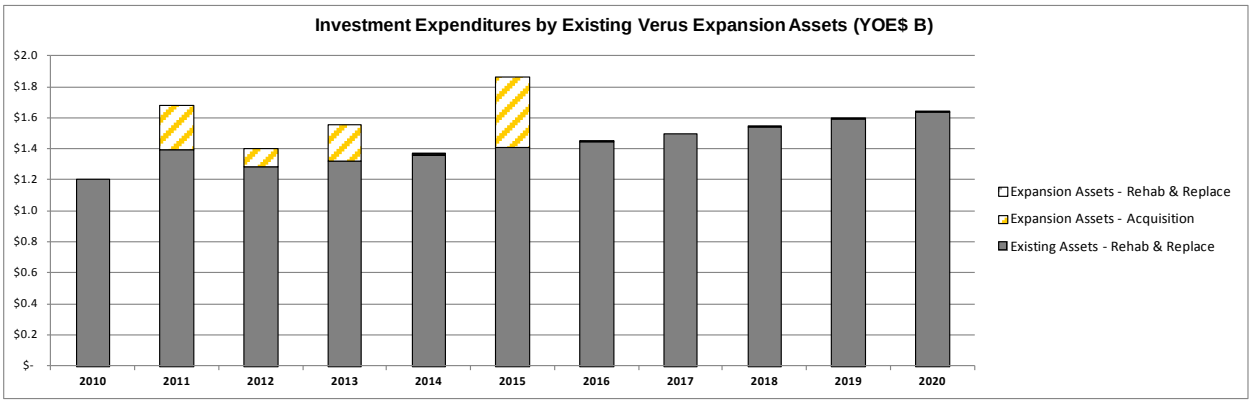
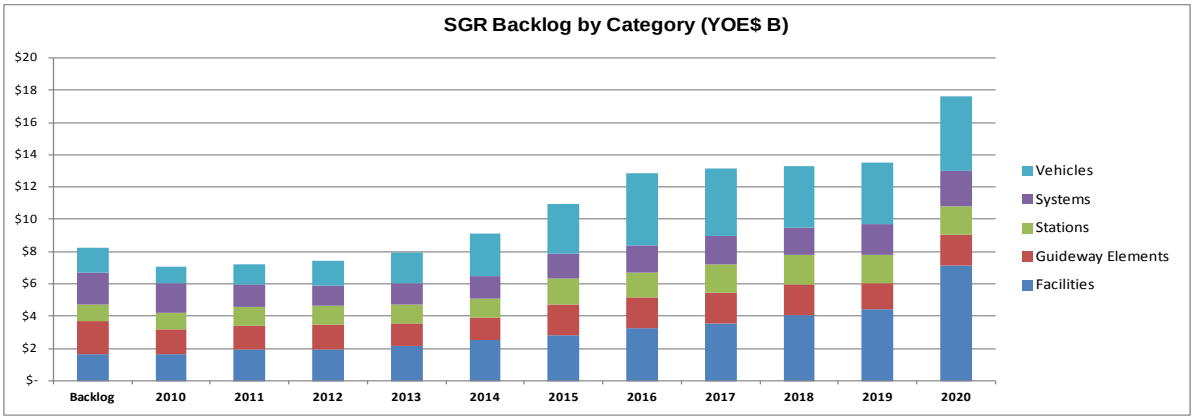



Figure 4 below presents a forecast of the SGR backlog, which represents the total level of investment required to bring all of the state's assets to a state-of-good repair. Similar to the expenditure forecast, the future composition of the SGR backlog forecast is determined in part by the weightings TERM Lite's investment prioritization criteria. Different weightings will yield a different mix of investment needs between stations, vehicles, systems and other transit asset types. However, while the *composition* of the SGR backlog forecast is influenced by investment prioritization, the future *size* of the backlog is relatively insensitive to how investment funds are spent.

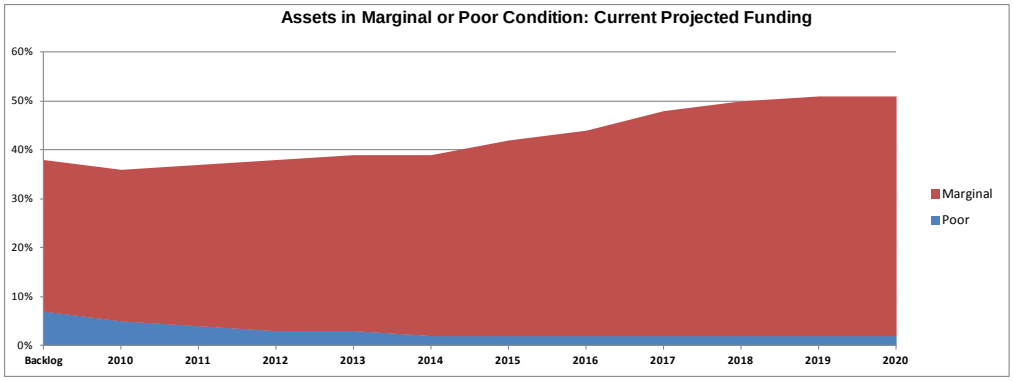
*Figure 4: Projected SGR Backlog with Current Capital Funding Forecast*




The SGR backlog that results from the current capital funding forecast is driven up mostly by aging facilities over time, which are not rehabilitated or replaced when needed. The updated inventory shows that systems (including train control and fare collection), stations and guideway elements (including track) remain fairly constant as a proportion of the backlog. However, vehicles also increase in the backlog over time – despite their higher priority ranking for safety and service reliability.

The resulting asset conditions under the current funding forecast are illustrated in Figure 5. With the expected capital funding, a majority of assets is projected to be in poor or marginal condition by 2022.

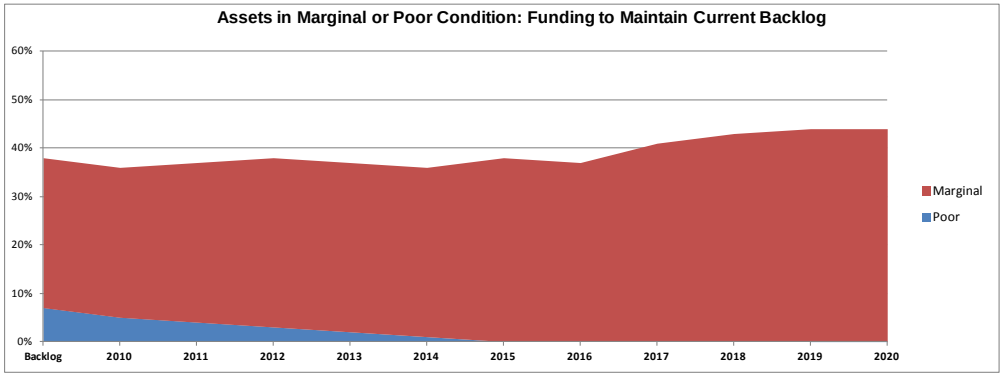
*Figure 5: Condition of Transit Assets with Current Capital Funding Projections*




## Scenario 2 – Maintain Backlog Value Over Ten Years

The other constrained scenario assumes that the current level of SGR backlog can be maintained over ten years, which requires approximately $24 billion in capital funding (in year of expenditure dollars). Figure 6 illustrates that even when this level of funding is applied, the conditions of assets are not static as different assets enter and leave the backlog. This occurs as funding becomes available and their priority for reinvestment increases. However, the majority of assets remain in adequate, good or excellent condition in this scenario.

*Figure 6: Condition of Transit Assets with Funding Available to Maintain Current Backlog*




In addition to the condition ratings, the constrained funding scenarios impact the age of assets in relation to their useful lives. The older an asset is the more of its useful life it has 'consumed' and when it goes beyond 100% of its useful life it enters the backlog. For example, an asset that is 90 years old and has a 100 year useful life is at 90% of its useful life. When it turns 101 and it has not been replaced it is at 101% and is beyond its useful life. The distribution of assets in relation to their useful life changes based on how much funding is available. With more funding assets are replaced closer to their useful life replacement age. With less funding, more assets will enter the backlog.

The chart in Figure 7 shows this impact of constrained rates of reinvestment on the statewide asset conditions and reinvestment needs. Specifically, Figure 7 shows both the current and projected future age distributions of California's transit assets (expressed as a percent of useful life consumed versus the percent share of the total replacement value of all assets). This graphic provides a snapshot of the "current" age distribution of California's transit assets (the blue layer) and a snapshot in ten year's time under the two different funding scenarios (the red and green layers).

Based on this analysis, both constrained funding scenarios shift the age distribution "to the right" – i.e. to a higher percent of useful life consumed – as assets have aged in the ten intervening years between 2010 and 2020. The distribution of assets which are beyond 100% of their useful life, and therefore in the backlog, is higher in 2020 under the first scenario, with the current capital funding forecast at $14 billion, than it is under the second scenario at $24 billion.

*Figure 7: Distribution of Assets by Percent of Useful Life Consumed*

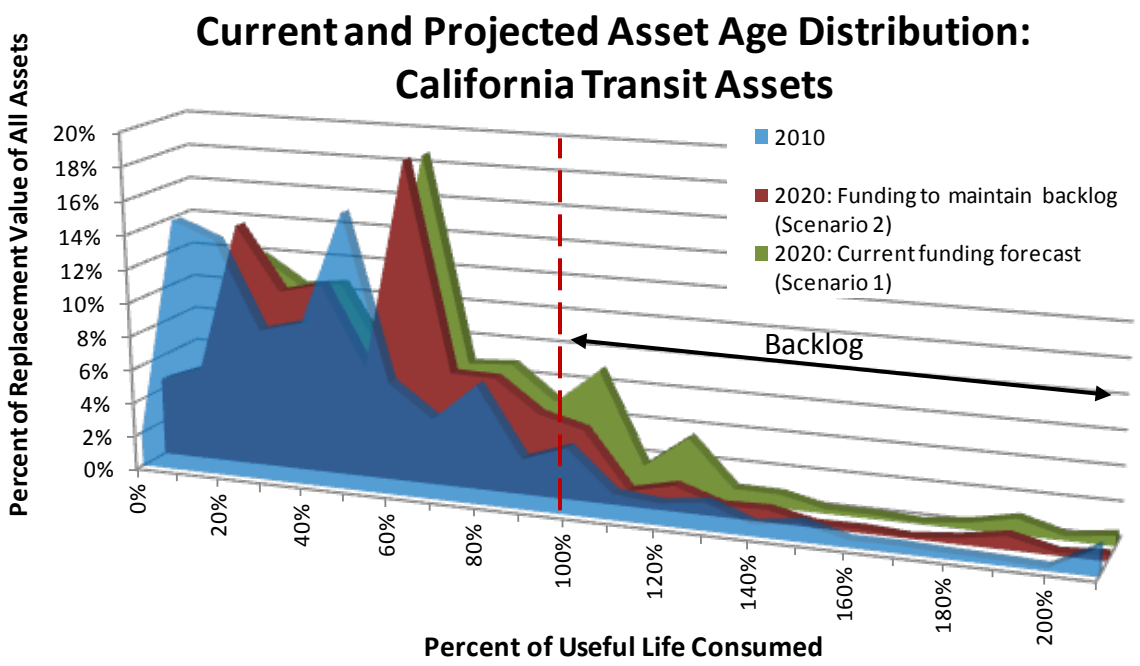
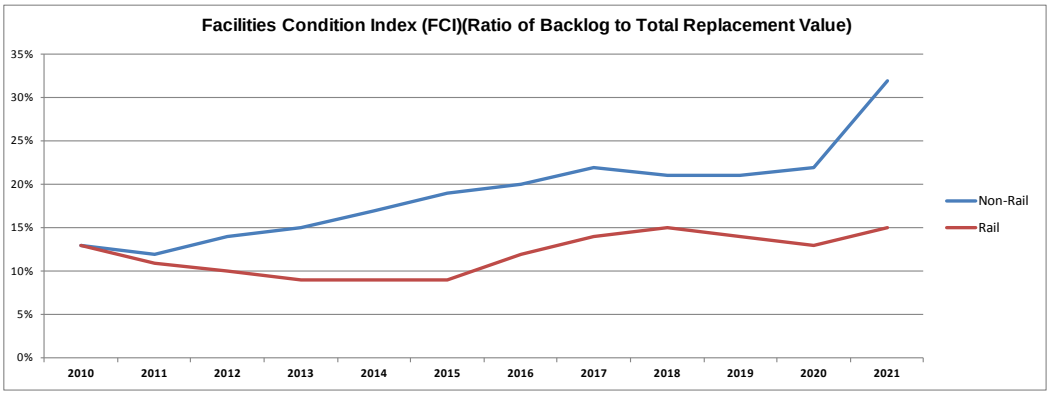



Figure 7 illustrates that there will be more assets beyond their useful life (the red dotted line) in 2020 than there were in 2010, which means the backlog of capital needs will grow under current capital funding projections.

It is important to understand that the impact of constrained funding or constrained capacity to reinvest has differential impacts depending on the mode in California. TERM Lite utilizes a priority scoring methodology to determine which assets are rehabilitated or replaced under constrained scenarios. Those priorities are currently set to maximize asset condition ratings. Safety and reliability also score highly (see Attachment for detailed assumptions). Given these priorities and the expected level of constrained funding, the backlog of non-rail assets increases more severely than that of rail assets. This can be seen in the Facilities Condition Index in Figure 8, which is the ratio of the value of the SGR backlog of assets to the total value of those assets.

*Figure 8: Facilities Condition Index for Asset by Mode with Current Capital Funding Projections (Scenario 1)*




One takeaway from this graphic is in Scenario 1, with current capital funding projections, by 2021 one-third of non-rail assets (by value) will not be in a state of good repair.

## 3.2 Expansion

Two types of projections are considered for capital expansion projects. As described above Service Expansion includes the capital needed to maintain service levels for increasing ridership demands, normally based on underlying population growth. Major New Services are projects that expand the capacity of the existing system into new areas or new modes, such as extending a line or adding a new ferry route. Table 6 shows the summary of needs and funding projections in these categories with a funding to needs ratio of 25%.

*Table 6: Service Expansion and Major New Service Unmet Capital Summary FY2011 to FY2020 (YOE$)*

| Type of Capital Funding | 10 Year Funding Needs ($B) | 10 Year Capital Funding Trend ($B) | 10 Year Funding Gap ($B) | Ratio: Funding to Needs |
|---|---|---|---|---|
| Service Expansion | $5.63 | $10.10 | $29.56 | 25% |
| Major New Service | $34.03 | | | |

### Service Expansion Needs

To estimate the capital required to support trends in ridership growth, the original ridership trends used in the TERM federal model were maintained. Specifically, TERM was used to estimate the rate at which existing vehicle fleets must expand to maintain current vehicle capacity utilization (i.e. "maintain performance") given the trend rate of increase in ridership for each study area over the next 10 years. While investing in fleet expansion, TERM also estimates the required level of investment needed to support the increasing fleet. These investments include maintenance facilities and expanded rail guideway assets, including track, systems and stations.

The trends for growth in ridership came from the most recent 10 year period of ridership reported to NTD, which were also used in the original study.

All of TERM's projected investment costs are based on standard cost values maintained in the TERM database for asset types which were obtained through FTA capital cost research. For this update the cost inflation used to determine year of expenditure (YOE$) costs over the ten year projection period was adjusted to match the weighted average rates for MPO planning as seen in the RTP/SCSs. For agencies not represented in those plans an average of transit related PPI growth was used to inflate costs. Those rates are described in Section 2 and detailed in the appendix.

The total Service Expansion needs by region are summarized in Table 7.

*Table 7: Service Expansion Funding Needs FY2011 to FY2020 (YOE$ B)*

| Region | Total Capital Need | Share of Total |
|---|---|---|
| **SACOG** | $0.158 | 3% |
| **SCAG** | $1.812 | 32% |
| **SANDAG** | $0.525 | 9% |
| **MTC** | $2.701 | 48% |
| **Other** | $0.438 | 8% |
| **Statewide** | **$5.634** | **100%** |

*Note: Updated analysis is from 2011 to 2020, with assumed % growth from 2019 to 2020 based on original TERM outputs.*

## Major New Service Needs

It is important to note that the TERM Service Expansion analysis described above does not identify needs related to major improvements or enhancements to capacity or performance. It only assesses the fleet expansion and support needs related to existing services (i.e., to keep up with population growth).

To assess major improvements or enhancements to capacity, CH2M HILL reviewed the major MPO RTP/SCSs for any Major New Service projects which would be initiated in the ten year projection period. These include proposed major investment in BRT, light rail, commuter rail and heavy rail projects. Some examples of these projects include:

- In the SACOG region - the Blue Line Extension to Cosumnes River College ($270 million) and Sacramento Streetcar ($182 million);
- In the SCAG region - the Crenshaw/LAX Transit Corridor ($1,733 million), Regional Connector ($1,366 million), and Expo Light Rail Line Extensions Phase I and II ($2,248 million);
- In the SANDAG region – the Mid-Coast Light Rail Extension ($1,642 million), San Diego Streetcar ($284 million), and COASTER Double Tracking;
- In the MTC region – the New Transbay Transit Center ($1,589 million), Caltrain Downtown Extension ( $2,596 million), Caltrain Electrification ($1,718 million), Muni Central Subway ($1,578 million), and BART Airport Connector ($484 million);
- In other parts of California - the Monterey Peninsula Fixed Guideway ($147 million), San Jose-Salinas Commuter Rail ($136 million), and Altamont Commuter Express Corridor Purchase and Improvements ($406 million).

For each of these projects, the study documented both the expected capital and O&M costs (if available) expected over FY2011 to FY2020. The survey did not identify any major new service projects located in rural counties. All Major New Service needs are expressed in YOE$, based on the values reported in the RTP/SCSs and not the weighted average inflation used for the other state-wide estimates included in this report. The summary table below shows the total need in billions for each region and the "Other" category which includes rural, urban and 5310 operators not captured in the RTP/SCSs where data was available.

*Table 8: Major New Service Funding Needs FY2011 to FY2020 (YOE$ B)*

| Region | Total Capital Need ($B) | Share of Total Need |
|---|---|---|
| **SACOG** | $0.69 | 2% |
| **SCAG** | $10.82 | 32% |
| **SANDAG** | $3.52 | 10% |
| **MTC** | $18.25 | 54% |
| **Other** | $0.76 | 2% |
| **Statewide** | **$34.03** | **100%** |

Since the completion of the original *California Unmet Transit Funding Needs FY2011 – FY2020* study, a few large Major New Service capital projects were delayed. In the most recent RTP/SCSs these projects now fall outside of the ten year timeframe of this analysis, thus reducing the overall need stated above. Some examples include the Green Line Extension to the Sacramento International Airport in the SACOG

region, the Westside Subway in the SCAG region, the Sorrento Mesa Guidway and the Downtown to Kearny Mesa Guideway in the SANDAG region, and the BART Extension from Berryessa to San Jose in the MTC region. The needs related to these projects are no longer represented in this study as they are beyond FY2020.

## Summary of Unmet Capital Needs

The transit capital funding gap for each region and statewide is summarized below by type of investment. As the expected capital funding consolidates service expansion and major new services, the gap is consolidated into a single line item for each region. Based on the results of this study the trend increases in capital funding from FY2011 to FY2020 are sufficient to cover less than one-half of preservation needs and about one quarter of expansion needs. In total the funding trends are estimated to only cover roughly one-third of all capital needs, however each region faces a different level of unmet funding.

*Table 9: Unmet Transit Capital Funding Needs Summary FY2011 to FY2020 (YOE$)*

| Type of Funding | Investment Type | 10 Yr Funding Needs (YOE $B) | 10 Yr Funding Trend (YOE $B) | Funding Gap | Ratio: Funding to Needs |
|---|---|---|---|---|---|
| SACOG | Preservation | $1.66 | $0.45 | $1.21 | 27% |
| | Service Expansion | $0.16 | $0.83 | $0.01 | 98% |
| | Major New Service | $0.69 | | | |
| SCAG | Preservation | $9.61 | $5.70 | $3.92 | 59% |
| | Service Expansion | $1.81 | $5.19 | $7.45 | 41% |
| | Major New Service | $10.82 | | | |
| SANDAG | Preservation | $3.03 | $0.86 | $2.17 | 28% |
| | Service Expansion | $0.53 | $0.84 | $3.21 | 21% |
| | Major New Service | $3.52 | | | |
| MTC | Preservation | $18.22 | $6.68 | $11.54 | 37% |
| | Service Expansion | $2.70 | $3.19 | $17.76 | 15% |
| | Major New Service | $18.25 | | | |
| Other | Preservation | $2.57 | $0.85 | $1.72 | 33% |
| | Service Expansion | $0.44 | $0.07 | $1.13 | 6% |
| | Major New Service | $0.76 | | | |
| *Statewide Subtotals* | *Preservation* | *$35.10* | *$14.53* | *$20.57* | *41%* |
| | *Service Expansion* | *$5.63* | *$10.10* | *$29.56* | *25%* |
| | *Major New Service* | *$34.03* | | | |
| **Total Capital** | | **$74.76** | **$24.64** | **$50.13** | **33%** |

*Note: Totals may not match due to rounding*

# 4. Operating Needs Estimates

The unmet transit operating needs are summarized in Table 10. While operating needs are broken out into type of need, the forecast operating funding is a consolidated total reflecting the operators' discretion in using these revenues. The final column represents the ratio of the projected available operating funding to the projected funding need. Based on the results of this update, trend increases in operating funding are sufficient to cover 80 percent of expected operating needs over the ten year period. Details regarding these projections are provided in the following sections.

*Table 10: Summary of Unmet Operating Funding Needs FY2011 to FY2020 (YOE$ B)*

| | Operating Cost Inflation | Operating Funding Growth | 10 Year Funding Needs ($B) | 10 Year Operating Funding Trend ($B) | 10 Year Funding Gap ($B) | Ratio: Funding to Needs |
|---|---|---|---|---|---|---|
| Existing Service Levels | 5.59% | 4.91% | $90.33 | $85.39 | $20.80 | 80% |
| Service Expansion | 5.59% | 4.91% | $12.52 | | | |
| Major New Service | N/A | 4.91% | $3.34 | | | |

## 4.1 Existing Service Levels (Preservation)

To generate operating funding needs to preserve existing service levels TERM uses a base year funding level and escalates the cost per vehicle annually over the ten years. The base year value for each region was generated from either 2009 NTD reporting of operating expenditures or from the 2009 California State Controller's Office Transportation Development Act reports. As such, the baseline values for operating expenditure were not refreshed in this update. However, the growth rates in expenditure were updated to reflect more recent data.

In order to update the operating funding needed for existing services, the original study data was refreshed with two more years of NTD reported values. As already described above the funding growth rate was updated to 4.91% based on two more years of trend data, from 2010 to 2011. That annual growth rate was then applied to the 2009 baseline value from the original study.

To update the level of O&M cost needs for existing services the operating expenditure average growth rate from 1991-2011 was used. As with the funding rate, the expenditure rate decreased with two additional years of data. This growth in need was then applied to the 2009 baseline of operating expenditures for each region. The results of the ten year projection of need for each region and statewide is presented below.

*Table 11: Existing Service Operating Funding Needs by Region FY2011 to FY2020 (YOE$ B)*

| Region | Total O&M Funding Needs ($B) | Share of Total Need |
|---|---|---|
| **SACOG** | $3.382 | 4% |
| **SCAG** | $36.711 | 41% |
| **SANDAG** | $4.015 | 4% |
| **MTC** | $29.496 | 33% |
| **Other** | $16.727 | 19% |
| **Statewide** | **$90.331** | **100%** |

## 4.2 Service Expansion

As already described TERM estimates Service Expansion needs based on assumed ridership growth and maintaining vehicle capacity utilization. To estimate the O&M costs associated with the resulting increase in fleet and support assets, operating needs were increased in linear proportion to the size of the revenue fleet. Cost inflation is also applied based on the updated operating cost inflation rate. The results of this analysis for each region are presented in Table 12.

*Table 12: Service Expansion Operating Funding Needs by Region FY2011 to FY2020 (YOE$ B)*

| Region | Total O&M Funding Needs ($B) | Share of Total Need |
|---|---|---|
| **SACOG** | $0.571 | 5% |
| **SCAG** | $5.498 | 44% |
| **SANDAG** | $0.955 | 8% |
| **MTC** | $4.211 | 34% |
| **Other** | $1.281 | 10% |
| **Statewide** | **$12.516** | **100%** |

## 4.3 Major New Service

To determine the level of operating needs for each region related to their Major New Service projects, CH2M HILL reviewed the planned and proposed service expansion projects reported in the RTP/SCSs from 2011 to 2020. Major new service projects had to include either expansion into a new geographic area or a new mode. The capital associated with these projects is reported above in Section 3. The operating and maintenance costs associated with these projects was scaled based on existing relationships with capital expenditure and are summarized below at the regional level.

*Table 13: Major New Service Operating Funding Needs by Region FY2011 to FY2020 (YOE$ B)*

| Region | Total Operating Need ($B) | Share of Total Need |
|---|---|---|
| **SACOG** | $0.302 | 7% |
| **SCAG** | $1.088 | 26% |
| ***SANDAG*** | $0.466 | 11% |
| ***MTC*** | $2.291 | 54% |
| **Other** | $0.073 | 2% |
| **Total** | **$4.220** | **100%** |

## 4.4 Summary of Unmet Operating Needs

The transit operating funding gap for each region and statewide is summarized in Table 14below, with operating funding consolidated into one line item for each region. Based on the results of this study the total trend increases in operating funding from FY2011 to FY2020 are sufficient to cover an estimated 80 percent of all operating needs.

*Table 14: Unmet Transit Operating Funding Needs Summary FY2011 to FY2020 (YOE$)*

| Type of Funding | Investment Type | 10 Yr Funding Needs (YOE $B) | 10 Yr Funding Trend (YOE $B) | Funding Gap | Ratio: Funding to Needs |
|---|---|---|---|---|---|
| SACOG | Preservation | $3.38 | $2.56 | $1.70 | 60% |
| | Service Expansion | $0.57 | | | |
| | Major New Service | $0.30 | | | |
| SCAG | Preservation | $36.71 | $32.07 | $11.23 | 74% |
| | Service Expansion | $5.50 | | | |
| | Major New Service | $1.09 | | | |
| SANDAG | Preservation | $4.02 | $4.05 | $1.39 | 75% |
| | Service Expansion | $0.96 | | | |
| | Major New Service | $0.47 | | | |
| MTC | Preservation | $29.50 | $29.69 | $6.31 | 82% |
| | Service Expansion | $4.21 | | | |
| | Major New Service | $2.29 | | | |
| Other | Preservation | $16.73 | $17.01 | $1.07 | 94% |
| | Service Expansion | $1.28 | | | |
| | Major New Service | $0.07 | | | |
| *Statewide Subtotals* | *Preservation* | *$90.33* | $85.38 | $21.69 | 80% |
| | *Service Expansion* | *$12.52* | | | |
| | *Major New Service* | *$4.22* | | | |
| **Total Capital** | | **$107.07** | **$85.38** | **$21.69** | **80%** |

# Attachment: Technical Detail

## A1. Funding Growth and Cost Inflation Rates

| MPO | Cost Inflation | Funding Growth | Weighting on Total Needs | Notes on RTP/SCS Averages |
|---|---|---|---|---|
| SCAG | 3.20% | 2.90% | 30% | |
| SACOG | 2.11% | 4.73% | 5% | • Funding growth is straight average of growth rates in RTP/SCS as no related capital values given<br>• Cost inflation is average of relevant years in RTP/SCS |
| SANDAG | 1.90% | 4.74% | 10% | • Funding growth is weighted by amount of state funding listed at each growth rate in the RTP/SCS<br>• CPI was indicated for cost inflation - estimated at 1.9% for most recent Year-on-Year CPI rate |
| MTC | 2.50% | 2.50% | 48% | • Funding growth based on revenue projections provided by Glenn [last name]<br>• Cost inflation source Rick Laver |
| Other | 3.20% | 4.90% | 8% | • Funding growth is average of annual capital funding reported to NTD since 2001 for the state<br>• Applied PPI rates related to transit for cost inflation (see A2 for detailed rates) |
| | | | | |
| Weighted Average | 2.69% | 3.13% | | |

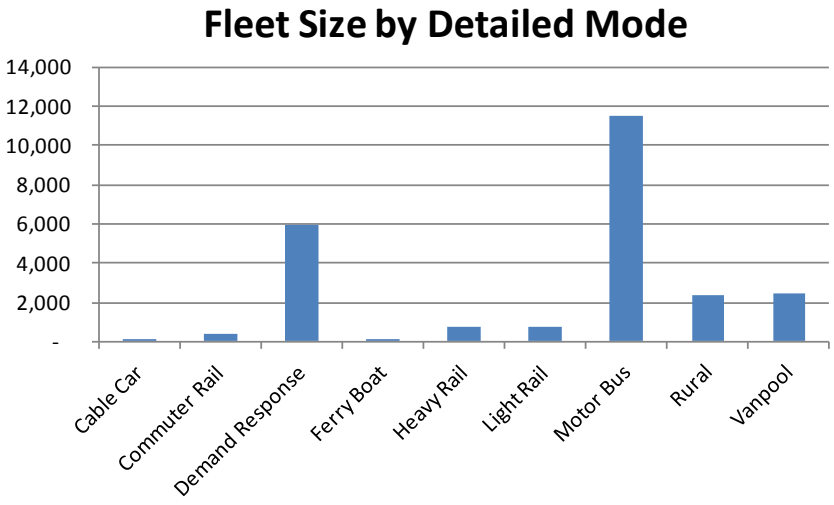
## A2. Updated Inventory Details

The original study inventory was updated to include new submissions to TERM federal made in 2010 or 2011. Agency inventory used in recent TERM Lite applications also replaced older inventory reports. In addition, the inventory from the previous study was cleansed of any agencies no longer operating in California, such as ATC Vancom, to ensure inventory was not duplicated with new assets. New agencies were also added since the previous study, including the Water Emergency Transportation Authority (WETA). As TERM Lite allows for the reporting of 'expansion' assets which are purchased after the start year of analysis, the inventory was also updated to include any assets listed after 2013. A summary of the inventory under each asset category is described below for quantity and age profiles.

### Revenue Vehicles

The updated inventory includes 24,258 revenue vehicles for transit agencies in the state of California. Of those vehicles reported, two are expansion ferries purchased for WETA in 2015. A majority of the revenue fleet are buses at 47% of the total fleet, with demand response vehicles the second most common. "Rural" is a mix of bus and demand response.

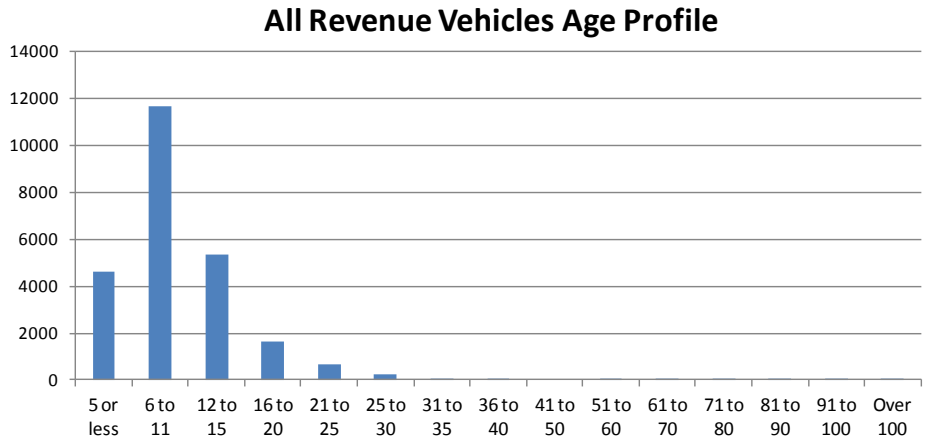
The average age of the revenue vehicle fleet in California is 10 years. Average age varies by mode of vehicle, as seen below, with cable cars and light rail the oldest vehicles. Cable cars are the oldest fleet by far, with a handful of vehicles over 100 years old, due to the historic cars still in San Francisco Muni's inventory.




| Mode | Quantity | % of Fleet | Avg Age |
|---|---|---|---|
| Cable Car | 47 | 0.2% | 104.7 |
| Commuter Rail | 426 | 1.8% | 18.9 |
| Demand Response | 5,922 | 24.4% | 6.7 |
| Ferry Boat | 33 | 0.1% | 15.5 |
| Heavy Rail | 773 | 3.2% | 15.8 |
| Light Rail | 778 | 3.2% | 20.7 |
| Motor Bus | 11,480 | 47.3% | 10.8 |
| Rural | 2,367 | 9.8% | 10.1 |
| Vanpool | 2,432 | 10.0% | 5.7 |
| **Total** | **24,258** | **100.0%** | **10.0** |

The age distribution of revenue vehicles is weighted towards vehicles less than 20 years old, 89 percent of vehicles are 15 years old or younger. Most vehicles, 48 percent, are between 6 to 11 years old. Again, age distributions vary by mode.

| Age Group | Quantity | % of Fleet |
|---|---|---|
| 5 or less | 4618 | 19.0% |
| 6 to 11 | 11632 | 48.0% |
| 12 to 15 | 5329 | 22.0% |
| 16 to 20 | 1644 | 6.8% |
| 21 to 25 | 647 | 2.7% |
| 25 to 30 | 225 | 0.9% |
| 31 to 35 | 29 | 0.1% |
| 36 to 40 | 23 | 0.1% |
| 41 to 50 | 0 | 0.0% |
| 51 to 60 | 2 | 0.0% |
| 61 to 70 | 39 | 0.2% |
| 71 to 80 | 1 | 0.0% |
| 81 to 90 | 18 | 0.1% |
| 91 to 100 | 7 | 0.0% |
| Over 100 | 42 | 0.2% |

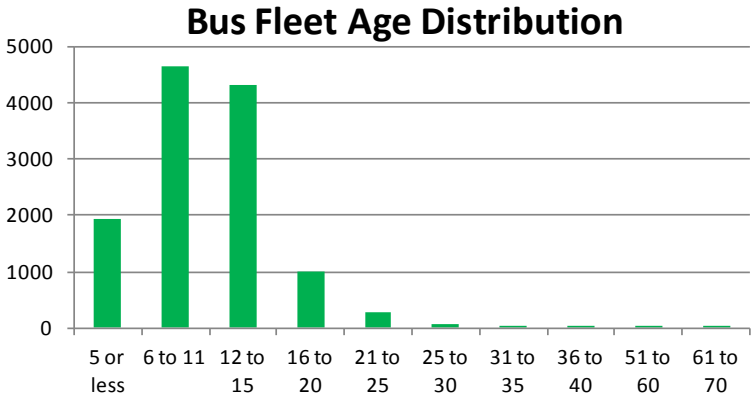



In order to compare modes easily, assets are grouped into Rail, Bus and Other categories. For revenue vehicles "Other" includes ferries, demand response vehicles, vanpools, and cable cars. For other asset categories, "Other" also includes non-vehicle assets related to system-wide needs (i.e. multi-modal).

Rail makes up a minority of the revenue fleet by mode, but it is the oldest category of vehicles. This is common as the useful life of rail cars generally ranges from 27 years for light and heavy rail to 35 years for commuter rail, while the useful life of a bus generally ranges from 12 to 15 years.

| | Quantity | % of Fleet | Avg Age |
|---|---|---|---|
| Bus | 12,213 | 50% | 10.8 |
| Other | 10,068 | 42% | 7.4 |
| Rail | 1,977 | 8% | 18.4 |
| **Total** | **24,258** | **100%** | **10.0** |

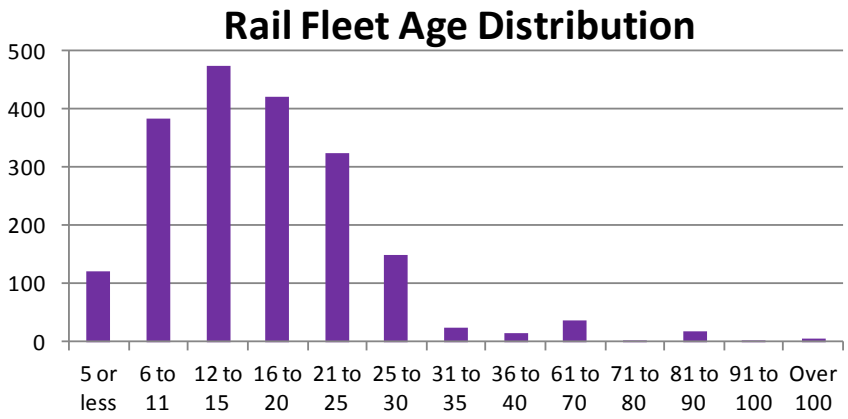
California's bus fleet has an average age near the 12 year replacement age recommended by FTA. The age distribution below shows that 46% of bus vehicles are equal to or past the 12 year useful life as of 2013. This means that many bus vehicles will require replacement in the near term and may enter the SGR backlog with constrained funding.




| BUS FLEET | | |
|---|---|---|
| Age group | Quantity | % of Fleet |
| 5 or less | 1924 | 15.8% |
| 6 to 11 | 4632 | 37.9% |
| 12 to 15 | 4304 | 35.2% |
| 16 to 20 | 998 | 8.2% |
| 21 to 25 | 269 | 2.2% |
| 25 to 30 | 74 | 0.6% |
| 31 to 35 | 4 | 0.0% |
| 36 to 40 | 4 | 0.0% |
| 51 to 60 | 1 | 0.0% |
| 61 to 70 | 3 | 0.0% |

The rail fleet, while older on average than the bus fleet, has a greater distribution of vehicles below the useful life range for rail assets. Eighty seven percent of rail vehicles are 25 years or younger, with 94 percent below 30 years old in 2013.

| RAIL FLEET | | |
|---|---|---|
| Age group | Quantity | % of Fleet |
| 5 or less | 123 | 6.2% |
| 6 to 11 | 383 | 19.4% |
| 12 to 15 | 475 | 24.0% |
| 16 to 20 | 420 | 21.2% |
| 21 to 25 | 325 | 16.4% |
| 25 to 30 | 149 | 7.5% |
| 31 to 35 | 24 | 1.2% |
| 36 to 40 | 15 | 0.8% |
| 61 to 70 | 36 | 1.8% |
| 71 to 80 | 1 | 0.1% |
| 81 to 90 | 18 | 0.9% |
| 91 to 100 | 3 | 0.2% |
| Over 100 | 5 | 0.3% |



## Stations

Reporting of station inventory varies widely by agency in California, as there are multiple approaches to cataloguing inventory. For example, some agencies report stations by square foot or linear feet of guideway or simply as a single unit for a building – i.e. 'each'. Some report the count of component station parts, such as platforms and canopies, where others report the entire station as one piece of inventory. Similarly for parking lots, some are reported by square feet, others as a single unit and others by number of parking spaces.

The different reporting approaches taken make direct comparison of quantities for sub-categories impossible. The comparisons described below are only meant to provide a state-level snapshot of station inventory, and not detailed analysis.

Most of the station inventory reported in California is related to rail or bus locations. The average age of these assets is about 20 years, with the oldest station inventory related to bus stations. The average ages of station inventory are below the average reported useful lives for all types of station assets.

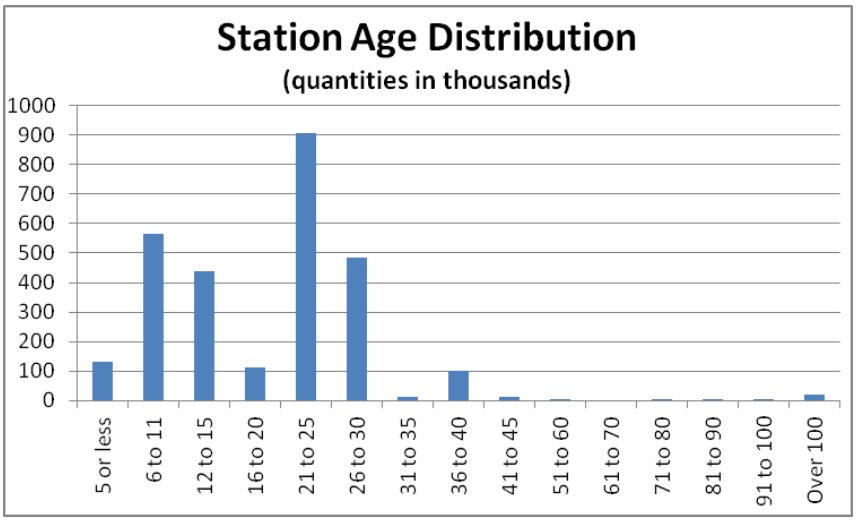
| Category | Quantity | % of Stations | Avg Age |
|---|---|---|---|
| (No category) | 55 | 0.00% | 17.16 |
| Ferry | 82 | 0.00% | 16.21 |
| Motor Bus | 370,091 | 13.24% | 23.77 |
| Rail | 2,424,035 | 86.74% | 19.27 |
| **Total** | **2,794,263** | **100.0%** | **19.87** |

However, looking at averages across station asset types obscures the large differences in useful lives in station components. For example, signage and graphics have an average useful life of about 13 years, and the reported inventory shows an average age very close to replacement. While canopies have the highest useful life at nearly 50 years, and the average age is well below half that value. Station buildings also have a long average useful life, but the reported inventory actually shows an average age above that (45.9 years), indicating that some station buildings may need replacement.

| Asset Element Type | Agency Useful Life | Avg Age |
|---|---|---|
| - | 28.9 | 7.6 |
| **Access** | 30.6 | 21.8 |
| **Building** | 45.6 | 45.9 |
| **Canopy** | 49.5 | 15.9 |
| **Dock** | 35.2 | 13.8 |
| **Elevators** | 23.5 | 20.7 |
| **Escalators** | 17.6 | 23.4 |
| **Misc** | 10.9 | 11.3 |
| **Parking** | 32.2 | 23.4 |
| **Pedestrian Walkway*** | 43.3 | 16.8 |
| **Platform** | 47.8 | 17.0 |
| **Shelter*** | 20.0 | 19.5 |
| **Signage & Graphics** | 12.8 | 12.1 |
| **Total** | 37.6 | 19.9 |

**Note: Default TERM Lite value as no agency reported useful lives.*

| Age Group | Quantity |
|---|---|
| 5 or less | 133,228 |
| 6 to 11 | 563,648 |
| 12 to 15 | 438,479 |
| 16 to 20 | 111,970 |
| 21 to 25 | 904,358 |
| 26 to 30 | 482,593 |
| 31 to 35 | 12,098 |
| 36 to 40 | 101,641 |
| 41 to 45 | 11,457 |
| 51 to 60 | 880 |
| 61 to 70 | - |
| 71 to 80 | 6,811 |
| 81 to 90 | 1,750 |
| 91 to 100 | 3,600 |
| Over 100 | 21,455 |

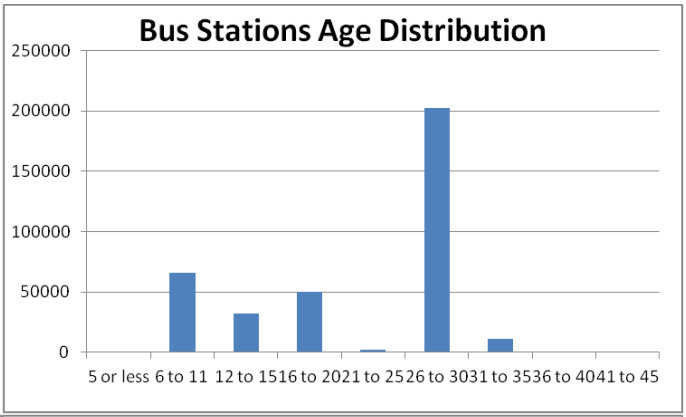


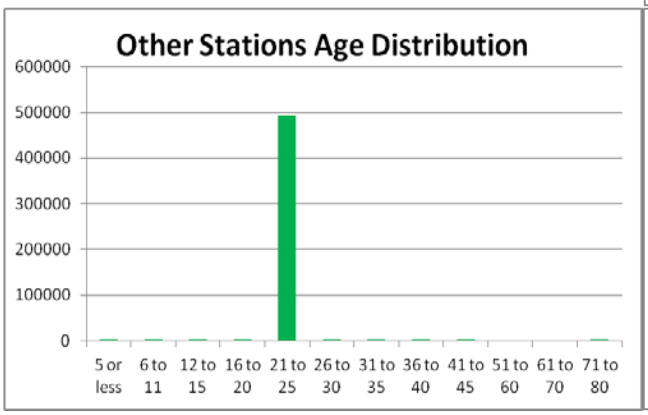

Most station assets reported are 21 to 25 years old, with a very wide distribution. Some Caltrain station buildings were reported from 106 to 150 years old.

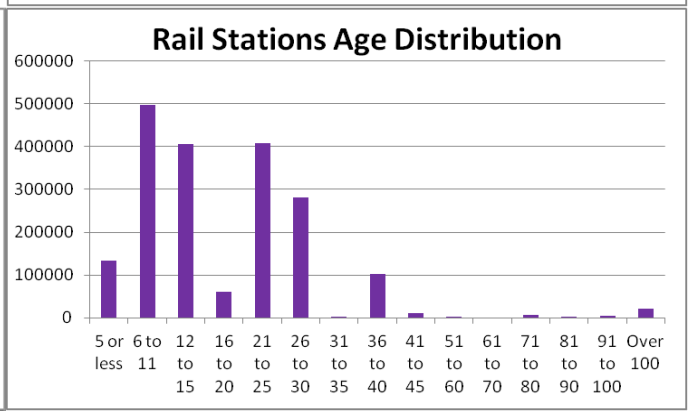
Agencies reported most station assets by mode related to rail operations, including light rail, heavy rail and commuter rail, at 69% total. The nearly 18% of assets defined as "Other" in the model category are related to system-wide assets which may be in a rail or bus station but serve the entire system, which explains the difference between the modal categorization and the categories above for location of station assets. Ferry assets are also in the "Other" category.

| Mode | Quantity | % of Stations | Avg Age |
|---|---|---|---|
| Bus | 364,191 | 13.0% | 22.4 |
| Other | 493,613 | 17. 7% | 22.1 |
| Rail | 1,936,459 | 69.3% | 18.8 |
| **Total** | **2,794,263** | **100%** | **19.87** |

Though the average ages of station assets by mode are very similar, all around 20 years old, the age distribution of station assets by mode are very different. Rail asset have a much wider age distribution than either bus or "Other" assets. In fact, the narrowest age distribution is for bus station assets where there are no assets over 45 years old. While, rail station assets can be up to and over 100 years old in California.



## Guideway Elements

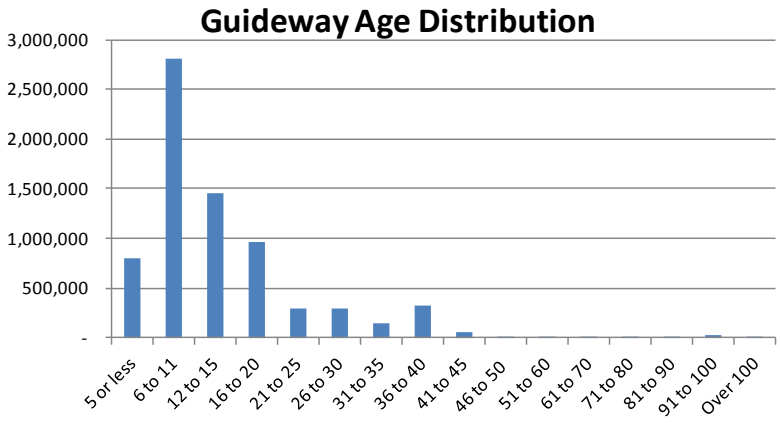
Most of the guideway inventory reported in the California transit inventory is trackwork, with guideway elements second. Guideway elements include elevated structures, at-grade structures and various types of tunnels. It is important to note, however that guideway is reported in various measurements and units which cannot be easily normalized for the purposes of comparison. The quantities shown here are variously reported in linear feet, length in feet, track miles, rt miles, and linear miles guideway. Given the differences in measurement by agency the comparisons below are not 'apples to apples' and are meant only for high level understanding of California's guideway inventory.

The average age of transit guideway in California is about 15 years, with the oldest on average reported to be Bus Guideway. However, most Bus Guideway assets have a useful life of 80 years so the average age is still well below replacement.

| Category | Quantity | % of Guideway | Avg Age |
|---|---|---|---|
| Bus Guideway | 809,460 | 11.2% | 19.25 |
| Guideway | 2,469,231 | 34.1% | 16.71 |
| Special Structures | 17,641 | 0.2% | 4.34 |
| Trackwork | 3,936,199 | 54.4% | 12.90 |
| **Total** | **7,232,531** | **100.0%** | **14.89** |

The general "Guideway" category includes light, heavy and commuter rail guideway elements. The average useful life for these assets is about 80 years, meaning that most of California's rail Guideway is well under the useful life with an average of about 17 years of age. However, most Guideway does require annual capital maintenance and associated funding.

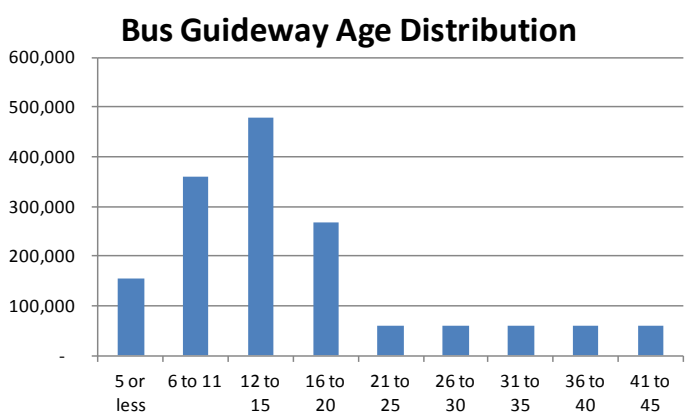
| Age group | Quantity |
|---|---|
| 5 or less | 795,918 |
| 6 to 11 | 2,812,168 |
| 12 to 15 | 1,457,755 |
| 16 to 20 | 963,317 |
| 21 to 25 | 291,916 |
| 26 to 30 | 301,216 |
| 31 to 35 | 150,089 |
| 36 to 40 | 327,836 |
| 41 to 45 | 63,819 |
| 46 to 50 | 3,883 |
| 51 to 60 | 4,143 |
| 61 to 70 | 4,284 |
| 71 to 80 | 5,354 |
| 81 to 90 | 8,287 |
| 91 to 100 | 28,218 |
| Over 100 | 14,327 |

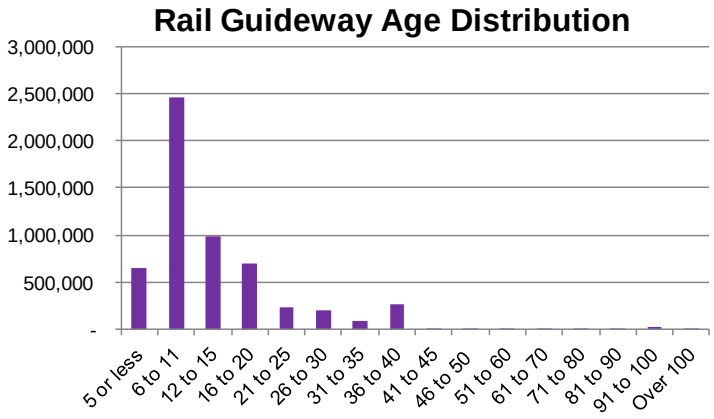



Trackwork has a broader range of useful lives, from 10 years to 50 years depending on the type of track. Considering that the average age of trackwork is about 13 years there may be some components requiring replacement in the near term.

| Mode | Quantity | % of Guideway | Avg Age |
|---|---|---|---|
| Bus | 1,556,632 | 21.5% | 16.0 |
| Other | 45,569 | 0.63% | 29.0 |
| Rail | 5,630,330 | 77.9% | 14.5 |
| **Total** | **7,232,531** | **100%** | **14.9** |

About 78% of guideway as measured and reported by mode is for rail operations. The distribution of age is much wider for rail guideway, with bus guideway having a higher average age but a narrower distribution.



## Systems

The major transit systems reported to FTA include revenue collection, communications, electrification, train control, signals, and utilities. As seen below, California's transit inventory is dominated by these categories as well. However, the units of asset reported in each category are not directly comparable as electrification assets, such as catenary and third rail, are often reported in relation to track feet or linear feet of guideway. Again, the quantities below should not be considered an 'apples to apples' comparison and are only meant to provide a high level understanding of California's transit systems inventory.

The average age of systems in California is about 17 years, with security and surveillance equipment in the youngest category. Revenue collection equipment can range from 10 or 10 year useful lives for encoding machines and fareboxes, to 20 year lives for in-station turnstiles and faregates. Given that the average age of this type of equipment is near 11 years there may be assets requiring replacement in the next 10 years of projections.

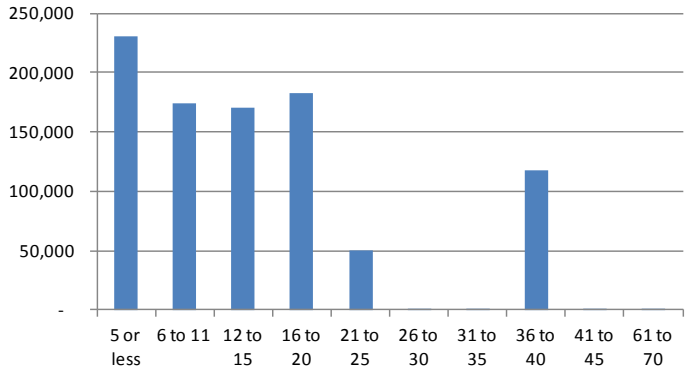
| Category | Quantity | % of Systems | Avg Age |
|---|---|---|---|
| ATMS | 14,001 | 0.1% | 9.0 |
| Central Revenue Collection | 196 | 0.0% | 14.2 |
| Communications | 1,088,261 | 5.4% | 12.6 |
| Electrification | 16,525,814 | 82.6% | 17.9 |
| ITS | 6,423 | 0.0% | 11.4 |
| Revenue Collection | 8,927 | 0.0% | 10.7 |
| Roadway Traffic Signals | 303 | 0.0% | 9.9 |
| SCADA | 7 | 0.0% | 7.9 |
| Security/Surv Equipment | 2,797 | 0.0% | 8.3 |
| Signals | 12,903 | 0.1% | 16.5 |
| Train Control | 1,258,208 | 6.3% | 13.9 |
| Utilities | 1,084,939 | 5.4% | 18.7 |
| **Total** | **20,002,778** | **100.0%** | **17.4** |

Similar to other categories of transit assets, the age of systems vary by mode. The oldest systems are related to system-wide operations. In this case a majority of the "Other" systems are older because they are utilities built in the 1970s and 1980s related to San Francisco Muni's cable car services.

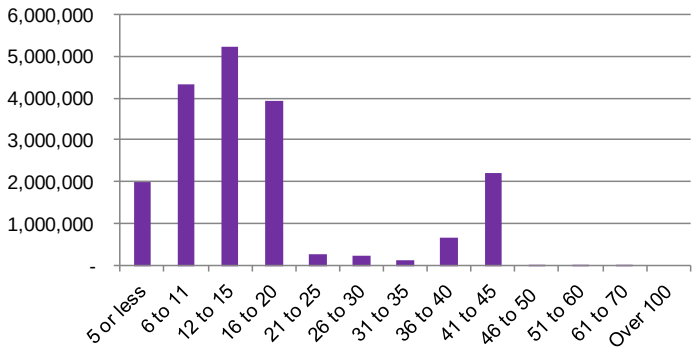
| Mode | Quantity | % of Equipment | Avg Age |
|---|---|---|---|
| Bus | 925,714 | 4.6% | 15.0 |
| Other | 26,375 | 0.13% | 24.0 |
| Rail | 19,050,689 | 95.2% | 17.5 |
| **Total** | **20,002,778** | **100%** | **17.4** |

Rail systems tend to be older and have a wider age distribution than bus systems. This is not surprising as rail systems tend to have longer useful lives than bus systems. For example, catenary and electrification substations have a useful life around 40 years while communications systems on buses tend to have useful lives from 10 to 12 years.

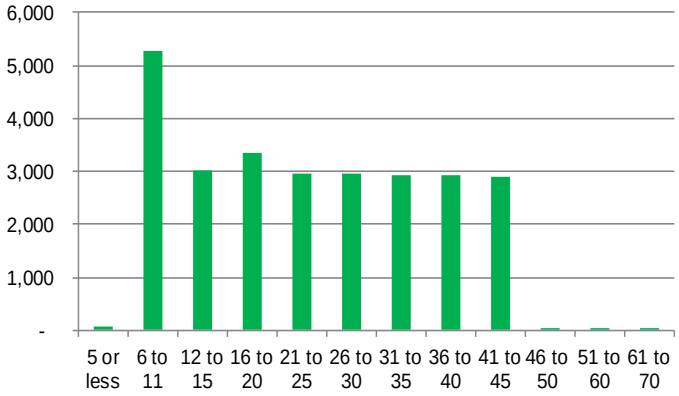
## Bus Systems Age Distribution




## Rail Systems Age Distribution




## Other Systems Age Distribution



## Facilities

Most non-station transit facilities in California are "Buildings" – based on a count of inventory records. As some facilities are reported based on square footage this assumes that one record corresponds to one facility. In addition the counts reported below exclude the following, though these are included in inventory for the purposes of SGR backlog analysis:

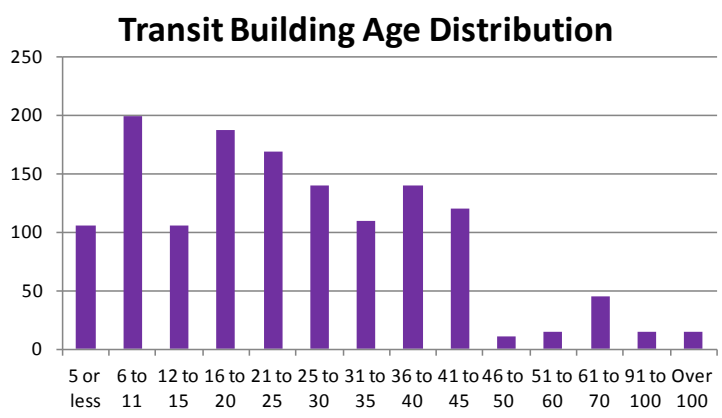
- 108 non-classified facilities, which have no description or classification to form a basis of inventory groupings (i.e. building, equipment, etc)
- Facility equipment (this is reported separately below)
- Central control
- Vertical transportation (i.e. elevators)

| Facility Type | Quantity | % of Facilities | Avg Age |
|---|---|---|---|
| Buildings | 1,378 | 94% | 25.8 |
| Major Shops | 15 | 1% | 31.2 |
| Storage Yard | 54 | 4% | 23.0 |
| Vehicle Wash | 15 | 1% | 11.9 |
| **Total** | **1,462** | 100% | **25.6** |

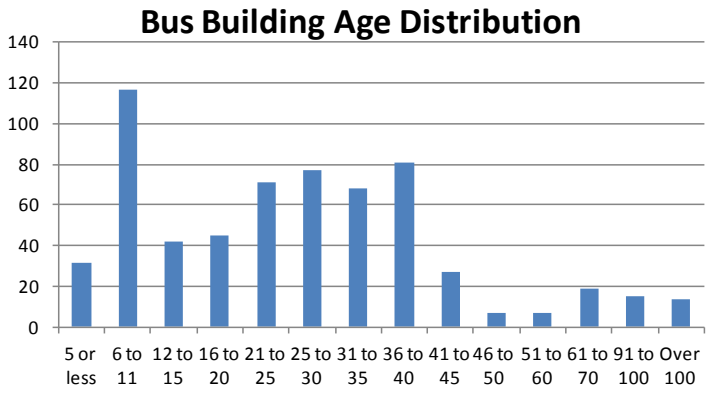
The average non-station transit facility in California is about 26 years old. Given that buildings make up the vast majority of facilities, the following analysis focuses on buildings. The useful life range for transit buildings is generally from 35 to 50 years.

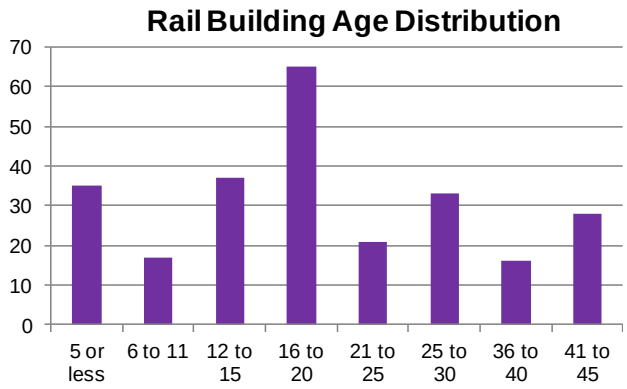
The oldest *Buildings* on average are combination administration and maintenance facilities at 37 years, potentially putting some past their useful life in 2013. Most facilities (48%) are for maintenance only purposes – based on a count of records as described above – which average 25 years.

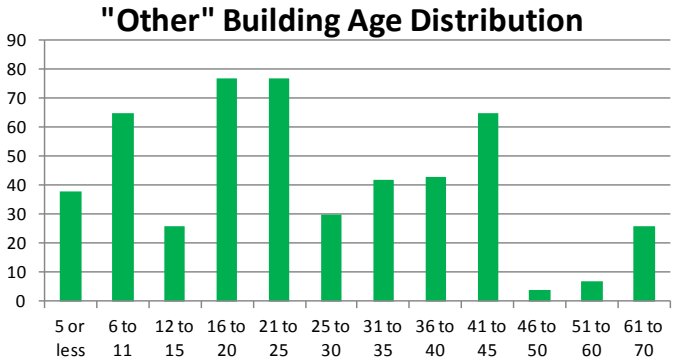
| Building Type | Avg Age |
|---|---|
| - | 24.2 |
| Admin/Maint | 37.0 |
| Administration | 25.6 |
| Bus Turnaround Facility | 23.0 |
| Maintenance | 25.1 |
| Passenger | 21.3 |
| Terminals | 13.9 |
| Utilities | 28.4 |
| **Total** | **25.8** |




Similar to revenue vehicles, the age distribution for buildings varies by mode; though the variance is not as pronounced as it is for vehicles. In general, bus related buildings are older than rail buildings and have a wider age distribution. Most rail related buildings are less than 20 years old and no rail buildings are over 45 years old. This shows that bus buildings are more at risk to enter the SGR backlog without funding.



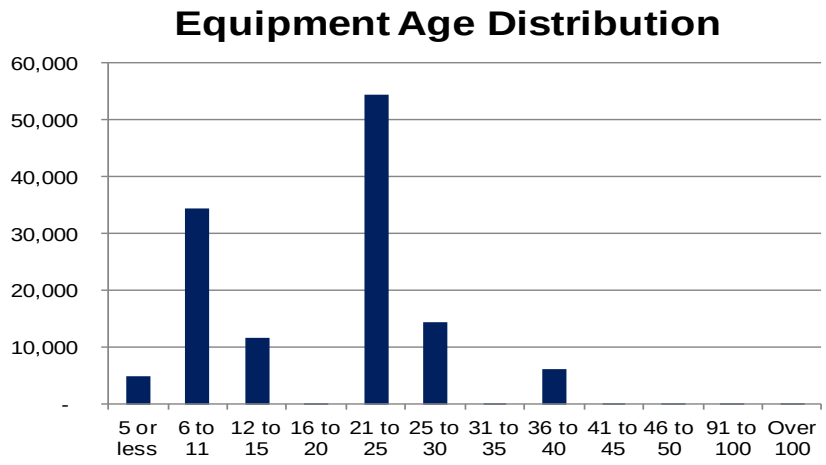




Equipment is also reported under Facilities in the FTA hierarchy used by TERM and TERM Lite. California's updated inventory includes approximately 126,000 pieces of equipment. Equipment does not include systems such as fare collection and train control, which have been reported above under Systems.

| Category | Quantity | % of Equipment | Avg Age |
|---|---|---|---|
| | 527 | 0.4% | 14.0 |
| - | 49,663 | 39.4% | 11.6 |
| Air Compressor (NRV-27) | 17 | 0.0% | 21.8 |
| Computers/Software | 4,619 | 3.7% | 9.3 |
| Furniture | 2,257 | 1.8% | 8.5 |
| Generator (NRV-25) | 53 | 0.0% | 13.8 |
| Hoist | 290 | 0.2% | 17.4 |
| Maintenance | 68,504 | 54.3% | 16.0 |
| Misc Equip (NRV-30) | 70 | 0.1% | 18.3 |
| Pollution Treatment | 52 | 0.0% | 19.1 |
| Scrubber, Sprayer (NRV-23) | 112 | 0.1% | 10.9 |
| Software | 23 | 0.0% | 12.7 |
| **Total** | **126,187** | **100%** | **13.3** |

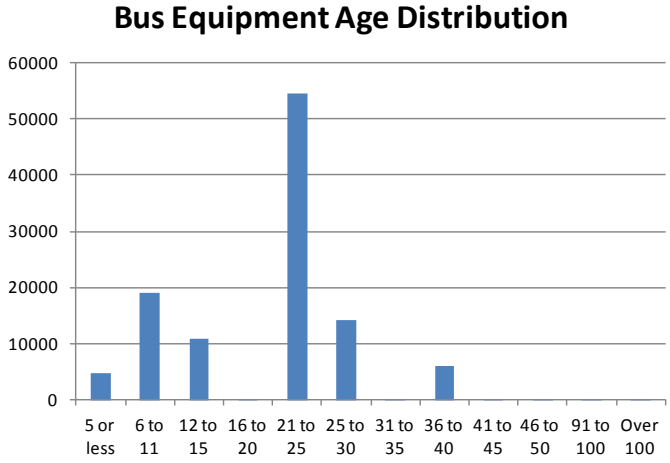
Most Equipment reported is for maintenance purposes (some quantities are reported in FTEs of staff so have been rounded to integers). The average age of transit equipment in California's statewide inventory is 13 years. Not surprisingly, furniture and computers are the youngest categories of equipment. A vast majority of equipment reported is less than 50 years old, with the exception of a couple items reported to be over 90 and 100 years old.

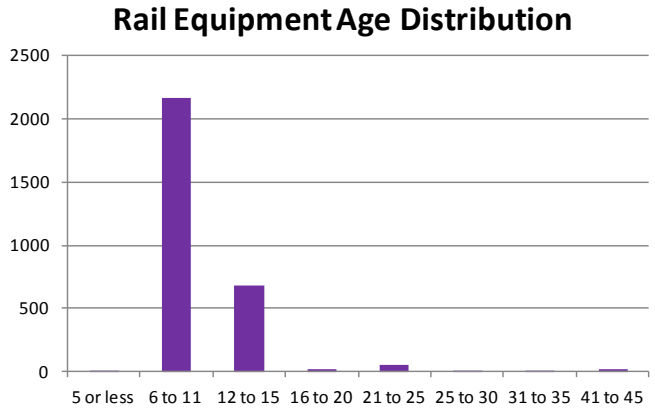


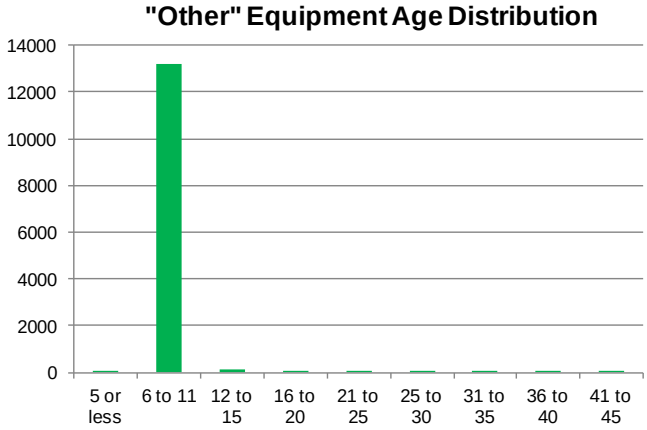

| Age Group | Quantity |
|---|---|
| 5 or less | 4,808 |
| 6 to 11 | 34,394 |
| 12 to 15 | 11,639 |
| 16 to 20 | 188 |
| 21 to 25 | 54,552 |
| 26 to 30 | 14,355 |
| 31 to 35 | 87 |
| 36 to 40 | 6,136 |
| 41 to 45 | 20 |
| 46 to 50 | 1 |
| 91 to 100 | 1 |
| Over 100 | 1 |

As with buildings, bus related equipment tends to be older than rail equipment. In addition, most equipment reported (87%) is related to bus operations or maintenance. Almost all equipment for "Other" operations is from 6 to 11 years old.

| Mode | Quantity | % of Equipment | Avg Age |
|---|---|---|---|
| Bus | 109,675 | 86.9% | 17.7 |
| Other | 13,576 | 10.8% | 10.1 |
| Rail | 2,936 | 2.3% | 16.7 |
| **Total** | **126,183** | **100%** | **13.3** |



# A3. Other Assumptions

## Capital Preservation

| Assumption | Value | Data Source |
|---|---|---|
| **Capital Cost Inflation for MPO regions** | Variable | RTP/SCS project lists or descriptions – see totals above |
| **Capital Funding Growth for MPO regions** | Variable | RTP/SCS project lists for State Funding growth – see totals above |
| **Capital Cost Inflation for "Other" agencies** | 3.20% | Producer Price Index growth rates for transit relevant industries – see below |
| **Capital Funding Growth for "Other" agencies** | 4.90% | NTD TS1.3 Time Series Capital Funding – average annual growth since 2001 |
| **Prioritization Criteria Weights** | • Condition: 65%<br>• Safety: 15%<br>• Service reliability: 15%<br>• O&M cost impact: 5% | Chicago RTA/TERM Lite default |
| **Prioritization Asset Rankings** | Varied by asset type | TERM Lite default settings |
| **Rehabilitation Policies** | Varied by asset type | TERM Lite default settings |
| **Replacement Policies/Useful Life** | Varied by asset type | As provided by agencies in inventory or TERM Lite default settings |
| **Current Backlog distribution** | Divided evenly across 10 years when unconstrained | NA |

*Producer Price Index Average Annual Change in Transit Relevant Indices*

| Area | Date Range | Avg Annual % Change |
|---|---|---|
| ***Rolling Stock*** | | |
| Locomotives, new including parts | 2001-2011 | 2.16% |
| Passenger cars, excluding parts | 2001-2011 | 5.02% |
| Secondary parts | 2001-2009 | 3.70% |
| Parts and Accessories | 2001-2006 | 1.38% |
| Street, subway, trolley, rapid transit | 2001-2006 | 1.07% |
| Overall rail rollingstock manufacturing | 2003-2012 | 3.84% |
| Rail rollingstock manufacturing | 2003-2012 | 4.40% |
| Other rail equipment | 2003-2012 | 2.55% |
| Motor vehicle manufacturing (overall) | 2004-2012 | 0.67% |
| ***Transportation Industry Construction*** | | |
| Maintenance and Repair Construction | 2003-2012 | 5.59% |
| New Construction | 2003-2012 | 4.77% |
| ***Average of all areas*** | Variable | ***3.20%*** |

### Capital Service Expansion

The assumptions for estimating the Capital needs for Service Expansion are the same as those used to develop the estimates in the original *California Unmet Transit Funding Needs FY2011 – FY2020,* including the trend growth in ridership. The only change from the previous report is the application of a 3.13% growth rate to capital funding and a 2.69% cost inflation factor.

### Capital Major New Services

The assumptions for estimating the Capital needs for Major New Services are the same as those used to develop the estimates in the original *California Unmet Transit Funding Needs FY2011 – FY2020.* The methodology used to develop these estimates included extracting project cost and timing information from available RTP/SCSs which may also include assumptions about the timing and budget of projects.

### Operating Preservation

The assumptions for estimating the Operating needs for Preservation are the same as those used to develop the estimates in the original *California Unmet Transit Funding Needs FY2011 – FY2020,* including the past trends in operating expenditure used to determine the baseline year of operating need. The only change from the previous report is the application of a 3.13% growth rate to capital funding and a 5.59% cost inflation factor. These growth rates were calculated from the average annual change from 1991-2011 in the NTD operating expenditure and funding time series respectively.

### Operating Service Expansion

The assumptions for estimating the Operating needs for Service Expansion are the same as those used to develop the estimates in the original *California Unmet Transit Funding Needs FY2011 – FY2020,* including the trend growth in ridership. The only change from the previous report is the application of a 4.91% growth rate to operating funding and a 5.59% cost inflation factor.

### Operating Major New Services

The assumptions for estimating the Operating needs for Service Expansion are the same as those used to develop the estimates in the original *California Unmet Transit Funding Needs FY2011 – FY2020.* The previous estimates for O&M costs related to Major New Services were also the basis for the updated values, as they were adjusted for the new levels of capital expenditure related to each project.