



FEDERAL TRANSIT ADMINISTRATION



TRANSIT
ASSET
MANAGEMENT

TAM 2018 NTD Year 1 Summary: Overview

This series of fact sheets summarizes data that transit agencies reported to the National Transit Database (NTD), providing an inventory and assessment of the condition of assets used to provide transit service nationally. The data are from 2018, the first year in

which transit agencies reported this information on transit assets, in accordance with the requirements of the Transit Asset Management (TAM) rule (49 CFR 625).

BACKGROUND ON TRANSIT ASSET MANAGEMENT REQUIREMENTS AND REPORTING

The Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Secretary to develop rules to establish a system to monitor and manage public transportation assets to improve safety and increase reliability and performance, and to establish performance measures, and the Fixing America's Surface Transportation (FAST) Act reaffirmed this requirement. On July 26, 2016, FTA published the TAM Final Rule.

The purpose of the Final Rule is to help achieve and maintain a state of good repair (SGR) for the nation's public transportation assets. TAM is a business model that uses transit asset condition to guide the optimal prioritization of funding. The 23rd Conditions and Performance Report notes that there is an estimated \$98.8 billion transit SGR backlog.¹

The regulations apply to all transit providers that are recipients or subrecipients of federal financial assistance under 49 U.S.C. Chapter 53 and own, operate, or manage transit capital assets used in the provision of public transportation. The Final Rule groups providers into two categories: Tier I and Tier II.

TIER I

Operates rail
OR
≥ 101 vehicles across all fixed route modes
OR
≥ 101 vehicles in one non-fixed route mode

TIER II

Subrecipient of 5311 funds
OR
American Indian Tribe
OR
≤ 100 vehicles across all fixed route modes
OR
≤ 100 vehicles in one non-fixed route mode

STATE OF GOOD REPAIR (SGR)

The SGR is the condition in which a capital asset is able to operate at a full level of performance. A capital asset is in a state of good repair when that asset:

1. Is able to perform its designed function,
2. Does not pose a known unacceptable safety risk, and
3. Its lifecycle investments have been met or recovered.

¹Source: 23rd Conditions and Performance Report

Each agency subject to the rule is required to develop a compliant TAM Plan (first required in October 2018), submit an annual data report to the

NTD with performance targets and status (inventory and condition assessment), and submit an annual narrative report (beginning in October 2019).

Purpose of this Report

This overview report and the subsequent series of more detailed fact sheets provide the first comprehensive look at transit agencies' reported data of a wide range of the primary assets supporting transit service, including revenue vehicles, equipment (service vehicles), facilities, and infrastructure (guideway and track). The data include information on the scope of assets used to support transit service across the country, including number and age, as well

as current condition and targets, for their ability to maintain them in a state of good repair.

The data are self-reported to the NTD by transit agencies based on the best quality information available to them. This information provides a snapshot of the overall condition of the country's public transportation system.

Evaluating Asset Performance and State of Good Repair

FTA requires transit agencies to measure asset performance by asset class, which means a subgroup of capital assets within an asset category. Table 1 shows assets which must be reported to the NTD and the applicable performance measures. Assets that meet or exceed the thresholds of the associated performance metrics (e.g., vehicles beyond useful life benchmark, track with performance restrictions, and facilities below the 3.0 TERM rating) are considered to be not in SGR. Transit agencies report on asset condition for the current year and set targets for each asset class for the coming year. The targets reflect an agency's expectation of its ability to keep assets in a state of good repair, based on their internal decision

making procedures. For example, an agency that has 60% of cutaway buses in SGR in the current year and sets a target of 65% of cutaway buses in SGR next fiscal year is estimating an SGR improvement of 5 percentage points. There are no rewards for meeting the targets and no penalties for not meeting the targets.

While the raw data is reported to NTD as percentages not in SGR, this report and series of factsheets simplifies the data to present the data as percentages of assets within SGR.

TABLE 1: ASSET CATEGORIES AND PERFORMANCE MEASURES

Asset Category	Performance Measure	Key Metric
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue vehicles met or exceeded ULB	Useful Life Benchmark (ULB): the expected lifecycle of a capital asset for a particular Transit Provider’s operating environment, or the acceptable period of use in service for a particular Transit Provider’s operating environment
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded ULB	
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions	Performance restriction: exists on a segment of rail fixed guideway when the maximum permissible speed of transit vehicles is set to a value that is below the guideway’s full service speed. These restrictions are often referred to as “slow zones.” The Transit Economic Requirements Model (TERM) scale for defining asset condition: 1 – poor 2 – marginal 3 – adequate 4 – good 5 – excellent
Facilities: Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale	

The 2018 reported data provide an opportunity to look comprehensively at SGR across the industry, identifying assets within each category that are beyond their useful lives or in poor condition. However, note that the TAM rule allowed transit

agencies to conduct condition assessments of facilities in a phased approach over four years. FTA anticipates that the backlog estimate may change pending more complete asset condition assessment data.

Initial Results

This section provides highlights of the initial results, with more detailed data analysis and descriptions following. Table 2 provides an initial record of the

overall transit asset inventory, and an estimate of those assets in SGR, using data provided in the NTD.

TABLE 2: TRANSIT ASSET INVENTORY AND ESTIMATED STATE OF GOOD REPAIR

Asset Category	Total # of Assets	% Assets in SGR
Revenue Vehicles	173,733 Vehicles	79%
Equipment (Service Vehicles)	29,480 Vehicles	66%
Facilities	12,506 Facilities	87%
Infrastructure (Track)	13,086 Miles of track	94%

Highlights

- Based on the data reported by transit agencies, an estimated 79% of the nation's transit capital assets are in SGR.
- Most of the nation's guideway was built after 1980, though a significant portion of commuter rail and heavy rail guideway was built before the 1930s.
- 3% of facilities (405) in use today were built at the turn of the 20th century.
- Compared to Tier I agencies, Tier II agencies (rural and smaller urban providers) have a higher percentage of bus and van assets not in SGR, but a higher percentage of facilities that are in SGR.
- 21% of all revenue vehicles are currently at or beyond their ULB, and an additional 27% of revenue vehicles will exceed their ULB in the next 4 years.
- 34% of all service vehicles are currently beyond their ULB, and an additional 26% of service vehicles will exceed their ULB in the next 4 years.
- 6% of track miles were reported as under performance restriction for 2018.
- 28% of guideway miles are currently beyond their expected service years, and an additional 4.7% will exceed their expected service years in the next 4 years.
- Transit agencies set targets reflecting an overall expectation of their ability to maintain assets in SGR. The submitted targets reflect their expectation of keeping nearly half of asset classes above 75% SGR.
- In general, the 2019 targets for facilities and infrastructure expected a higher share of assets to be in SGR than targets set for revenue vehicles and equipment.
- There were 67 Group TAM Plans, developed by 18 direct recipients and 49 DOTs, with a total of 1,943 rural, tribal, and small urban agencies participating.
- Nationally, approximately 19% of all transit assets were reported in Group Plans; the vast majority of those assets are revenue vehicles.
- Approximately 39% of Group Plans have 14 or fewer participants; there were two plans with greater than 100 participants.

The following sections of this document provide additional detail on the highlights for Group Plans, each of the four asset categories, and Performance Targets.

GROUP PLANS

Group plans are designed to reduce the burden on smaller transit providers by consolidating administrative and reporting efforts by the Sponsor. State Departments of Transportation (State DOTs) are the most common sponsors, but Metropolitan Planning Organizations (MPOs) or larger transit agencies may also sponsor group plans. Sponsors are required to

include their Tier II subrecipients that do not have a direct funding relationship with FTA, and have the option of inviting other small urban providers to join the Group Plan. In 2018, there were a total of 67 Group TAM Plan sponsors, developed by 18 direct recipients and 49 DOTs, covering a total of 1,943 participants.

Highlights

- Approximately 85% of subrecipient agencies opted to join a Group Plan, with the remainder developing individual TAM plans.
- Nationally, approximately 19% of all transit assets are included in Group Plans, the majority of which are revenue vehicles.
- Approximately 39% of Group Plans have 14 or fewer participants; there were two plans with greater than 100 participants.

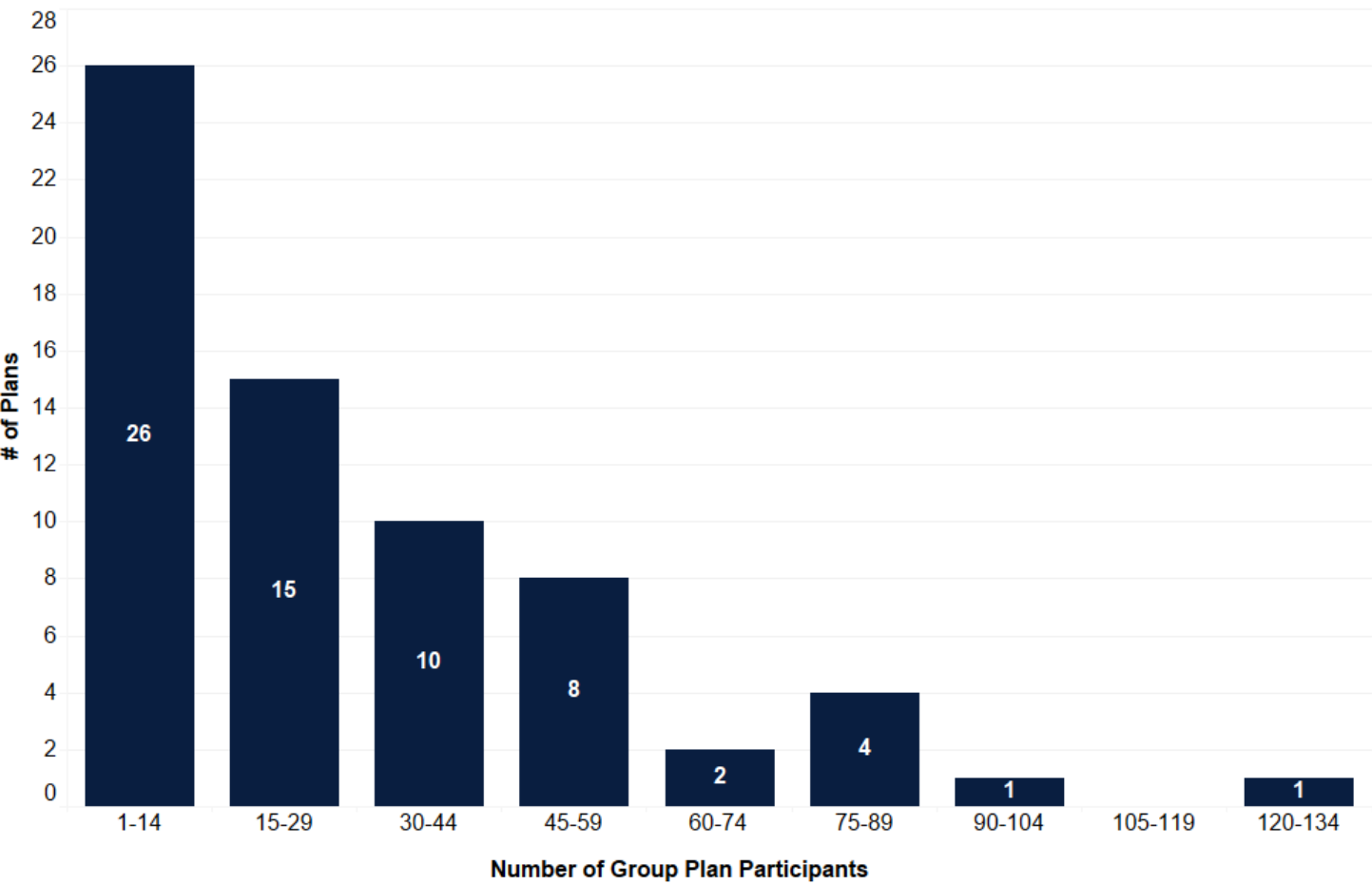
TABLE 3: NUMBER OF TRANSIT ASSETS INCLUDED IN GROUP PLANS

Asset Category	Number of Assets Included in Group Plans	Total # of Assets Nationwide	Percnt of Assets Included in Group Plans
Revenue Vehicles	36,796	173,733	21%
Equipment	1,807	29,480	6%
Facilities	1,480	12,506	12%
Total	40,083	215,719	19%

Agencies Participating in Group Plans

Most Group Plans had fewer than 50 participating agencies, with approximately 39% having 14 or fewer participants. Only two plans had over 100 participants. Figure 1 shows the distribution of the number of participants in Group Plans.

FIGURE 1: DISTRIBUTION OF PARTICIPANTS IN GROUP PLANS



REVENUE VEHICLES

Revenue vehicles are the most common type of capital assets used in the provision of public transit, and the most familiar assets to the public. There are 28 classes of revenue vehicles reported to the NTD; for ease of understanding, this factsheet combines them into four asset types: rail vehicles, buses,

vans, and other vehicles. The full breakout of how each asset type reported is below in Table 4. Each asset type has multiple asset classes with detailed age and condition information. Figure 2 shows the total number of revenue vehicles in the U.S., organized by asset type and agency tier.

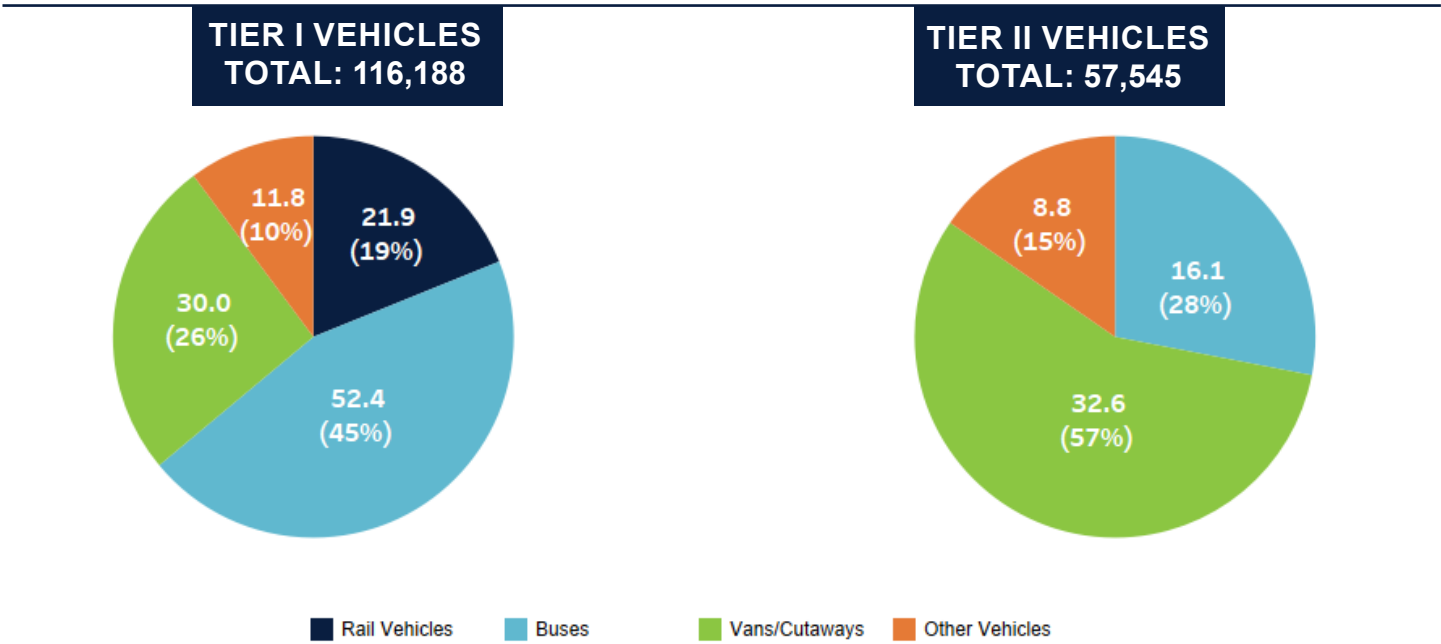
Highlights

- Overall, a smaller percentage of rail vehicles will require replacement over the next four years compared to other types of revenue vehicles.
- Many of the higher-cost vehicle asset classes (e.g., rail vehicles) are in SGR.
- Twenty-one percent of all revenue vehicles are beyond their ULB, and an additional 27% of vehicles will exceed their ULB in the next 4 years.

TABLE 4: CATEGORIZATION OF ASSETS

Asset Type	Asset Classes	
Rail Vehicles	Automated Guideway Vehicle	Commuter Rail Self-Propelled
	Cable Car	Passenger Car
	Commuter Rail	Heavy Rail Passenger Car
	Locomotive	Inclined Plane Vehicle
	Commuter Rail	Light Rail Vehicle
	Passenger Coach	Monorail Vehicle
		Streetcar Rail
Buses	Articulated Bus	School Bus
	Bus	Trolleybus
	Double Decker Bus	Vintage Trolley
	Over-the-Road Bus	
Vans/Cutaways	Cutaway	Van
Other Vehicles	Aerial Tramway	Other
	Automobile	SUV
	Ferry	
	Minivan	

FIGURE 2: NUMBER OF TRANSIT REVENUE VEHICLES IN THE U.S. (THOUSANDS)



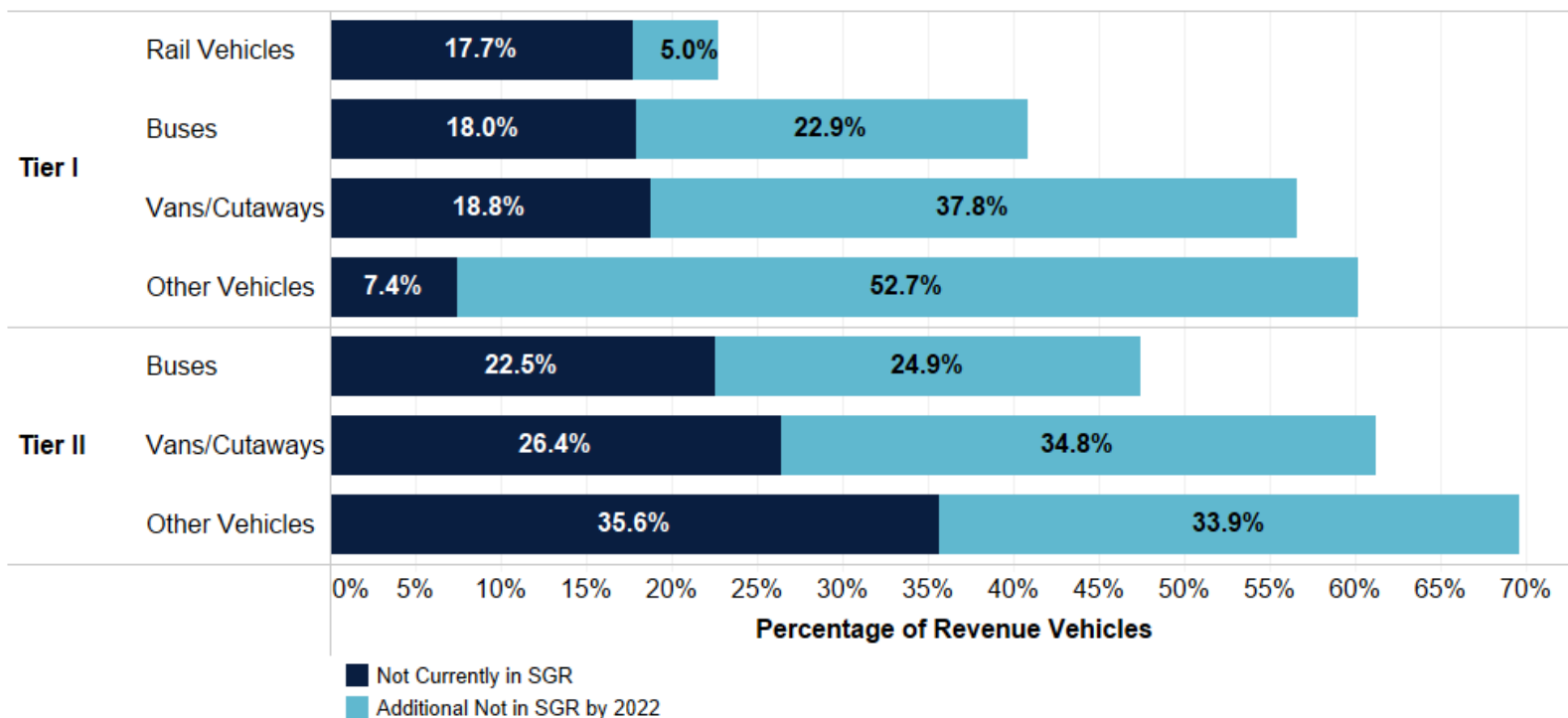
How Many Revenue Vehicle Assets Are Beyond Their ULB?

In order to measure the SGR for revenue vehicles, FTA has established default ULBs for each asset class. A ULB is the age at which each asset class will enter the SGR backlog; it can also be interpreted as the estimated replacement cycle for a specific asset class. FTA provided transit agencies with default values based on the federal Transit Economic Replacement Model (TERM). Transit agencies are also allowed to set a customized ULB, if they have reason to believe that FTA defaults do not accurately reflect their operating environment. On average, most agencies reported ULBs close

to the default values. When customized ULBs were reported, the majority were reported as lower than the FTA default, meaning that transit agencies felt their assets would not be in SGR as long as the default ULB.

The average years until replacement vary widely across asset classes on a national scale. Some classes are already beyond their ULB, while many will be approaching replacement in the next 4 years. Figure 3 indicates the percentage of assets that are at or beyond their ULB and therefore not in SGR.

FIGURE 3: PERCENTAGE OF TIER I AND TIER II ASSETS NOT IN SGR CURRENTLY AND IN NEXT FOUR YEARS



SERVICE VEHICLES

Service Vehicles are vehicles used to support transit service, maintain revenue vehicles, and perform transit-oriented administrative activities. Examples

include tow trucks, track de-icing vehicles, and supervisor cars used by the transit agency.

Highlights

- Over 29,000 service vehicles are used by transit agencies to support operations (overall reported value \$3.9 billion in 2018 dollars).
- Thirty-four percent of all service vehicles are at or beyond their ULB and thus not in SGR. These vehicles would cost \$1.92 billion to replace. An additional 25.6% of vehicles will fall out of SGR in the next 4 years, at a cost of \$512 million.³
- The average age and need for replacement vary across asset classes:
 - Automobiles are on average 6.8 years old with 43% not in SGR.
 - Bus service vehicles are on average 7.6 years old with 29% not in SGR.
 - Rail service vehicles are on average 24 years old with 53% not in SGR.

How Many Service Vehicles Do Agencies Own?

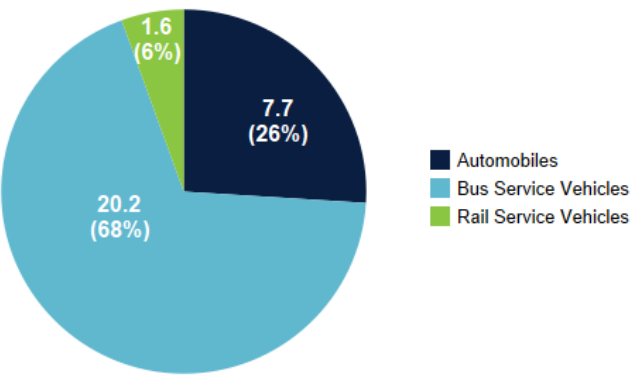
Nationwide, transit providers use nearly 30,000 vehicles to support transit service. These vehicles are used to maintain tracks, provide transportation for workers between sites, and support other crucial functions. The overall value of these vehicles in 2018 was \$3.9 billion (in 2018 dollars). Although rail service vehicles are the smallest group of assets within this category (1,600 vehicles), they make up the largest proportion of asset value (\$2.3 billion). Thirty-four percent of service vehicles are already beyond their expected ULB, meaning many are in need of

replacement in the very near future. The total cost to replace these assets is \$1.92 billion. An additional 25.6% of service vehicles will exceed their ULB in the next four years. These additional assets will cost \$512 million to replace, bringing the cost of replacing all service vehicles exceeding their ULB within the next four years to over \$2.4 billion.

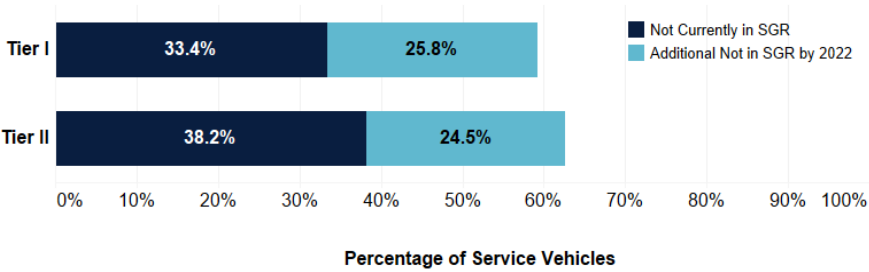
Figure 4 shows the number of service vehicles organized by type. Figure 5 shows service vehicles exceeding their ULB within the next four years.

³Cost estimate calculated in 2018 dollars.

**FIGURE 4: NUMBER OF VEHICLES
(BY TYPE) (THOUSANDS)**



**FIGURE 5: PERCENT AND REPLACEMENT
VALUE OF SERVICE VEHICLES NOT IN
SGR CURRENTLY AND IN THE NEXT FOUR
YEARS**



TRANSIT FACILITIES

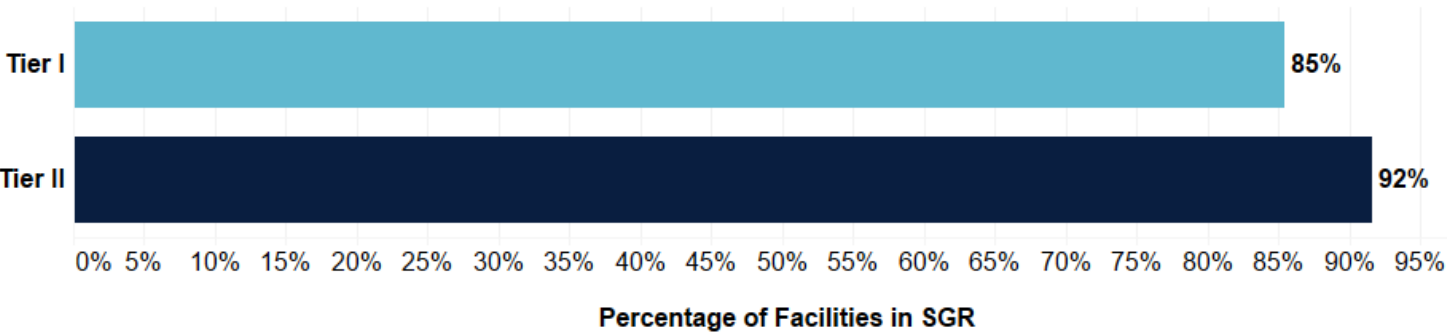
Transit agencies are required to conduct regular condition assessments of their assets, every four years. This process involves inspections that evaluate an asset’s physical and visual conditions, performance characteristics, and potential risks and impacts of failures. FTA requires transit agencies to assess and report facility condition to the NTD

based on the five-point scale used in TERM. An asset is considered in good repair if it has a rating of 3 (adequate), 4 (good), or 5 (excellent) on this scale. Likewise, a facility is deemed to not be in good repair if it has a rating of 1 (poor) or 2 (marginal).

Highlights

- Transit agencies reported information for over 12,500 facilities nationwide.
- Eighty-seven percent of transit facilities nationwide are in SGR, with a higher percentage of Tier II agency facilities in SGR than Tier I agency facilities.⁴
- It would cost an estimated \$5.8 billion to replace the facilities not in SGR.⁵
- The average facility is 27 years old, with approximately 400 facilities constructed before 1900. About 90% of assessed facilities built since 1960 are in SGR.

FIGURE 6: PERCENT OF FACILITIES IN SGR BY TIER



Transit facilities are broken into four asset classes: maintenance, passenger, administrative, and parking. Agencies submit condition ratings for each facility, which are then aggregated to calculate the facility condition performance measure metric.

TABLE 5: TRANSIT FACILITIES (BY ASSET CLASS)⁶

Asset Class	Average Condition Assessment	Number of Facilities	Total Size (sq. ft.)	Percent of Facilities in SGR
Administrative	3.7	830	22,759,802	92%
Maintenance	3.5	3,270	209,138,649	86%
Parking	3.5	2,249	73,239,519	91%
Passenger	3.4	4,371	246,194,987	85%

⁴Agencies were not required to provide condition assessment for all facilities in the first year; this value is expected to change in the coming years as more complete data is reported to NTD.

⁵Estimated using a calculation of \$162/sq ft. applied to facilities not in SGR. The multiplier represents the higher end of a cost range to construct commercial facilities.

⁶Analysis was only conducted for facilities with data on condition assessment and square footage. This explains the discrepancy between the number of facilities included among different tables.

TRACK AND INFRASTRUCTURE

As reported to the NTD, there are over 14,700 miles of track used to provide transit service nationally. This includes track serving commuter rail, heavy rail, light rail, and other types of rail systems (including articulated rail, cable car, inclined plane, monorail/

automated guideway, and streetcar). For further details on the definition of modes, types of service, and calculation of track miles refer to the [NTD Policy Manual](#).

Highlights

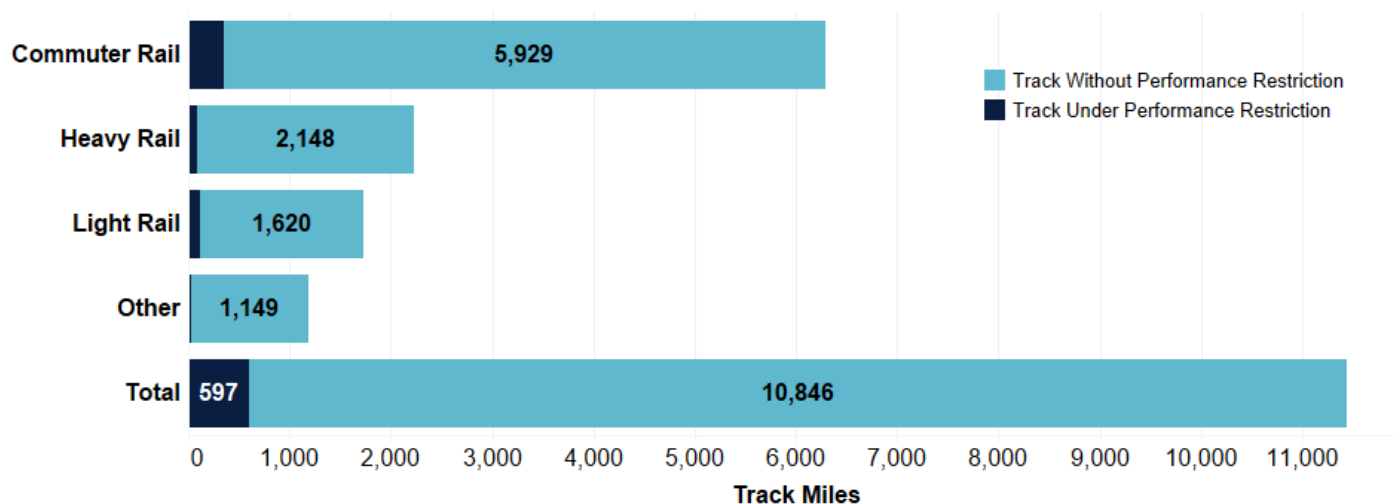
- Most of the Nation's track and guideway⁷ was constructed after 1980, though a significant portion of commuter rail and heavy rail track is older than the 1930s.
- The average expected service years (ESY) for guideway was 66 years.
- Around 597 track miles were reported as underperformance restriction for 2018. This represents an estimated replacement cost of \$59.7 billion.⁸
- In 2018 approximately 28% of all reported guideway is beyond its ESY, representing around 2,576 miles of guideway needing replacement at an estimated cost of \$257.6 billion.

Track under Performance Restriction

Rail providers are required to establish a target for infrastructure, for the percent of track under performance restriction, and to report the performance measure to the NTD. A performance restriction exists on a segment of rail fixed guideway when

the maximum permissible speed of transit vehicles is set to a value that is below the guideway's full service speed. These restrictions are often referred to as "slow zones." Figure 8 shows these totals as a percent of total revenue track miles.

FIGURE 7: TOTAL TRACK AND TRACK UNDER PERFORMANCE RESTRICTION (TRACK MILES)



⁷NTD collects data on both track and guideway, with some data elements (e.g., infrastructure age) reported only under guideway. Transit guideway is the full right of way, which includes the track, as well as buildings and structures dedicated for the operation of transit vehicles. It does not include passenger stations or transit facilities. This fact sheet notes whether the calculations are for track or for guideway.

⁸Cost estimated using an industry accepted value of \$100 million per mile.

PERFORMANCE TARGETS

Transit agencies set performance targets for the coming year, reflecting their expectation of their ability to keep assets in SGR. FTA encouraged transit agencies to set realistic targets based on available asset condition data and anticipated resources. For some agencies, the projections reflect aspirational goals; in other cases, they may reflect an expectation based on current condition and funding constraints.

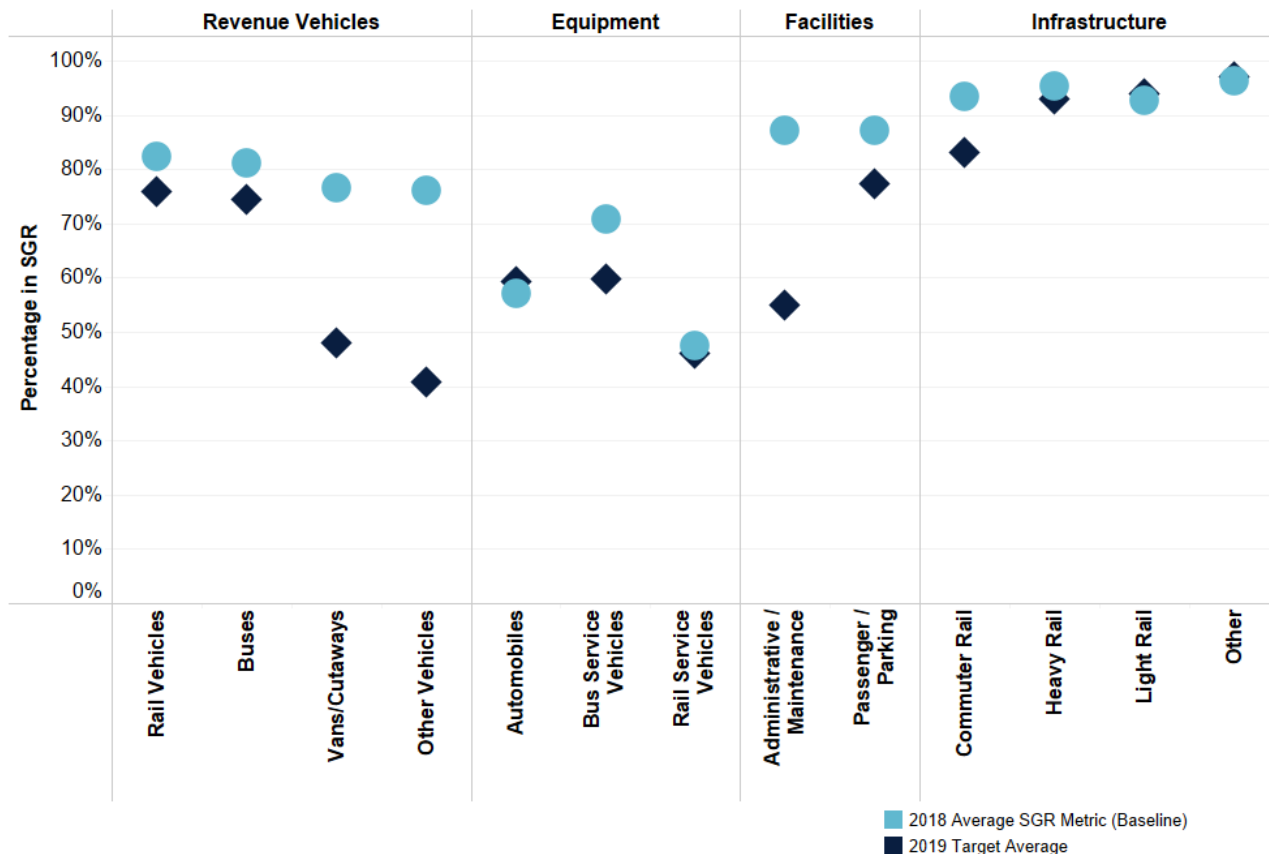
There are no rewards for meeting the targets and no penalties for not meeting the targets. Agencies report performance targets to the NTD aggregated by asset class, rather than individually by each asset. In 2018, transit agencies reported 4,202 targets for 38 transit asset classes, representing their expected SGR in the upcoming 2019 fiscal year.

Highlights

- Transit agencies set targets reflecting an overall expectation of their ability to maintain assets in SGR. The submitted targets reflect their expectation of keeping nearly half of asset classes above 75% SGR.
- Agencies report high expectations in the ability to avoid slow zones on rail infrastructure; no agencies expected greater than 50% of track miles in slow zone.

Figure 8 summarizes agencies' current and targeted future SGR.

FIGURE 8: AVERAGE SGR METRIC (2018) AND TARGET (2019)





TAM First-Year Summary: Group Plans (2018)

Group plans are designed to reduce the burden on smaller transit providers by consolidating the administrative and reporting efforts to a Sponsor Agency. State Departments of Transportation (State DOTs) are the most common sponsors, but Metropolitan Planning Organizations (MPOs) or larger transit agencies may also sponsor group

plans. Sponsors are required to include their Tier II subrecipients that do not have a direct funding relationship with FTA, and have the option of inviting other small urban providers to join the Group Plan. In 2018, there were a total of 67 Group TAM Plan sponsors, developed by 18 transit agencies and 49 State DOTs, covering a total of 1,943 participants.

AGENCIES PARTICIPATING IN GROUP PLANS

The number of participants in each plan ranged from 1 to 133, with approximately 39% of plans having 14 or fewer participants. There were two plans with greater than 100 participants. Figure G-1 shows the distribution of the number of participants in Group Plans.

FIGURE G-1: DISTRIBUTION OF PARTICIPANTS IN GROUP PLANS

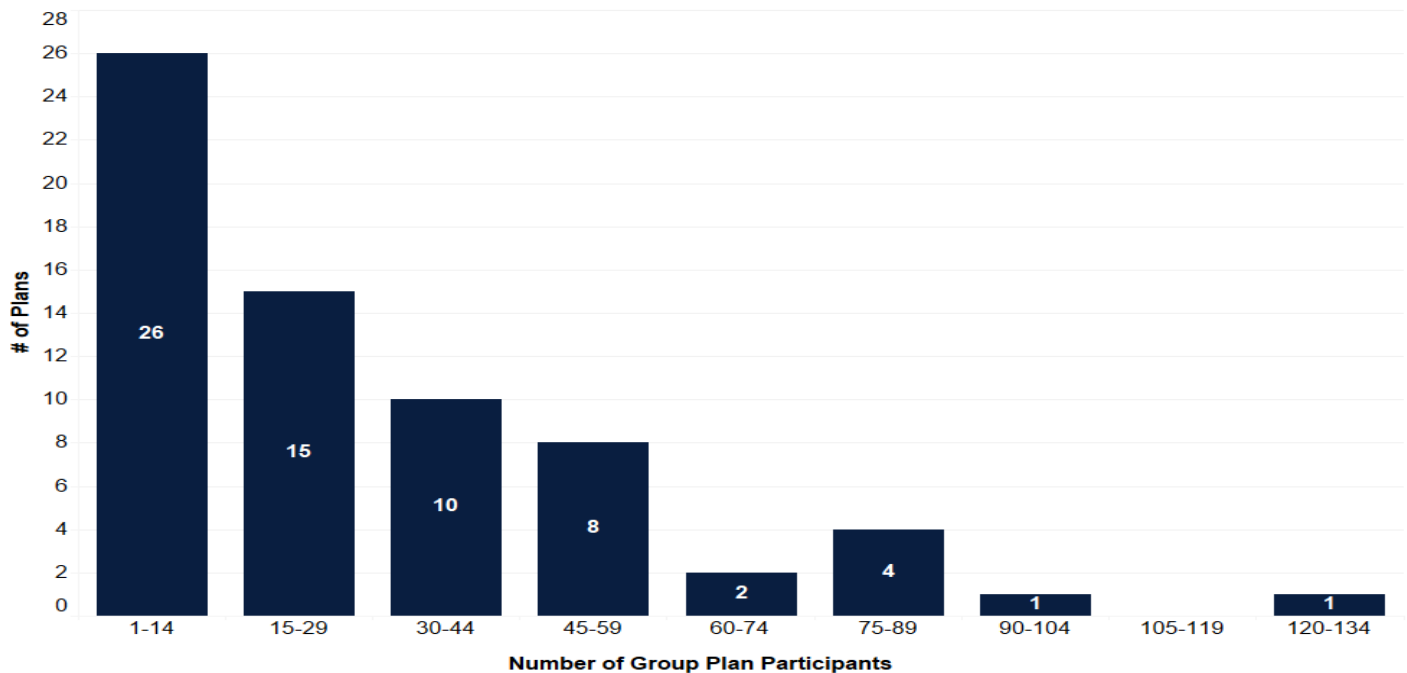


TABLE G-1: PARTICIPATING AGENCIES BY TYPE

Type of Participating Agency	Number of Participating Agencies	% of Total Participating Agencies
Required (Tier II Subrecipients)	1,622	83%
Tribe	32	2%
Option (Small Urban)	289	15%
Total	1,943	--

NUMBER OF TRANSIT ASSETS INCLUDED IN GROUP PLANS

Nationally, approximately 19% of all transit assets are included in Group Plans. As shown in Table G-2, they are primarily revenue vehicles.

TABLE G-2: NUMBER OF TRANSIT ASSETS INCLUDED IN GROUP PLANS

Asset Category	# of Assets in Group Plans	Total # of Assets	% Assets in Group Plans
Revenue Vehicles	36,796	173,733	21%
Equipment	1,807	29,480	6%
Facilities	1,480	12,506	12%
All	40,083	215,719	19%



TAM First-Year Summary: Revenue Vehicles (2018)

Revenue vehicles are the most common type of capital assets used in the provision of public transit, and the most familiar assets to the public. There are 28 classes of revenue vehicles reported to the NTD; for ease of understanding, this fact sheet combines them into four

asset types: rail vehicles, buses, vans, and other vehicles. Table R-1 shows the full breakout of how each reported asset class is combined into the displayed types. Each asset type has multiple asset classes with detailed age and condition information.

FIGURE R-1: NUMBER OF TRANSIT REVENUE VEHICLES IN THE U.S. (THOUSANDS)

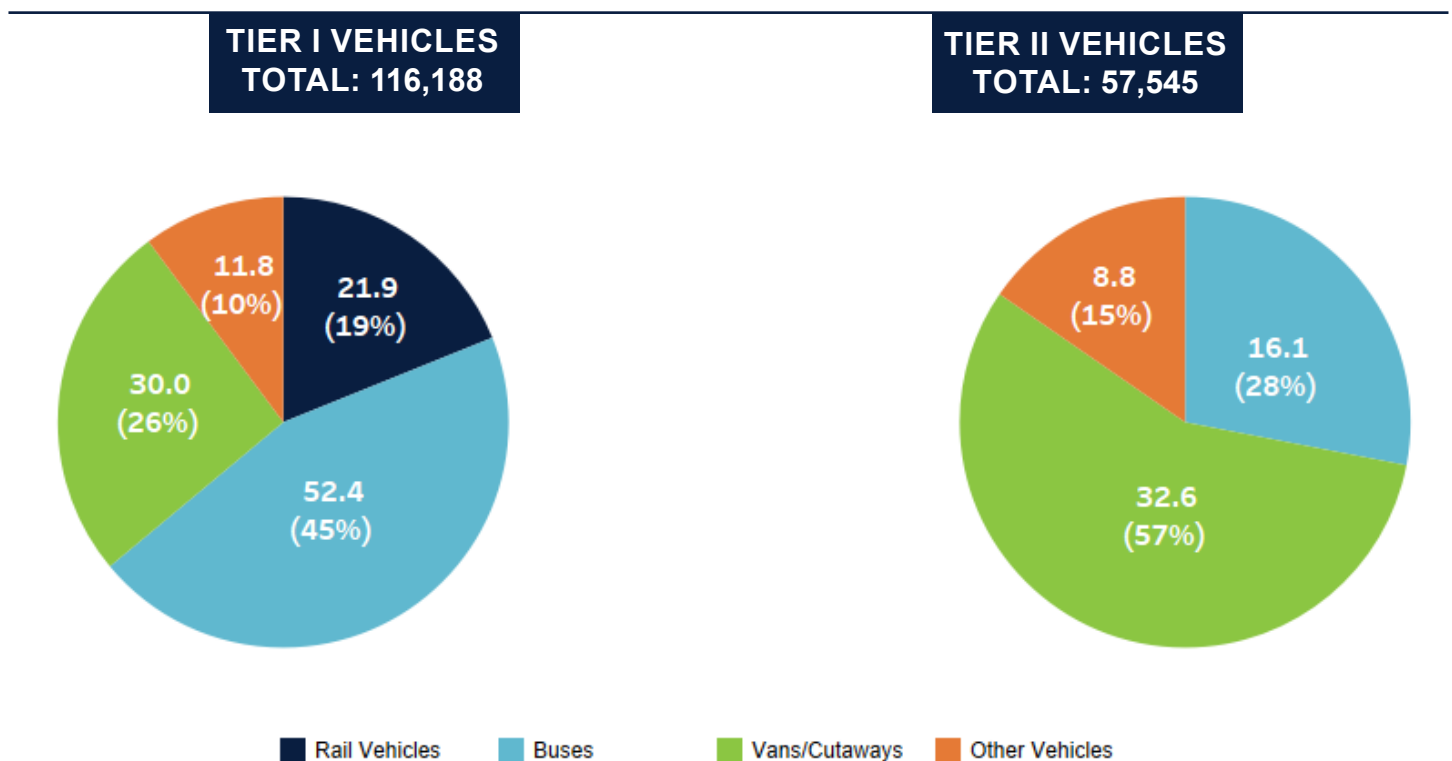


TABLE R-1: CATEGORIZATION OF ASSETS

Asset Type	Asset Classes	
Rail Vehicles	Automated Guideway Vehicle	Commuter Rail Self-Propelled Passenger Car
	Cable Car	Heavy Rail Passenger Car
	Commuter Rail	Inclined Plane Vehicle
	Locomotive	Light Rail Vehicle
	Commuter Rail	Monorail Vehicle
	Passenger Coach	Streetcar Rail
Buses	Articulated Bus	School Bus
	Bus	Trolleybus
	Double Decker Bus	Vintage Trolley
	Over-the-Road Bus	
Vans/Cutaways	Cutaway	Van
Other Vehicles	Aerial Tramway	Other
	Automobile	SUV
	Ferry	
	Minivan	

Table R-2 shows the total number of vehicles nationwide and the percent of revenue vehicles in SGR, organized by asset type and agency tier. Note that calculations related to SGR and useful life benchmarks (ULBs) exclude revenue vehicles that were missing a ULB in the NTD.

TABLE R-2: REVENUE VEHICLE NUMBERS BY TIER

Asset Type	Asset Class	Total Number	Number in Tier I Agencies	Percent in SGR (Tier I)	Number in Tier II Agencies	Percent in SGR (Tier II)
Rail Vehicles	Automated Guideway Vehicle	116	116	100%	--	--
	Cable Car	36	36	39%	--	--
	Commuter Rail Locomotive	840	840	76%	--	--
	Commuter Rail Passenger Coach	3,666	3,666	74%	--	--
	Commuter Rail Self-Propelled Passenger Car	2,756	2,756	70%	--	--
	Heavy Rail Passenger Car	11,892	11,892	68%	--	--
	Inclined Plane Vehicle	6	6	67%	--	--
	Light Rail Vehicle	2,328	2,328	91%	--	--
	Monorail Vehicle	8	8	100%	--	--
	Streetcar Rail	291	291	36%	--	--
	Rail Total	21,939	21,939		--	
Bus	Articulated Bus	5,670	5,572	81%	98	79%
	Bus	55,929	41,181	82%	14,748	74%
	Double Decker Bus	229	219	100%	10	70%
	Over-the-road Bus	5,932	4,717	60%	1,215	71%
	School Bus	99	24	13%	75	31%
	Trolleybus	596	596	56%	0	N/A
	Vintage Trolley	73	73	7%	0	N/A
	Buses Total	68,528	52,382		16,146	
Van/Cutaway	Cutaway	38,885	13,846	75%	25,039	72%
	Van	23,708	16,196	44%	7,512	52%
	Vans/Cutaways Total	62,593	30,042		32,551	
Other	Aerial Tramway	70	2	100%	68	16%
	Automobile	7,547	6,175	18%	1,372	22%
	Ferryboat	196	46	83%	150	91%
	Minivan	11,168	4,503	60%	6,665	59%
	Other	37	2		35	83%
	Sports Utility Vehicle	1,655	1,097	74%	558	48%
	Other Total	20,673	11,825		8,848	
Total Vehicles		173,733	116,188		57,545	

USEFUL LIFE BENCHMARKS AND FTA DEFAULTS

The ULB is the age at which each asset class will enter the SGR backlog; it can also be interpreted as the estimated replacement cycle for a specific asset class.

To estimate the SGR for revenue vehicles, FTA established default ULBs for each vehicle class, using the average age at which it would reach the mid-point (a rating of 2.5) on the FTA Transit Economic Requirements Model (TERM) scale. Transit agencies are also allowed to set a customized ULB, if they have reason to believe that FTA defaults do not accurately reflect their operating environment. Assets that are beyond their ULB, whether it is the FTA default or a custom value, are considered to **not** be in SGR and in

need of rehabilitation or replacement.

Most agencies reported ULBs close to the default values, with 1,294 agencies with capital responsibility. Custom values tended to be lower than the default, meaning that they would need to be replaced sooner than the FTA estimated value.

Agencies set both higher and lower ULBs, indicating a range in expected replacement cycles, based on their unique operating environments. Table R-3 outlines the default and range of custom ULBs for each asset class.

TABLE R-3: DEFAULT AND CUSTOM USEFUL LIFE BENCHMARKS (ULBS)

Asset Type	Asset Class	Percent Reporting Asset	FTA Default ULB (yrs)	Percent Agencies Setting Custom ULB	ULB Range (yrs)
Rail	Automated Guideway Vehicle	0.20%	31	80.00%	25 - 50
	Cable Car	0.04%	112	N/A	N/A
	Commuter Rail Locomotive	0.86%	39	63.60%	15 - 80
	Commuter Rail Passenger Coach	0.94%	39	58.30%	25 - 40
	Commuter Rail Self-Propelled Passenger Car	0.51%	39	53.80%	30 - 40
	Heavy Rail Passenger Car	0.59%	31	66.70%	22 - 77
	Inclined Plane Vehicle	0.12%	56	33.30%	51 - 56
	Light Rail Vehicle	0.98%	31	48.00%	25 - 41
	Monorail Vehicle	0.04%	31	100.00%	80 - 80
	Streetcar Rail	0.59%	31	33.30%	25 - 44
Bus	Articulated Bus	3.22%	14	48.80%	12 - 25
	Bus	38.01%	14	54.20%	1 - 22
	Double Decker Bus	0.27%	14	28.60%	12 - 20
	Over-the-road Bus	4.28%	14	35.80%	8 - 25
	School Bus	0.82%	14	47.60%	2 - 25
	Trolleybus	0.20%	13	60.00%	13 - 18
	Vintage Trolley	0.27%	58	N/A	N/A
Van/Cutaway	Cutaway	81.29%	10	42.90%	1 - 23
	Van	39.86%	8	36.80%	1 - 15
Other	Aerial Tramway	0.08%	12	50.00%	12 - 50
	Automobile	8.71%	8	41.00%	1 - 10
	Ferryboat	1.37%	42	42.90%	10 - 105
	Minivan	41.98%	8	39.30%	2 - 84
	Other	0.27%	14	57.10%	4 - 15
	Sports Utility Vehicle	4.51%	8	24.30%	4 - 12

ASSET REPLACEMENT

Assets are considered due for replacement when they reach the end of their ULB. Assets that are at or beyond their ULB, as highlighted in Table R-4, are considered overdue for replacement. Figure R-2 shows the percentage of assets nationwide that

already exceed their ULB, or will in the next four years. On average, 18% of buses for Tier I agencies, and 23% of buses for Tier II agencies are at or beyond their ULB, and already overdue for replacement.

FIGURE R-2: PERCENTAGE OF TIER I AND TIER II ASSETS NOT IN SGR CURRENTLY AND IN NEXT FOUR YEARS

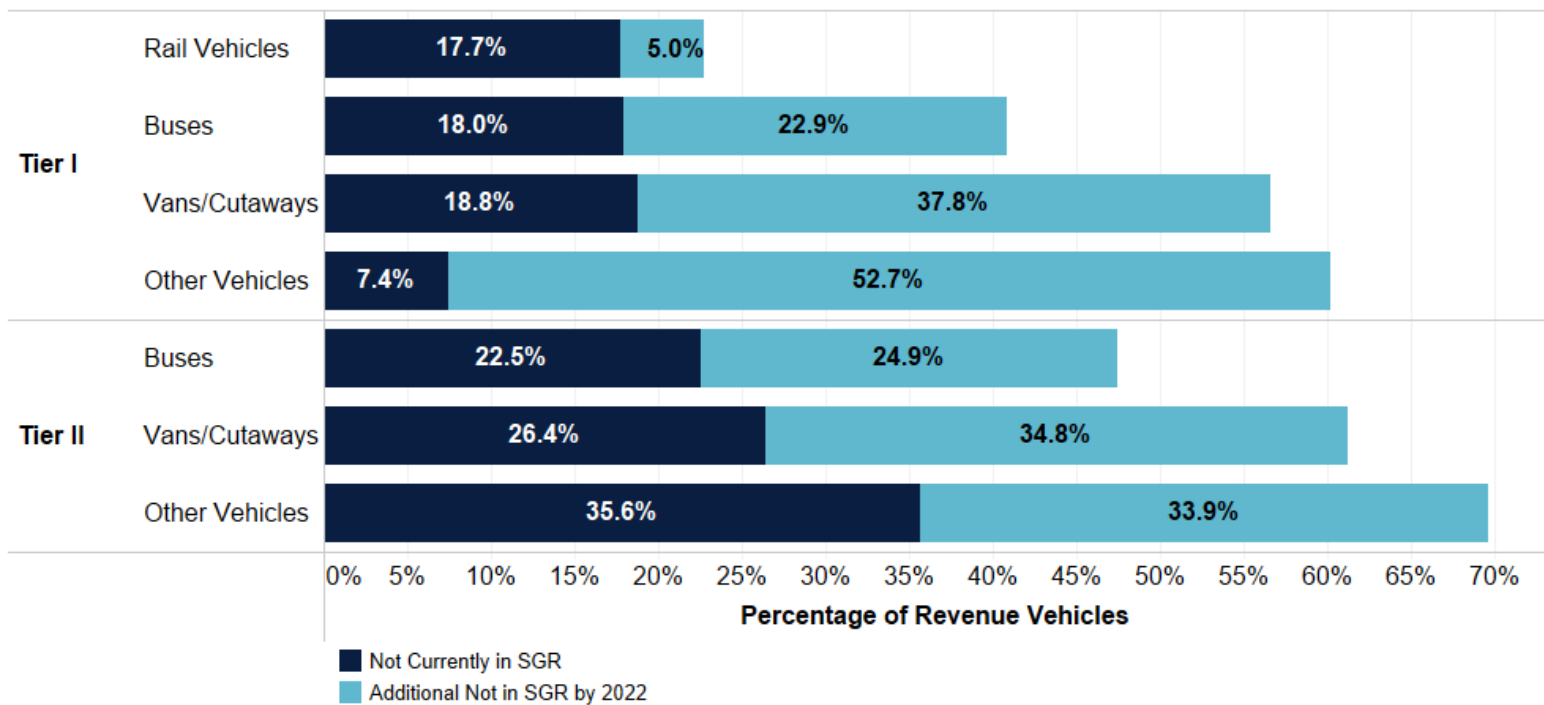


Table R-4 lists total estimated replacement costs (in 2019 dollars) for revenue vehicles currently not in SGR while Table R-5 provides the average years until each asset class reaches its ULB. For example, this means that based on agency reported data, on a national average, Heavy Rail Passenger Cars will need to be replaced in 10 years, while Inclined Plane Vehicles are 17 years beyond their estimated time for replacement.

TABLE R-4: ESTIMATED REPLACEMENT COST FOR REVENUE VEHICLES

Asset Type	Asset Class	Tier I (\$ million)	Tier II (\$ million)	Total (\$ million)
Rail	Automated Guideway Vehicle	N/A	--	N/A
	Cable Car	\$94.70	--	\$94.70
	Commuter Rail Locomotive	\$718.50	--	\$718.50
	Commuter Rail Passenger Coach	\$1,979.50	--	\$1,979.50
	Commuter Rail Self-Propelled Passenger Car	\$2,123.40	--	\$2,123.40
	Heavy Rail Passenger Car	\$4,376.00	--	\$4,376.00
	Inclined Plane Vehicle	\$0.70	--	\$0.70
	Light Rail Vehicle	\$864.30	--	\$864.30
	Monorail Vehicle	N/A	--	N/A
	Streetcar Rail	\$772.90	--	\$772.90
Bus	Articulated Bus	\$1,045.30	\$10.20	\$1,055.40
	Bus	\$2,928.60	\$1,518.30	\$4,446.90
	Double Decker Bus	N/A	\$1.80	\$1.80
	Over-the-road Bus	\$1,114.90	\$112.10	\$1,226.90
	School Bus	\$0.20	\$4.10	\$4.30
	Trolleybus	\$253.10	N/A	\$253.10
	Vintage Trolley	\$282.50	N/A	\$282.50
Van/Cutaway	Cutaway	\$269.10	\$663.20	\$932.30
	Van	\$101.90	\$125.50	\$227.40
Other	Aerial Tramway	N/A	\$22.70	\$22.70
	Automobile	\$5.90	\$12.20	\$18.10
	Ferryboat	\$45.00	\$108.10	\$153.20
	Minivan	\$7.50	\$84.30	\$91.80
	Other	\$0.10	\$0.30	\$0.40
	Sports Utility Vehicle	\$1.40	\$4.00	\$5.40

TABLE R-5: REVENUE VEHICLES: AVERAGE YEARS UNTIL REPLACEMENT

Asset Type	Asset Class	Average Years Until Replacement
Rail	Automated Guideway Vehicle	12
	Cable Car	27
	Commuter Rail Locomotive	11
	Commuter Rail Passenger Coach	3
	Commuter Rail Self-Propelled Passenger Car	23
	Heavy Rail Passenger Car	10
	Inclined Plane Vehicle	-17
	Light Rail Vehicle	10
	Monorail Vehicle	24
	Streetcar Rail	-11
Bus	Articulated Bus	7
	Bus	5
	Double Decker Bus	1
	Over-the-road Bus	6
	School Bus	-1
	Trolleybus	7
	Vintage Trolley	-16
Van/Cutaway	Cutaway	3
	Van	2
Other	Aerial Tramway	1
	Automobile	0
	Ferryboat	18
	Minivan	1
	Other	4
	Sports Utility Vehicle	2



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TAM First-Year Summary: Service Vehicles (2018)

Service Vehicles are used to indirectly deliver transit service, maintain revenue vehicles, and perform transit-oriented administrative activities. Examples

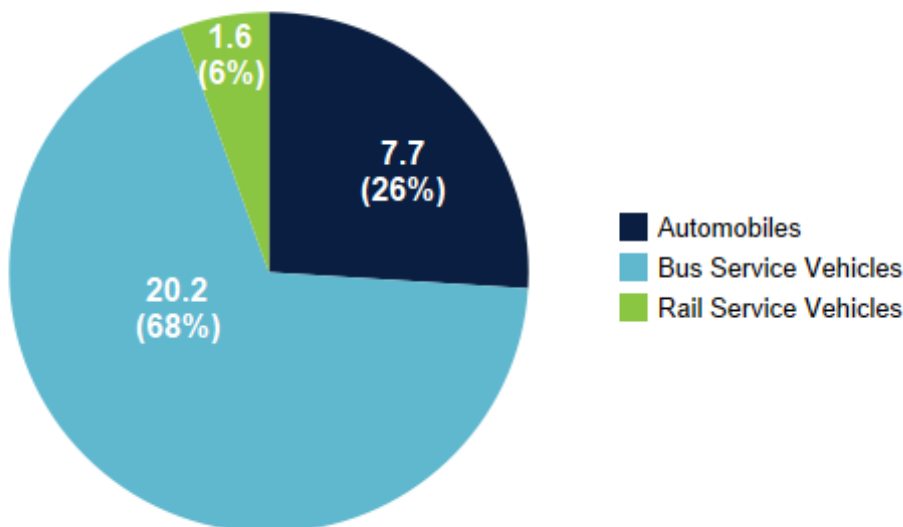
include tow trucks, rail track de-icing vehicles, and cars used by the transit agency.

SERVICE VEHICLES

Nationwide, transit providers use nearly 30,000 vehicles to support transit service (including more than 7,500 automobiles, 1,500 rail vehicles, and 20,000 trucks and other bus service vehicles). These vehicles are used to maintain tracks, provide transportation for workers between sites, and support other crucial functions. The overall value of these

vehicles in 2018 was reported at \$3.9 billion (in 2018 dollars). Agencies reported this replacement cost to NTD. Although rail service vehicles are the smallest category of assets within service vehicles, they make up the largest proportion of asset value (\$2.3 billion). Figure S-1 shows the number of service vehicles organized by type. Analysis excludes three museum display buses.

FIGURE S-1: NUMBER OF SERVICE VEHICLES IN THE U.S. (THOUSANDS)

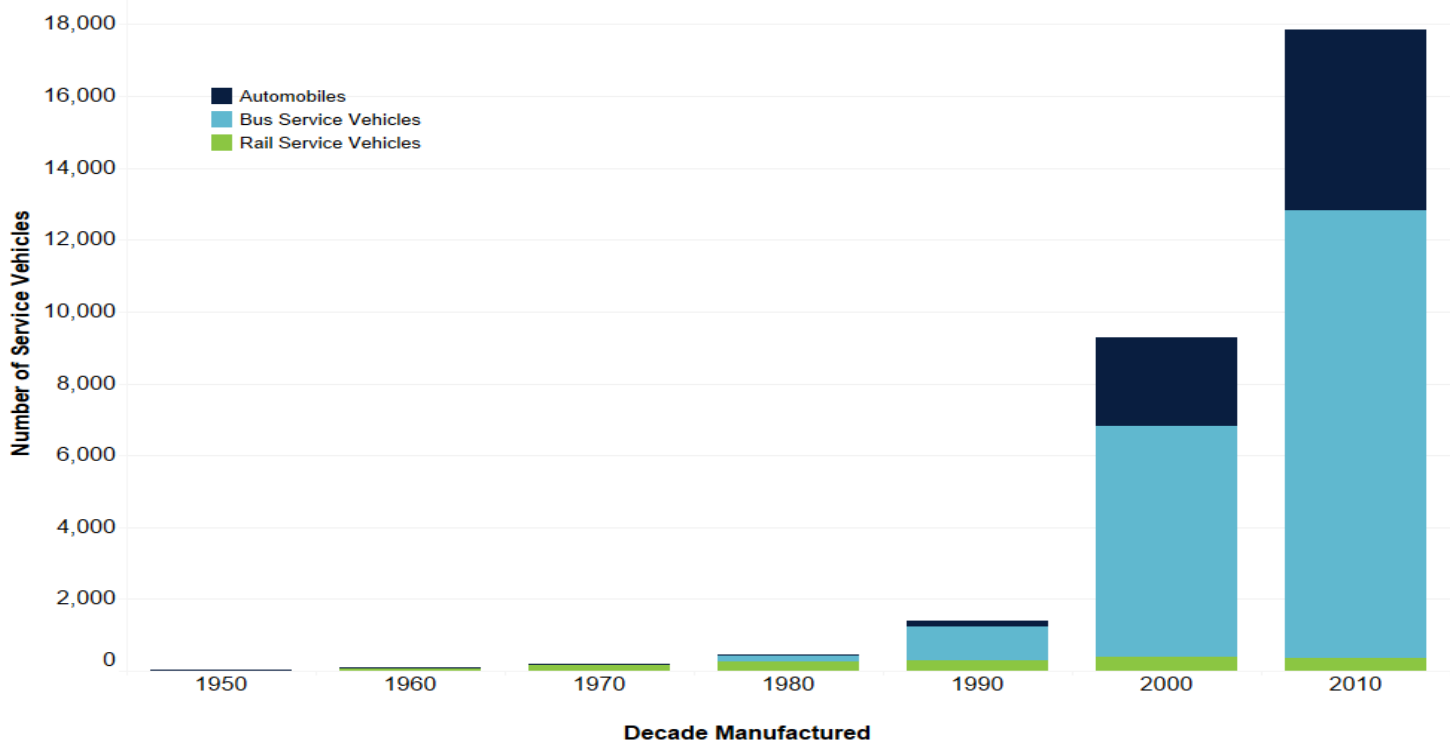


AGE OF SERVICE VEHICLES

Service vehicles are reported with the date of manufacture. Useful life for these assets varies significantly both across asset categories and within asset categories. Over 99.9% of assets were manufactured after 1950 (shown below).

The oldest asset (a rail vehicle not shown below) was manufactured in 1900. Assets beyond their ULB are no longer considered in SGR. Figure S-2 shows the distribution for the year of manufacture for service vehicles, organized by vehicle type.

FIGURE S-2: YEAR OF MANUFACTURE DISTRIBUTION FOR SERVICE VEHICLES



USEFUL LIFE BENCHMARKS (ULB) FOR SERVICE VEHICLES

ULBs represent the expected life cycle or the acceptable period of use in service of a capital asset for a transit agency's operating environment. Transit agencies may use the FTA-provided default values or adjust them based on local maintenance and operating conditions.

As Table S-1 indicates, rail service vehicles are on average a year from reaching their ULB, while automobiles and bus service vehicles are the

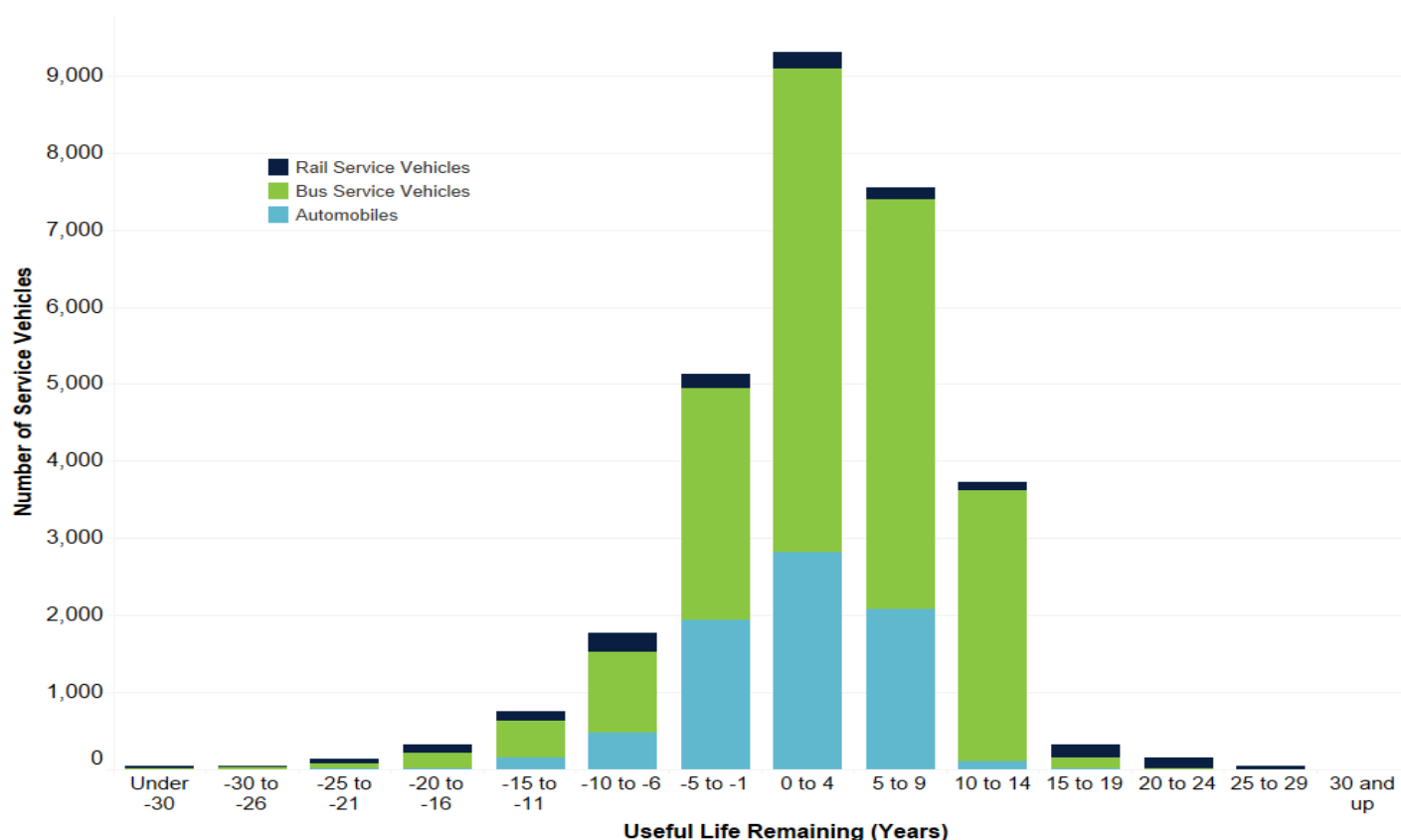
youngest asset classes on average. Automobiles and bus service vehicles are also on average close to the end of their ULBs. The data implies that agencies may keep many of these assets beyond the FTA default ULB, and that many agencies set custom ULBs, particularly for rail service vehicles.

Figure S-3 shows the average ULBs for each vehicle type, as well as the life remaining (calculated from year of manufacture and ULB).

TABLE S-1: AGE AND ULB FOR SERVICE VEHICLES

Vehicle Type	Average Age (yrs)	Default ULB (yrs)	Percent Agencies Setting Custom ULBs	ULB Range (yrs)
Automobiles	6.8	8	30%	2 - 40
Bus Service Vehicles	7.6	14	44%	3 - 40
Rail Service Vehicles	24	25	54%	5 - 45

FIGURE S-3: USEFUL LIFE REMAINING DISTRIBUTION BY VEHICLE TYPE

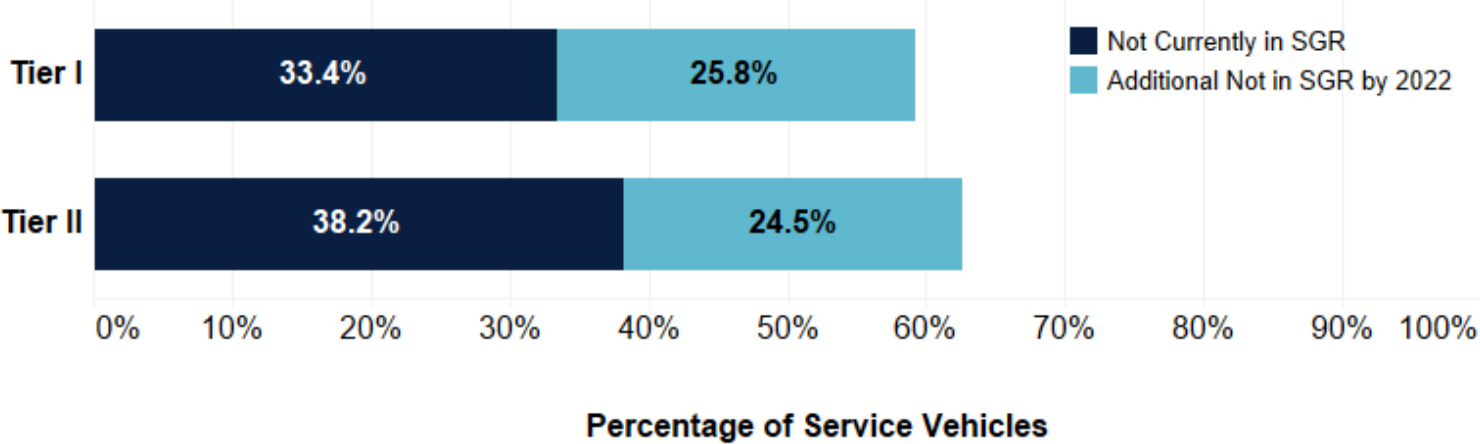


ASSET REPLACEMENT

Assets are due for replacement when they reach the end of their ULB. Assets that are at or beyond their ULB are due for replacement. Thirty-four percent of service vehicles are already at or beyond their ULB, meaning many are in consideration for replacement in the very near future. The total cost to replace these assets is reported as \$1.92 billion (in 2018

dollars). An additional 25.6% of service vehicles will exceed their ULB in the next four years, bringing the total percentage of assets in need of replacement to 59.7%. These additional assets will cost \$512 million to replace, bringing the total cost of replacing all service vehicles exceeding ULB within the next four years to over \$2.4 billion. Figure S-4 shows the breakdown of these vehicles in need of replacement now and in the next four years by agency tier.

FIGURE S-4: PERCENT OF VEHICLES NOT IN SGR CURRENTLY AND IN NEXT FOUR YEARS





TAM First-Year Summary: Facilities (2018)

Transit agencies are required to conduct regular condition assessments of their assets. This process involves inspections that evaluate an asset's physical and visual conditions, performance characteristics, and potential risks and impacts of failures. Only transit facilities are required to report these condition assessments to the NTD. Transit facilities are divided into four asset classes: maintenance, passenger, administrative, and parking, allowing agencies to report condition ratings by facility type and by asset class.

FTA requires transit agencies to assess and report facility condition to the NTD based on the five-point scale used in the Transit Economic Requirements Model (TERM). The TERM scale indicates that an asset is considered in good repair if it has a rating of 3 (adequate), 4 (good), or 5 (excellent); it is not considered to be in good repair if it has a rating of 1 (poor) or 2 (marginal).

TRANSIT FACILITIES: AGE AND CONDITION

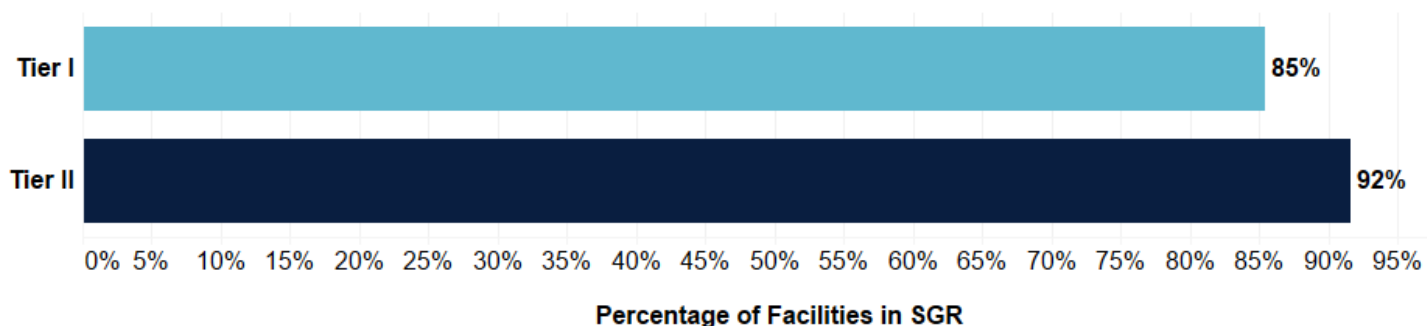
Transit agencies reported 12,506 facilities nationwide. Table F-1 provides summary statistics for the facilities with condition assessments reported.

TABLE F-1: SUMMARY OF FACILITIES WITH CONDITION RATINGS

	Tier I	Tier II	Total
Facilities with Condition Rating	6,022	2,373	8,395
Mean Age	29	20	27
Average Condition Rating	3.3	3.7	3.4

FIGURE F-1: PERCENT OF FACILITIES IN A STATE OF GOOD REPAIR BY AGENCY TIER

Figure F-1 details the percent of facilities in SGR by agency tier. Among reported facilities, 85 percent of Tier I facilities are in SGR and 92 percent of Tier II facilities are in SGR.



TRANSIT FACILITY TYPES

There are four transit facility asset classes: maintenance, passenger, administrative, and parking. Agencies self-assess the condition for each of their facilities on the 1-5 TERM scale, and submit condition ratings for every facility, which are then aggregated to

calculate the facility condition performance measure metric. This condition rating is based on the [TAM Facility Performance Measure Reporting Guidebook](#) requirements.

TABLE F-2: RANGE OF CONDITION RATINGS AND SGR PERCENTAGES BY FACILITY TYPE

Asset Class	Facility Type	Average Condition Assessment	Share of Facilities in SGR	Year Built for Oldest Facility
Administrative	Administrative Office / Sales Office	3.7	92%	Pre-1910
	Revenue Collection Facility	3.7	90%	Pre-1910
Maintenance	Combined Administrative and Maintenance Facility (describe in Notes)	3.6	90%	Pre-1910
	General Purpose Maintenance Facility/Depot	3.6	91%	Pre-1910
	Heavy Maintenance & Overhaul (Backshop)	3.0	77%	Pre-1910
	Maintenance Facility (Service and Inspection)	3.3	84%	Pre-1910
	Other, Administrative & Maintenance (describe in Notes)	3.2	74%	Pre-1910
	Vehicle Blow-Down Facility	4.0	100%	1960
	Vehicle Fueling Facility	3.7	89%	Pre-1910
	Vehicle Testing Facility	2.7	67%	1978
	Vehicle Washing Facility	3.6	92%	1914
Parking	Other, Passenger or Parking (describe in Notes)	3.8	97%	Pre-1910
	Parking Structure	4.0	97%	1939
	Surface Parking Lot	3.4	89%	Pre-1910
Passenger	At-Grade Fixed Guideway Station	3.5	90%	Pre-1910
	Bus Transfer Center	3.8	94%	Pre-1910
	Elevated Fixed Guideway Station	3.1	75%	Pre-1910
	Exclusive Platform Station	3.7	97%	Pre-1910
	Ferryboat Terminal	3.7	93%	Pre-1910
	Simple At-Grade Platform Station	3.3	90%	Pre-1910
	Underground Fixed Guideway Station	2.7	62%	Pre-1910

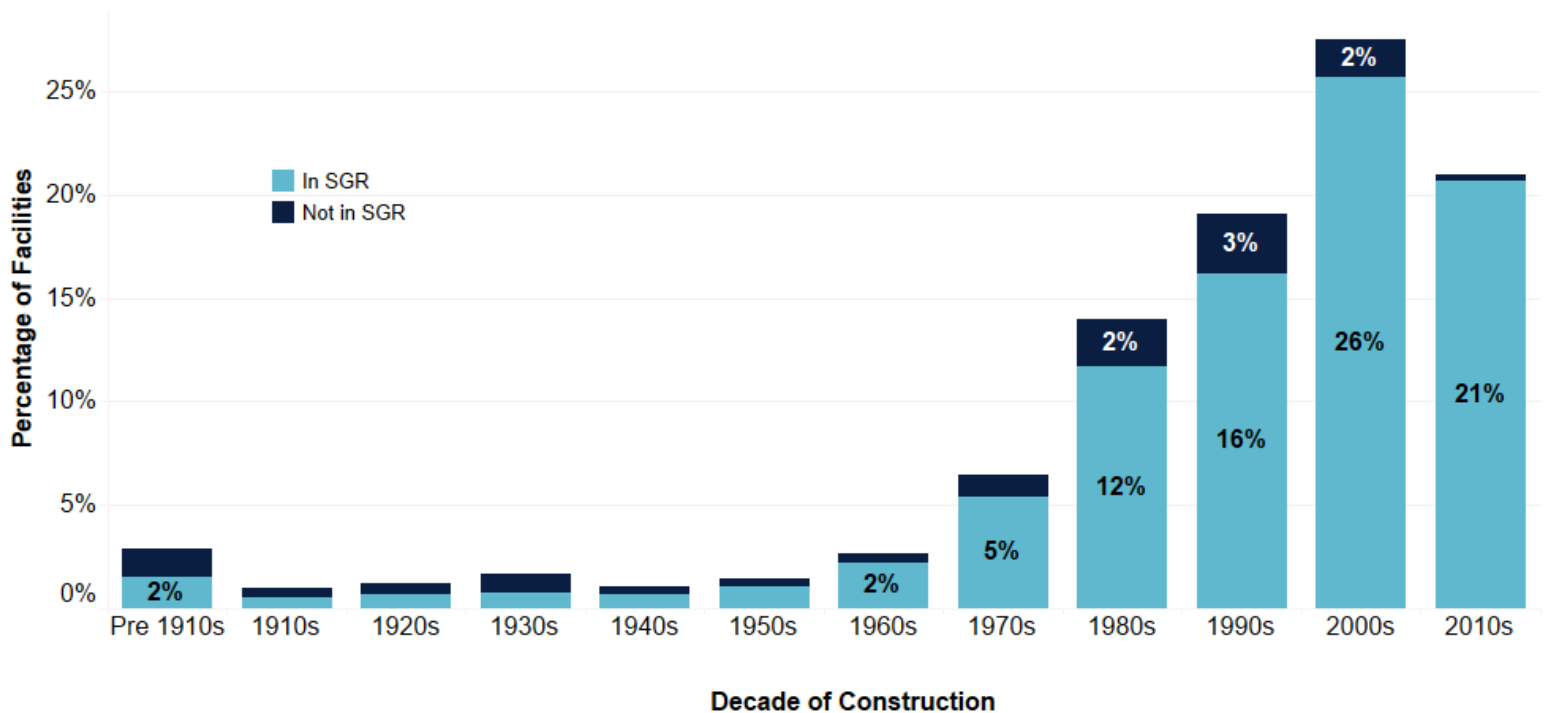
TERM Scale: 1(poor)-2(marginal)-3(adequate)-4(good)-5(excellent)

STATE OF GOOD REPAIR AND AGE OF TRANSIT FACILITIES

The new NTD data allows a snapshot look at the condition of transit facilities nationwide. Figure F-2 shows that about 28% of assessed facilities were built between 2000 and 2009, and around 3% are over a hundred years old. The data shows that while 90% of

facilities built in the last 60 years are in SGR, only half built over 100 years ago are reported to be in SGR. Agencies were only required to conduct condition assessments for 25% of their facilities in the first year.

FIGURE F-2: PERCENT OF FACILITIES IN SGR BY DECADE BUILT



HOW MUCH WILL IT COST TO REPLACE FACILITIES NOT IN SGR?

TABLE F-3: ESTIMATED COST TO REPLACE TRANSIT FACILITIES (BY ASSET CLASS)

Facility Asset Class	Average Condition Assessment	Number of Facilities	Total Size (sq. ft.)	Share of Facilities in SGR	Replacement Cost for Facilities
Administrative	3.7	830	22,759,802	92%	\$288,721,260
Maintenance	3.5	3,270	209,138,649	86%	\$2,126,125,422
Parking	3.5	2,249	73,239,519	91%	\$599,575,252
Passenger	3.4	4,371	246,194,987	85%	\$2,832,573,907

The replacement cost for facilities was estimated by multiplying the total square footage of facilities not in SGR by \$162. This multiplier represents the higher end of commercial facility construction cost range. As agencies were only required to conduct condition

assessments for at least 25% of their transit facilities in the first year, the replacement cost for facilities is likely to change as more agencies report more facility condition assessments to the NTD.



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TAM First-Year Summary: Track and Infrastructure (2018)

TRACK AND INFRASTRUCTURE OWNED BY TRANSIT AGENCIES

As reported to the NTD, there are over 14,700 miles of track used to provide transit service in the U.S. This includes approximately 9,500 miles for Commuter Rail (64%), 2,200 miles of heavy rail (16%), 1,700 miles of light rail (12%), and 1,200 miles (8%) in other types of rail systems (articulated rail, cable car, inclined plane, monorail/automated guideway, streetcar rail, and hybrid rail). The average expected service years (ESY) for guideway was 66 years.

Rail providers and other fixed-route operators also report power and signal equipment and linear miles of guideway.

A separate right of way or rail for the exclusive use of public transportation. This includes track, as well as buildings and structures dedicated for the operation of transit vehicles. It does not include passenger stations or maintained.

This fact sheet notes whether the calculations are for track only or for track and guideway together.

In total, transit providers reported 4,827 linear miles of guideway structures and 1,986 power and signal equipment elements.

PERFORMANCE RESTRICTIONS

Rail providers are required to establish a target for infrastructure -- the percent of track under performance restriction -- and report the performance measure to the NTD. The average target for track SGR was for roughly 13% of all track to be under a performance restriction. For all rail modes, around 4% to 7% of track was reported to be under performance restrictions. Agencies reported a total of 597 miles of track with slow zones in 2018, which is estimated at approximately \$59.7 billion in replacement costs

(calculated using an industry-accepted replacement cost of \$100 million).

A performance restriction is defined to exist on a segment of rail fixed guideway when the maximum permissible speed of transit vehicles is set to a value below the guideway's full service speed. These restrictions are often referred to as "slow zones."

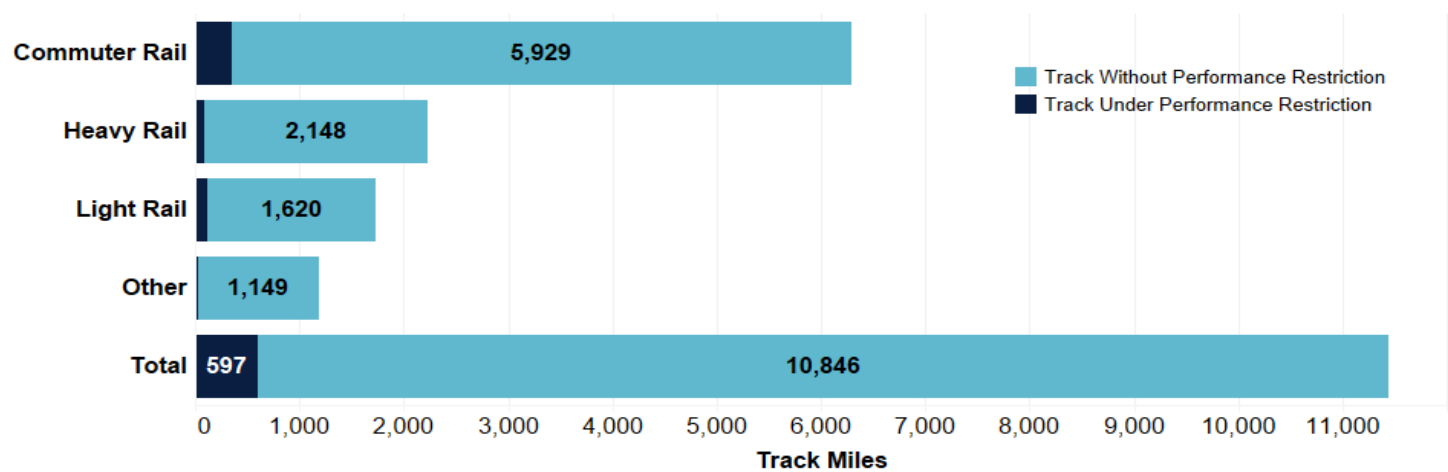
The [TAM Infrastructure Reporting Guidebook](#) details the following requirements for reporting performance restrictions:

- Agencies must measure the length of track miles under performance restrictions each month based on a snapshot of conditions that existed as of 9:00 AM local time on the first Wednesday of the month. This calculation must be performed separately for each combination of rail fixed guideway mode (or type of system) and type of service.
- All performance restrictions that can be applied to a specific section of track (excluding system-wide

- restrictions for inclement weather, for example) must be included in the calculation, regardless of cause or duration. This includes temporary speed restrictions placed due to construction or maintenance activity.
- Agencies are required to report an annual value for length of track miles under performance restrictions to FTA by averaging the values calculated each month over the course of the year.

Figure T-1 summarizes the total track miles by type of rail system, along with the mileage and percent under performance restriction.

FIGURE T-1: TOTAL TRACK AND TRACK UNDER PERFORMANCE RESTRICTION



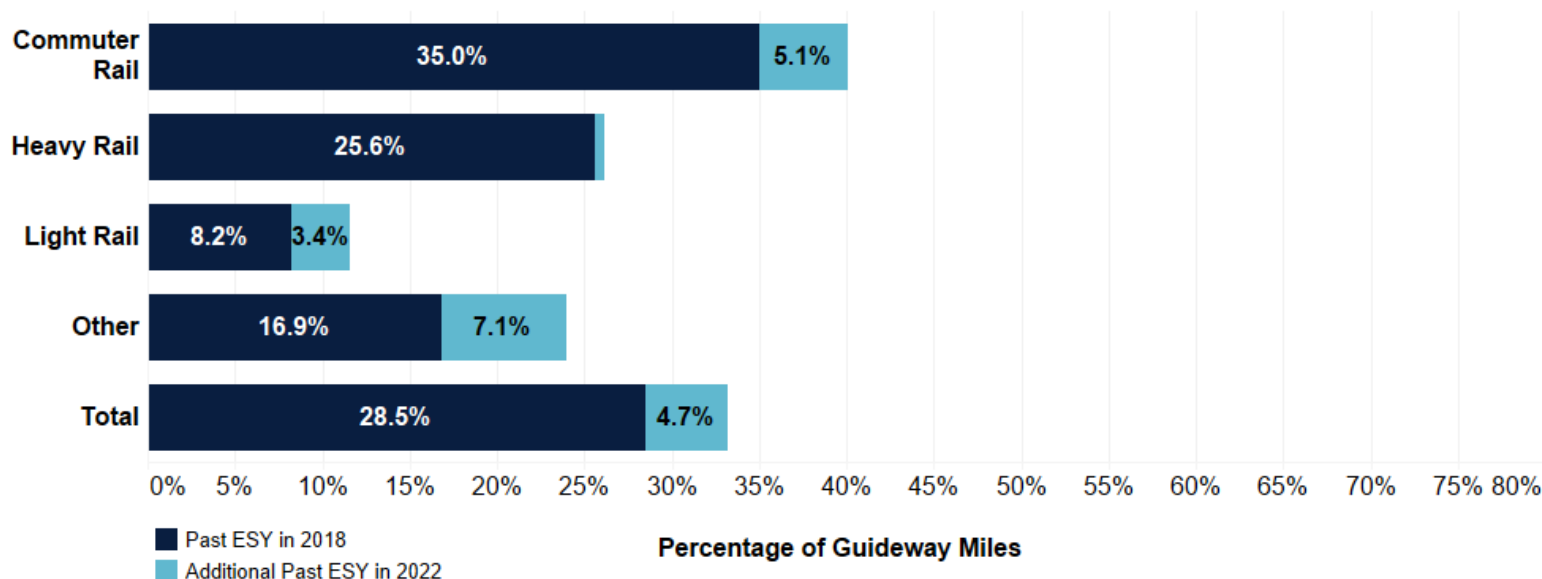
EXPECTED SERVICE YEARS (ESY)

Agencies report an ESY for track or guideway elements for each rail mode. For each mode, the agency also reports an approximate year of construction, as either before 1930 or in one of the 10 decades from the 1930s through the 2020s. Using the reported data, FTA estimates the percent of guideway that is currently in use beyond its ESY. Figure T-2 summarizes this estimate by rail mode.

miles is estimated to exceed their ESY in the next four years, for a total of 33% of guideway miles. These additional guideway elements will cost \$43 billion to replace. This would bring the cost estimate to replace all guideway assets beyond their reported ESY in the next four years to approximately \$300 billion.

In 2018 approximately 28% of all reported guideway is beyond its ESY, representing around 2,576 miles of guideway needing replacement at an estimated cost of \$257.6 billion. An additional 5% of guideway

FIGURE T-2: AVERAGE PERCENT OF GUIDEWAY INFRASTRUCTURE PAST EXPECTED SERVICE YEARS



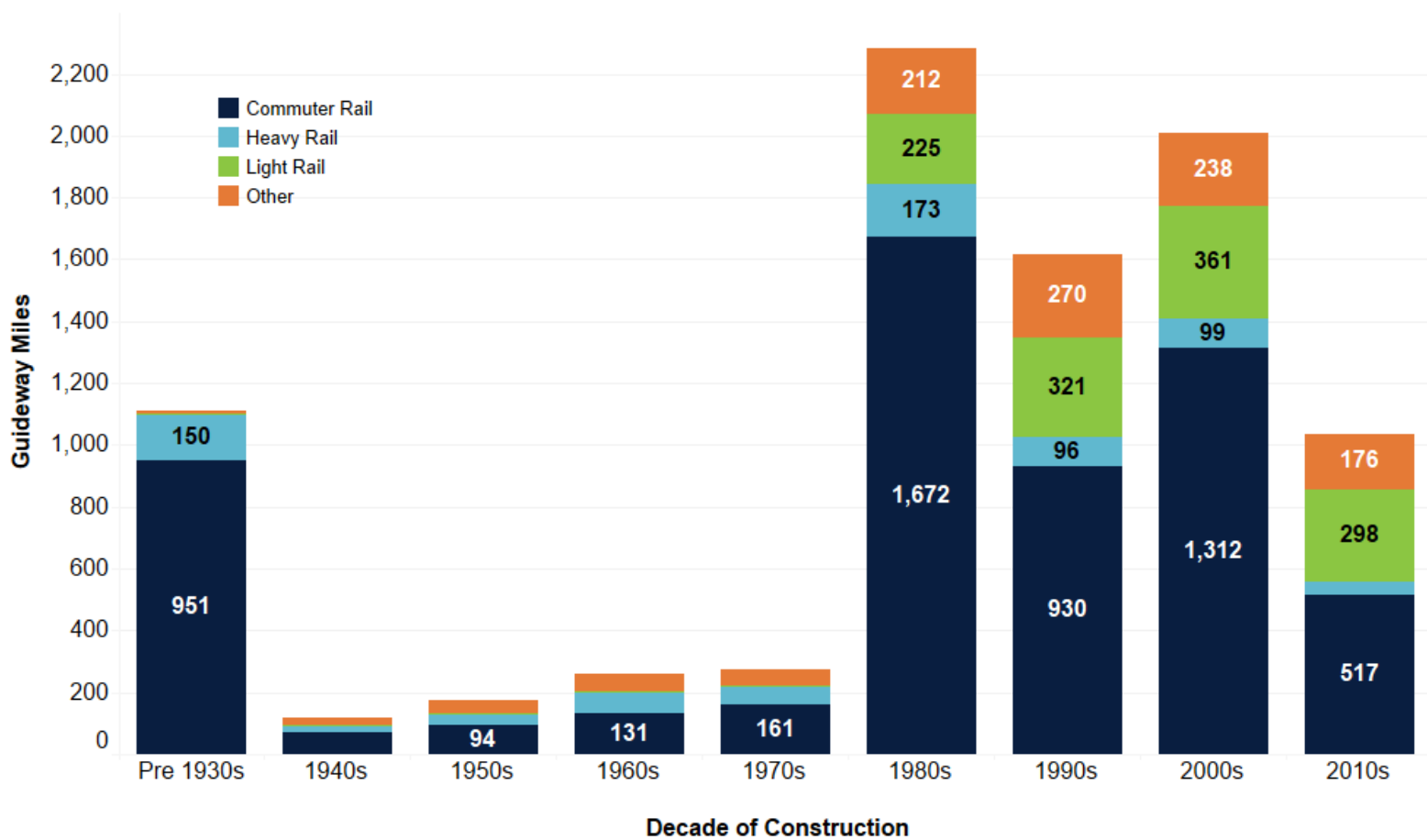
GUIDEWAY CONSTRUCTION

Figure T-3 shows the reported year of construction. For most guideway, the age is well below the average expected life of 66 years. The figure also shows that most guideway constructed before the 1980s belongs to heavy rail and commuter rail systems, whereas

a significant portion of heavy rail guideway was constructed before the 1930s. Note that the year of construction could include both expansion projects as well as replacement of even older guideway elements.

Data Note: The mileage depicted in Figure T-3 does not equate to the total guideway mileage nationally, because year of construction data was not collected for all infrastructure assets in rail right of way (ROW). However, the distribution in this factsheet is assumed to be representative of the whole.

FIGURE T-3: YEAR OF CONSTRUCTION FOR GUIDEWAY





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TAM First-Year Summary: Performance Targets (2018)

Transit agencies set performance targets for the coming year, reflecting their expectation of their ability to keep assets in SGR. FTA encouraged transit agencies to set targets based on available asset condition data and anticipated resources. For some agencies, the projections reflect increasing SGR goals; in other cases, they may reflect an expectation of decreasing SGR based on the agency's constraints. FTA has clearly explained there are no rewards for meeting the targets and no penalties for not meeting

the targets. Agencies are not required to report their local decision making process for setting their SGR targets. Agencies report performance targets to the NTD aggregated by asset class, rather than individually by each asset.

In 2018, transit agencies reported 4,202 targets for 38 transit asset classes, representing their expected SGR in the upcoming 2019 fiscal year.

DISTRIBUTION OF PERFORMANCE TARGETS

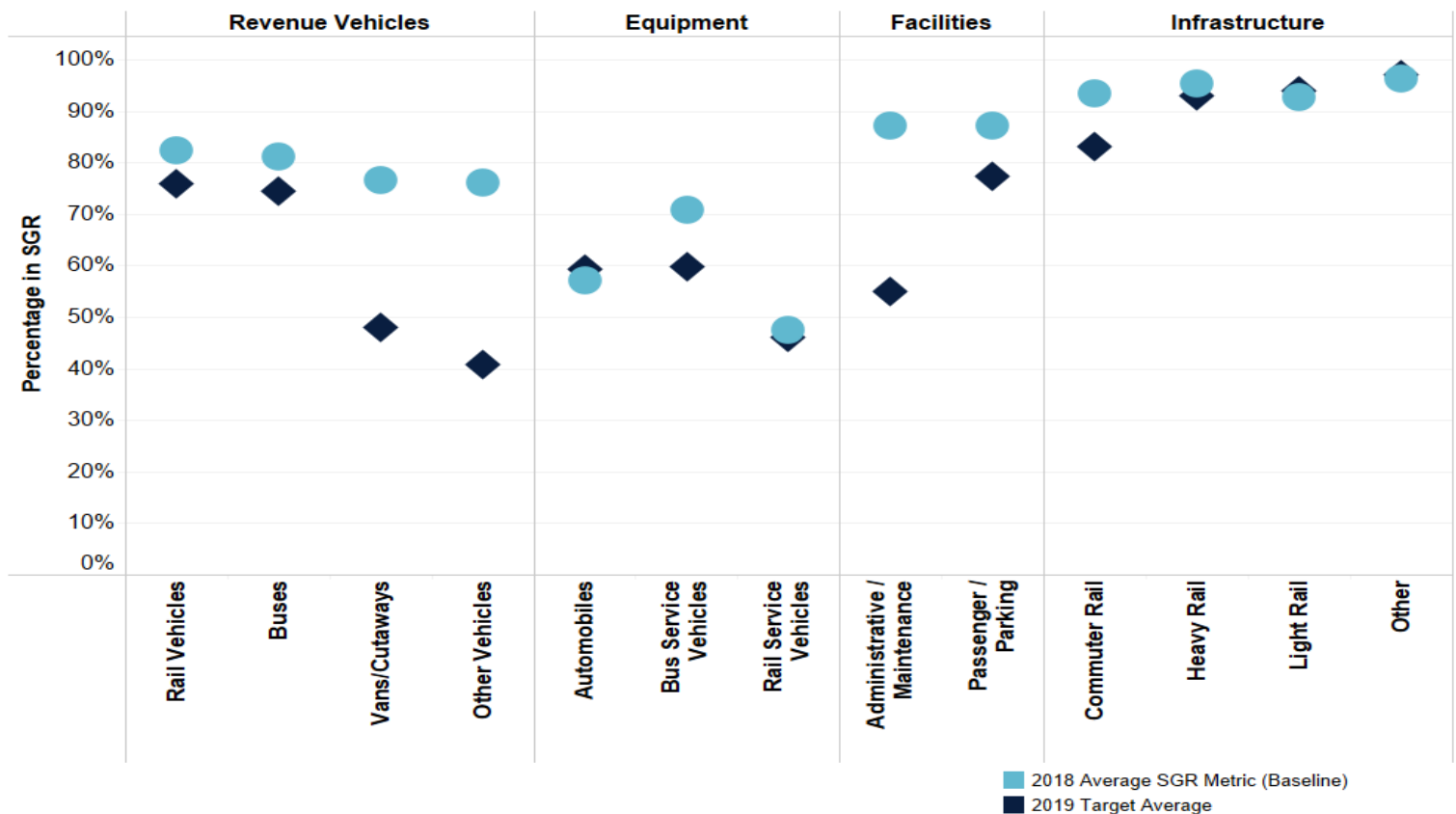
Table P-1 and Figure P-1 show the 2018 condition assessments and the 2019 performance targets broken down by asset category and class. The 2018 values are calculated based on data reported to the NTD; 2019 target values are the average for all targets set for that asset class. The data show a range in agencies' expectations in their ability to maintain or

improve the condition of transit assets in the near future. On average, transit agencies forecast expectations for 2019 SGR for facilities and infrastructure that align closely with the current reported condition, generally improving SGR targets for service vehicles, and a mix of higher and lower SGR targets for revenue vehicles. Table P-2 shows average performance targets, organized by asset category and agency tier.

TABLE P-1: PERCENT OF ASSETS IN STATE OF GOOD REPAIR (BY ASSET CLASS)

Asset Category	Asset Class	% Assets in SGR (2018 Baseline)	% Assets in SGR (2019 Target Average)
Revenue Vehicles	Rail Vehicles	82%	76%
	Buses	81%	74%
	Vans/Cutaways	76%	48%
	Other Vehicles	76%	41%
Equipment	Automobiles	57%	59%
	Bus Service Vehicles	71%	60%
	Rail Service Vehicles	47%	46%
Facilities	Administrative / Maintenance	87%	55%
	Passenger / Parking	87%	77%
Infrastructure	Commuter Rail	93%	83%
	Heavy Rail	95%	93%
	Light Rail	93%	94%
	Other	96%	97%

FIGURE P-1: AVERAGE SGR METRIC (2018) AND TARGET (2019)



In general, Tier II agencies reported lower average performance targets across all asset categories.

TABLE P-2: AVERAGE PERFORMANCE TARGETS BY ASSET CATEGORY AND AGENCY TIER

Asset Category	Total Percent in SGR	Tier I Percent in SGR	Tier II Percent in SGR
Revenue Vehicles	79%	82%	73%
Equipment	66%	67%	62%
Facilities	87%	85%	92%
Infrastructure	94%	94%	N/A

For each asset class reported by each agency, FTA compared the 2018 metric (e.g., percent of assets in SGR) to the 2019 target, and determined whether the target was lower, higher, or the same as the current metric. For purposes of this analysis, a target lower than the current reported metric indicates a forecasted decline in SGR for that asset class for the following year; a target higher than the current reported metric

indicates a forecasted increase in SGR for the following year. Many targets forecasted maintaining the same level of SGR for the next year. Table P-3 displays this comparison, aggregated across all agencies and asset classes. In general, targets for revenue vehicles and for infrastructure were more likely to forecast an improved SGR than for facilities and equipment.

TABLE P-3: NATIONAL AVERAGES OF TRANSIT AGENCY'S EXPECTED SGR NEXT FISCAL YEAR (2019)

Asset Category	Type	Declining SGR in 2019 (% Targets)	No Change in SGR in 2019 (% Targets)	Increasing SGR in 2019 (% Targets)
Revenue Vehicles	Rail Vehicles	49%	27%	24%
	Buses	29%	13%	58%
	Vans / Cutaways	43%	8%	50%
	Other Vehicles	53%	12%	35%
Equipment	Automobiles	41%	9%	50%
	Bus Service Vehicles	58%	2%	41%
	Rail Service Vehicles	53%	2%	45%
Facilities	Administrative / Maintenance Facilities	76%	6%	18%
	Passenger / Parking Facilities	61%	4%	36%
Infrastructure	Commuter Rail	74%	0%	26%
	Heavy Rail	31%	4%	65%
	Light Rail	49%	1%	50%
	Other	76%	8%	16%