OFFICE OF THE NEW YORK STATE COMPTROLLER

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A Review of Capital Needs at the Metropolitan Transportation Authority

Highlights

- OSC's inflated estimate of the MTA's capital repair needs, based on the MTA's 2013 TYNA, suggests $69 billion was needed over the 10-year period covering two capital programs from 2015 through 2024. At least another $43 billion was needed for the next capital program period, from 2025 through 2029.
- Signal problems were responsible for 25 percent of major incidents delaying trains in 2022 and 2023.
- About 7 percent of subway signals have been modernized, with 24 percent in construction or to be awarded this year, and 69 percent which still use the older conventional fixed block system.
- The 2023 TYNA projects the MTA will have to purchase more than 3,900 subway cars over the next 20 years to replace existing cars. OSC estimates that the cost of replacement could approach $15 billion.
- According to the 2023 TYNA, 73 percent of the subway rail car maintenance building structures and 69 percent of the roofs at maintenance-of-way support shops are in poor or marginal condition.
- According to the 2023 TYNA, 100 percent of the Grand Central Terminal train shed's structural supports and roof slab, drainage system and HVAC system are in poor or marginal condition.
- All of the platforms that the LIRR is responsible for maintaining at Penn Station are in poor or marginal condition and have received minimal capital funding in recent years.

As part of its overhaul in the 1980s, the Metropolitan Transportation Authority (MTA) committed itself to developing a 20-Year Needs Assessment (TYNA) of capital needs, updated every five years. The TYNA is meant to provide an unrestrained view of the capital needs of the system to inform the MTA's five-year capital programs, which ultimately act as a resource allocation exercise to address system needs, in addition to enhancements.

The MTA, which did not release its needs assessment in 2019, issued a new TYNA in October 2023 as required by State legislation. The document is a departure from earlier assessments in some ways. Most notably, it did not include projected costs associated with needed system repairs. The new TYNA is also unconstrained in identifying needs and provides greater detail on asset condition than in the past. The MTA has noted estimating costs for project work over a 20-year horizon cannot be done with precision and that the capital program, with specific projects and timeframes, should inform the budget.

While not required by State law, the lack of costs in the latest TYNA makes it difficult to assess how much investment is needed, which is useful for allocating limited capital funding resources. This report attempts to use the 2013 TYNA and 2023 TYNA to provide detail on needed investment and the current state of asset conditions to measure recent progress. The MTA can build on this information by demonstrating how its proposed capital plan would reduce existing deficiencies in the state of repair of its assets. The MTA should also link operating indicators with the investment choices made. Doing so would help the public and decision makers understand the MTA's vast funding needs and their impact on the ridership experience.

Background

The MTA issued its latest TYNA in October 2023 as required by State law, a prerequisite for the release of its 2025-2029 capital program in the fall of 2024. The 2023 TYNA provided a detailed breakdown of the conditions of its assets, including more than 360 categories of components where assets were examined to evaluate whether they were in fair, good, poor or marginal condition. These ratings provide a useful baseline to measure progress when future TYNAs are released. The assessment is also unconstrained in that it does not consider available funding or the capacity to do the needed work as past assessments did, an appropriate change given its purpose.

According to the MTA, the condition ratings were developed using data collected through the end of 2022. The ratings were then adjusted based on ongoing investments that would improve the condition of the assets. Work that is planned but has not yet begun was not factored into the condition ratings.

In a break with past practice, however, the MTA did not include cost estimates for the need of each capital element, which provides an important measuring stick for understanding investment in the system. In the absence of the amount of investment needed to keep up with repair needs, the condition of the components of the system takes on added importance, as they are the only measure available to the public to understand progress toward maintaining the system.

Analytic Considerations

It is important to note that the 2013 TYNA was constrained by both the anticipated availability of funding as well as the capacity to execute the needed work. As a result, capital needs were even greater than what was included in the assessment due to the large backlog of State of Good Repair (SGR) needs. The 2013 TYNA measured the percentage of backlogged work towards SGR in a smaller group of asset categories making comparison to 2023's condition ratings difficult. The 2013 TYNA also did not consider subsequent policy shifts, such as the MTA's acceleration of subway accessibility investments and an increased focus on resiliency projects, which have led to changes in strategy and impacted related costs.

The following sections merge the cost data in the 2013 TYNA with the assessment of conditions in the 2023 TYNA to identify where investment has been made in the system and where progress is still needed to bring and maintain the system in a state of good repair. Where possible, operational indicators are included to suggest the direct impact on customers, particularly where these investments impact the safety, frequency and reliability of the system.

To use the 2013 TYNA data, the Office of the State Comptroller (OSC) inflated the dollar cost laid out in 2013 in an attempt to more accurately reflect price inflation and its impact on needed capital spending. In sum, the inflated needs of the system were at least $69 billion over the 10-year period from 2015 through 2024, with another $43 billion needed from 2025 through 2029. The needs for each element are then compared to what has been completed and committed through December 2023 in the 2015-2019 and 2020-2024 capital programs.[1] The increased funding for the 2020-2024 program has been accompanied by the MTA's capital commitments averaging $9 billion over the last three years, more than achieved historically.

This report also lays out the conditions of MTA capital elements in the 2023 TYNA, with a focus on components that have the highest percentage

[1] Some limitations of the analysis are an exclusion of spending and commitments from the 2010-2014 capital plan during the analysis period and the lack of data on projects that have not been completed but are of "beneficial use" where partial completion improves the ridership experience.

of the asset in poor or marginal condition. While many components are at or nearing fair or good condition, 106 components out of the 364 included have 50 percent of the assets in poor or marginal condition. The MTA should consider making additional investment in these assets or explain how maintenance and other measures will reduce the impact to riders of these assets in a deteriorated state of repair.

While the cost estimates in the 2013 TYNA are outdated, it is the latest cost data available, and when merged with condition data, may provide some sense of the dollar amount needed. In some cases, prior capital programs have dedicated a comparable amount that was called for in the 2013 TYNA, but progress towards a state of good repair has experienced variation, as per the most recent 2023 TYNA. Greater understanding of why this is occurring and how the next capital plan will remedy these issues is needed.

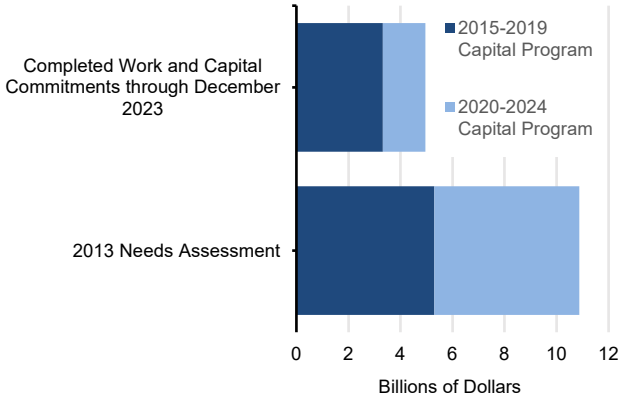
New York City Transit

New York City Transit (NYCT) is by far the largest portion of the MTA's assets and the greatest area of need by cost. According to the 2013 TYNA, NYCT made up 63 percent of capital needs during 2015 through 2024. Over 110 of the components graded in poor or marginal condition are located within the NYCT system, with 19 components where more than 50 percent of the assets condition are in poor or marginal condition.

Signals and Communications

The largest need at NYCT is for signals and communications. A well-functioning signal and communication system is critical for the provision of safe, reliable and frequent service. The 2013 TYNA estimated that an inflation-adjusted $10.9 billion would be needed for signals and communications over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $9.7 billion over both programs, but as of December 2023, only $1.9 billion of signal and communication projects have been completed

FIGURE 1
Progress of NYCT Signals and Communications Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

and another $3 billion has been committed (see Figure 1).

Delays caused by signal problems declined from 53,443 in 2019 to 40,139 in 2023, a 25 percent decline. Signal problems, however, were responsible for 25 percent of major incidents delaying trains in 2022 and 2023.

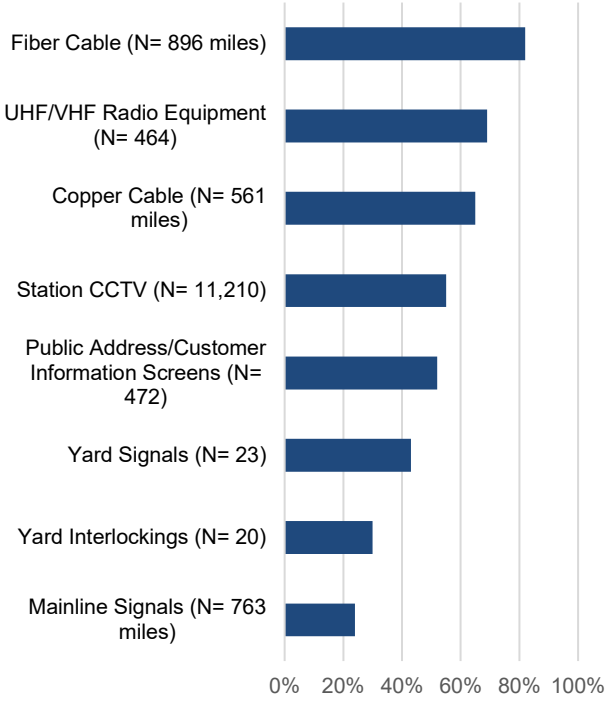
One of the main improvements for signals is their modernization, most importantly the installation of Communications-Based Train Control (CBTC). This system automates communication between the trains and the rail control center, effectively making the system more efficient via traffic management, as trains can be closer together without creating safety issues, effectively increasing service frequency without requiring additional cars. Signal delays on the 7 train declined 60 percent between 2019 and 2023 due to CBTC becoming operational during this period. Signal delays on the L, which also has CBTC installed, declined by 56 percent in this period.

Currently, about 7 percent of subway signals have been modernized, with 24 percent in construction or to be awarded this year, and 69 percent which still use the older conventional fixed block system. The fixed block system dates

to the beginning of the subway system more than 100 years ago and needs more space between trains to operate safely. Of all mainline signals, more than 1 out of 5 were in poor or marginal condition. The 2023 TYNA laid out the MTA's goal to increase the number of signal miles with modern signal systems from the current 52 (and 182 miles already underway) to 549 signal miles by 2044. This would cover 90 percent of all subway trips but still would leave 28 percent of signal miles with conventional signaling.

The fiber cable used for backbone communication infrastructure needs upgrading, with 82 percent in poor or marginal condition. Likewise, 52 percent of public address/customer information screens are also in need of repair (see Figure 2). Mainline signals have 24 percent of signal miles in poor or marginal condition and mainline interlockings are in similar condition.

FIGURE 2
NYCT Signals and Communications — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

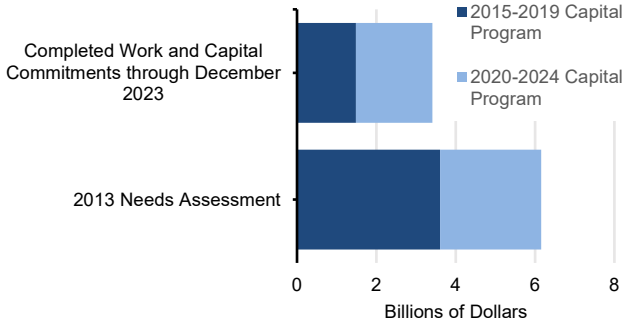
Subway Cars

Subway cars were the second largest area of need by dollar amount through 2024 according to the 2013 TYNA. Subway cars are fundamental to service delivery and are the most direct way in which the riders experience the system. Subway cars must be replaced regularly as cars have a life expectancy of 40 years. Currently, NYCT (including Staten Island Railway) maintains a fleet of more than 6,500 subway cars, 39 percent of which are over 30 years old with 30 percent either rapidly approaching — or past — their useful life. The average age of the subway fleet has increased from 20 years old in 2013 to 26 years in 2022.

The 2013 TYNA estimated that an inflation-adjusted $6.2 billion would be needed for new subway cars over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $5.8 billion on those programs for subway cars but as of December 2023, only $700,000 has been spent on completed subway car projects and another $3.4 billion has been committed (see Figure 3).

The 2023 capital needs assessment projects the MTA will have to purchase more than 3,900 subway cars over the next 20 years to replace the existing cars before they reach the end of their useful life. OSC estimates that the cost of the 3,900 cars could approach $15 billion.

FIGURE 3
Progress of NYCT Subway Car Purchases



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

The delivery of all 460 cars ordered in the 2015-2019 capital program to replace some of the oldest cars (which are more than 40 years old and have the lowest mean distance between failures) is not expected until 2025 as a result of contractor problems compounded by the COVID-19 pandemic. The cars that have been delivered so far have also experienced equipment problems. The MTA has exercised an option on this contract for another 640 cars, with the last cars expected to be delivered in 2027.

The mean distance between failures (MDBF) for subway cars has declined in the past year, from 138,074 miles in November 2022 to 120,291 miles in November 2023, lower than the 124,458 miles recorded in November 2019. The oldest cars, the R46 models, had a MDBF of only 41,859 miles in November 2023. Replacing these older cars could improve service reliability by reducing car failures.

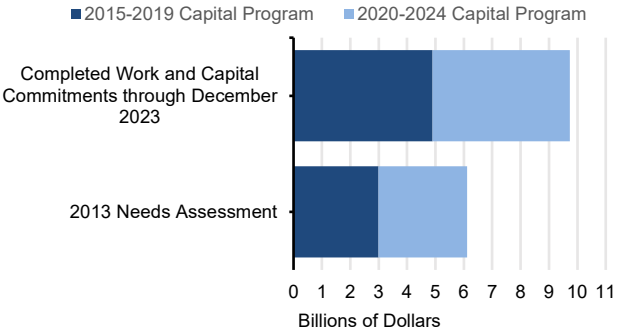
Passenger Stations

Passenger stations are intended to provide riders with a safe and comfortable environment for boarding and disembarking from trains. Stations are the most highly visible part of infrastructure and as such, they have received substantial investment.

Starting with the 2010-2014 capital program, the MTA abandoned a prior strategy of only performing comprehensive rehabilitation projects in favor of targeting investments to address the most critically deficient components (such as stairs and platform edges) at stations systemwide.

The 2013 TYNA estimated that an inflation adjusted $6.1 billion would be needed for passenger stations over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $14.5 billion in those programs for station work including $6.8 billion for station accessibility projects. As of December 2023, $3.1 billion in station projects have been completed including

FIGURE 4
Progress of NYCT Subway Station Projects

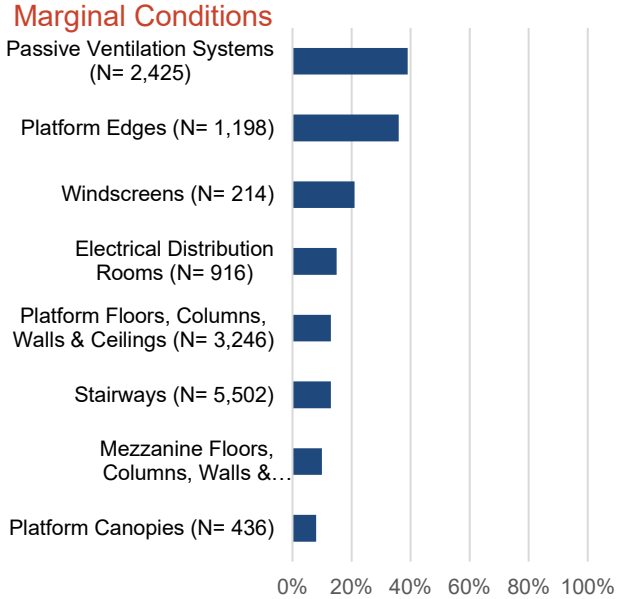


Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

$1 billion for accessibility and another $6.6 billion has been committed including $2.8 billion for accessibility (see Figure 4).

Investment in stations has allowed for lower rates of poor or marginal conditions. According to the 2023 TYNA, 18 percent of station components are in poor or marginal condition including 39 percent of passive ventilation systems and 36 percent of platform edges (see Figure 5). Stations had a backlog of repair work at 22 percent in the 2013 TYNA, marking improvement.

FIGURE 5
NYCT Station Components — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

However, station communication systems including the public announcement systems and CCTV, both in the subway and for Staten Island Railway, each have over 50 percent of components in poor or marginal condition.

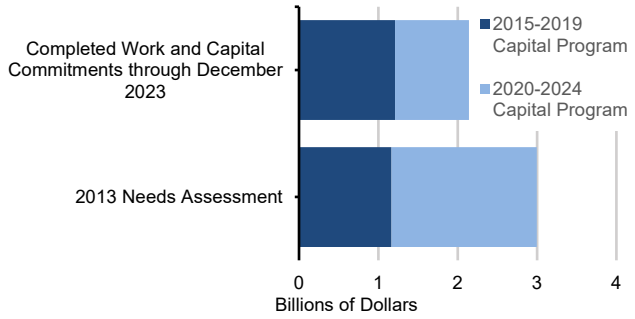
Buses

Similar to subway cars, normal replacement of NYCT buses is necessary since buses have a useful life of 12 years. The fleet is thus scheduled to be replaced nearly twice in a 20-year period. Currently, 469 buses or 8 percent of the fleet are past their useful life.

The 2013 TYNA estimated that an inflation-adjusted $3.7 billion would be needed for new buses over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $3.1 billion in those programs for New York City Transit buses but as of December 2023, $1.4 billion has been spent on completed bus projects and another $778 million has been committed (see Figure 6).

The 2023 needs assessment projects the MTA will purchase 9,258 buses over the next 20 years including 7,775 zero-emission buses. The new buses are needed as the MDBF for the bus fleet has declined in the past four years, from 10,498 miles in November 2019 to 9,850 miles in November 2023.

FIGURE 6
Progress of NYCT Bus Purchases



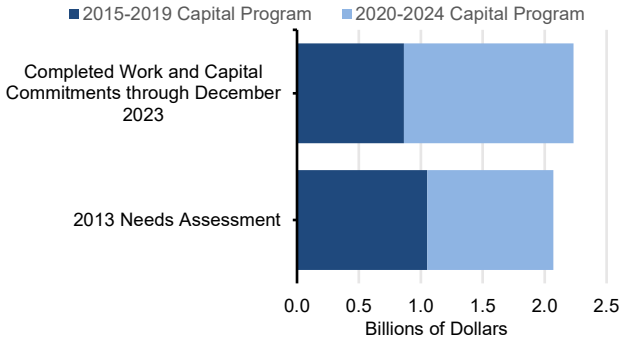
Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

Line Structures

The subway system has 252 miles of line structures. These include 155 miles of underground structures (including 13 miles of under-river tubes), 70 miles of elevated and viaduct structures (such as bridges) and 26 miles of open cut and embankment structures.

The 2013 TYNA estimated that an inflation-adjusted $2.1 billion would be needed for line structures over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend nearly $4 billion on those programs for line structures but as of December 2023, $543 million for line structure projects have been completed and another $1.7 billion has been committed (see Figure 7).

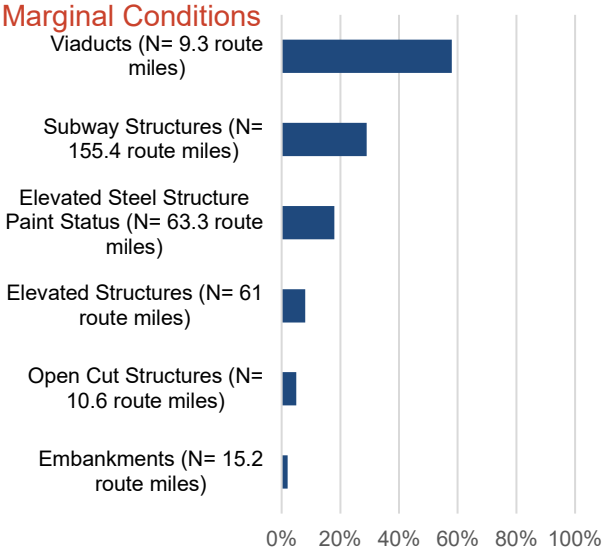
FIGURE 7
Progress of NYCT Line Structure Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

According to the 2023 TYNA, 22 percent of line structures, including 58 percent of viaduct structures, are in poor or marginal condition (see Figure 8).

FIGURE 8
NYCT Line Structures — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

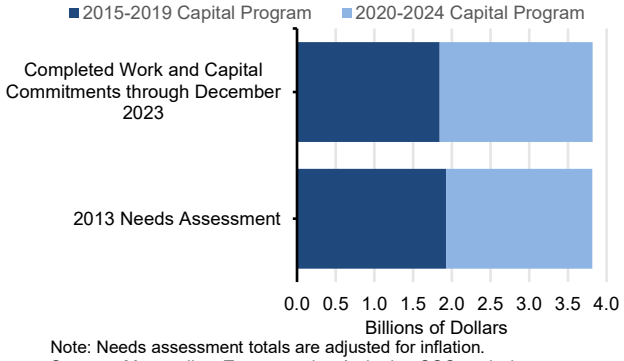
Track

The subway system contains 665 miles of mainline track and 1,770 mainline switches, while the 24 rail yards contain another 102 miles of track and 874 switches.

The 2013 TYNA estimated that an inflation-adjusted $3.8 billion would be needed for track over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend nearly $4.4 billion on those programs for track. As of December 2023, $2.7 billion in track projects have been completed and another $1.2 billion has been committed (see Figure 9).

After declining in 2020 and 2021, delays caused by track problems were at the 2019 level in 2023 at 24,440. Major incidents caused by track problems also increased by 9 percent between 2019 and 2023. According to the 2023 TYNA, 11 percent of mainline track and 16 percent of mainline switches have a remaining life of less than six years (see Figure 10). In 2022, track conditions were responsible for 19 percent of major incidents that delayed 50 or more trains. While derailments can be a function of human

FIGURE 9
Progress of NYCT Track Projects



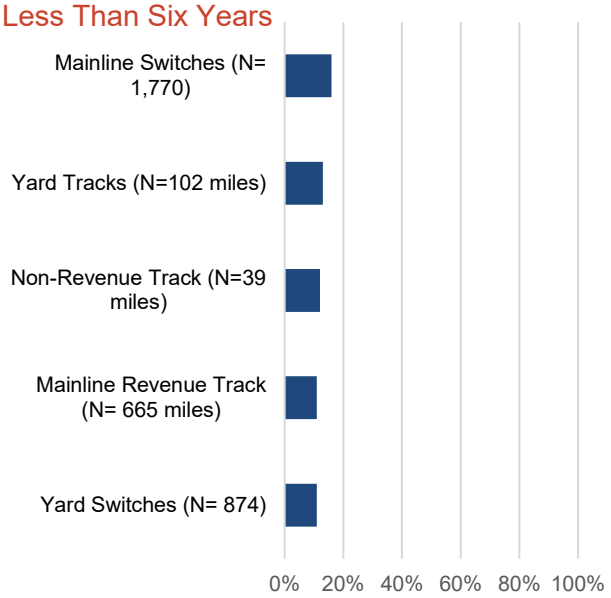
Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

behavior or other components of system infrastructure, maintenance of track repair is critically important for avoiding potential derailments.

Traction Power

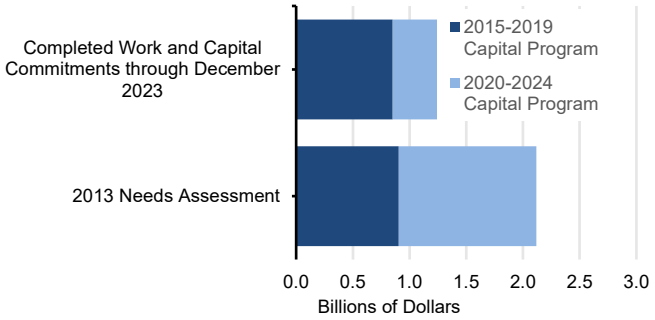
Electricity is essential to the operation of NYCT's subway cars. There are 224 electrical substations throughout the subway system that convert high-voltage alternating current to 600-volt direct current power for use in train propulsion. The

FIGURE 10
NYCT Track — Remaining Life of Less Than Six Years



Sources: Metropolitan Transportation Authority; OSC analysis

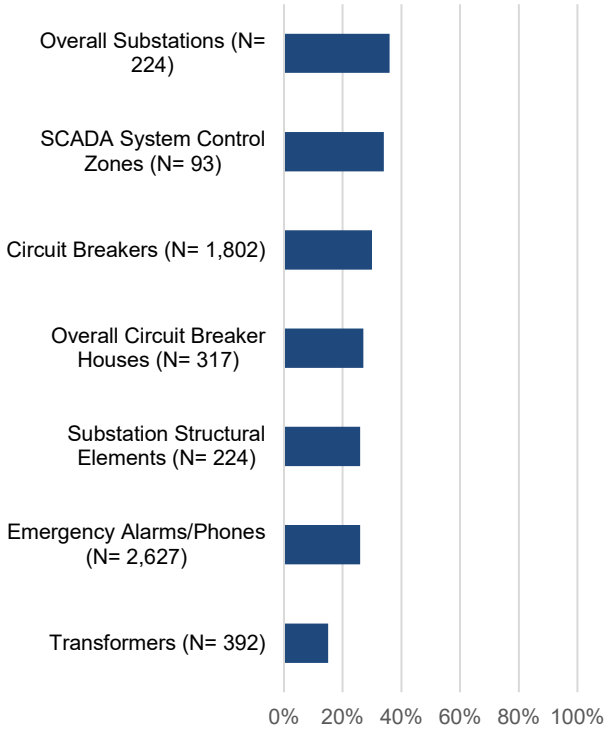
FIGURE 11
Progress of NYCT Traction Power Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

2013 TYNA estimated that an inflation-adjusted $2.1 billion would be needed over the 2015-2019 and 2020-2024 capital programs for traction power. The MTA plans to spend $2.2 billion on those programs but as of December 2023, $612 million in traction power projects have been completed and another $673 million has been committed (see Figure 11).

FIGURE 12
NYCT Traction Power — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

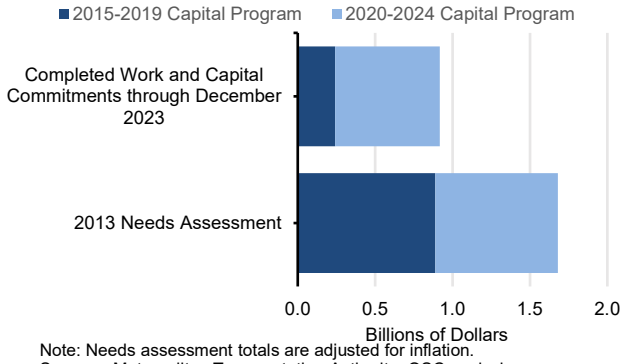
According to the 2023 TYNA, 36 percent of substations are in poor or marginal condition and 30 percent of circuit breakers are also in such condition (see Figure 12).

Bus Depots

The MTA's 38 bus depots and maintenance facilities support bus service throughout the City, providing fuel, servicing, maintenance and storage.

The 2013 TYNA estimated that an inflation-adjusted $1.7 billion would be needed over the 2015-2019 and 2020-2024 capital programs for bus depots. The MTA plans to spend $1.2 billion on those programs but as of December 2023, only $211 million for bus depots and facilities has been completed and another $707 million has been committed (see Figure 13).

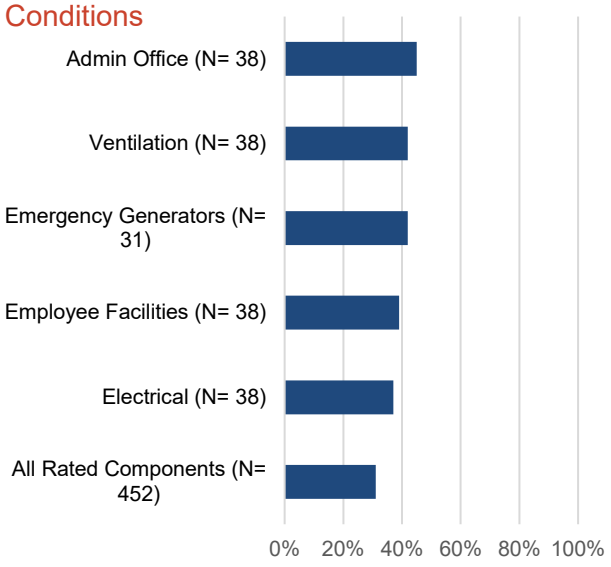
FIGURE 13
Progress of NYCT Depot Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

Depot and Bus Maintenance Facilities consist of 14 asset components. According to the 2023 TYNA, 31 percent of components at bus depots and maintenance facilities are in poor or marginal condition (see Figure 14). Poor conditions may also have detrimental effects on employee health and safety.

FIGURE 14
NYCT Depots — Poor or Marginal Conditions



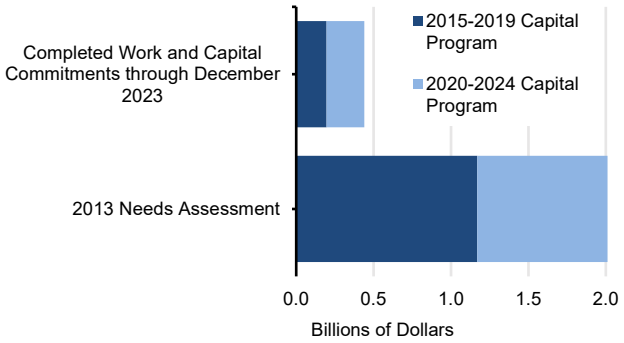
Sources: Metropolitan Transportation Authority; OSC analysis

Line Equipment

Line equipment refers to the array of equipment distributed along the right of way. Broadly, there are four distinct types of line equipment: tunnel lighting, ventilation plants, pump rooms and deep wells. In particular, pump room projects and their ability to prevent and mitigate flooding are critical for climate resilience.

The 2013 TYNA estimated that an inflation-adjusted $2.2 billion would be needed for line equipment over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $619 million in those programs for line equipment but as of December 2023, $104 million in line equipment projects have been completed and another $336 million has been committed (see Figure 15).

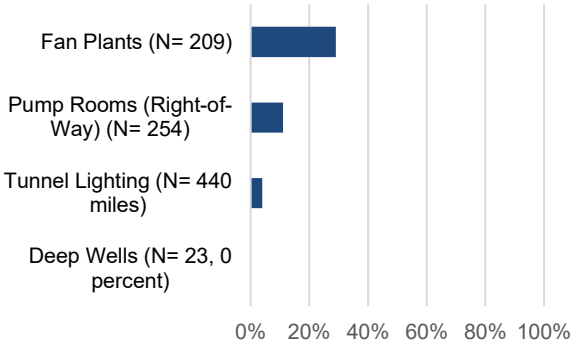
FIGURE 15
Progress of NYCT Line Equipment Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

According to the 2023 TYNA, 29 percent of ventilation plants, 11 percent of pump rooms and 4 percent of tunnel lighting are in poor or marginal condition (see Figure 16). Despite the lower than needed capital investment, NYCT has improved its maintenance and inspection program to identify defects and repair them to ensure that the equipment remains safe and operational.

FIGURE 16
NYCT Line Equipment — Poor or Marginal Conditions



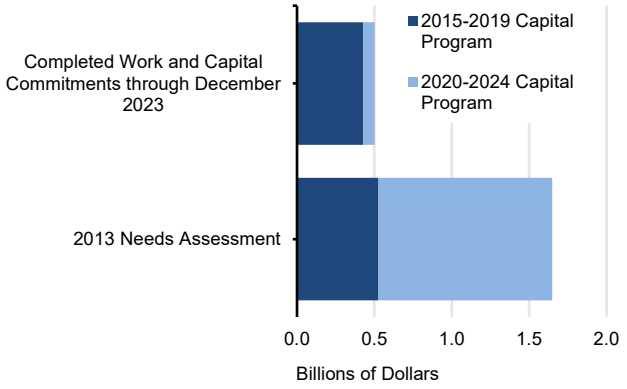
Sources: Metropolitan Transportation Authority; OSC analysis

Shops and Yards

The mission of NYCT's system of shops and yards is to keep the subway system in good working order. There are 15 rail car maintenance shops that handle daily maintenance and cleaning, two rail car overhaul complexes and 29 maintenance-of-way shops that maintain the tracks, signals and electrical infrastructure. There are also 24 rail storage yards.

The 2013 TYNA estimated that an inflation-adjusted $1.6 billion would be needed over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $914 million on those programs but as of December 2023, only

FIGURE 17
Progress of NYCT Shops and Yards Projects



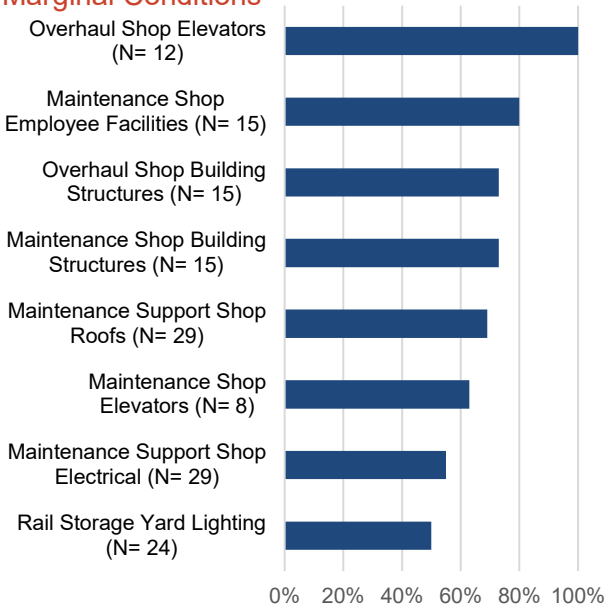
Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

$315 million in shop and yard projects have been completed and another $187 million has been committed (see Figure 17).

In the 2023 TYNA, shops and yards have 36 components broken out. Eleven of these components, including building structures at the Rail car Maintenance and Overhaul shops, have more than 50 percent of assets in poor or marginal condition.

Amid this slower investment to address related needs, these assets are in some of the worst condition of any of the MTA's assets. According to the 2023 TYNA, 73 percent of the rail car maintenance building structures and 69 percent of the roofs at maintenance-of-way support shops are in poor or marginal condition (see Figure 18, next page). All of the rail car overhaul elevators are in poor or marginal condition. The importance of shops and yards cannot be understated. During Superstorm Sandy, the Coney Island Yard was flooded with 27 million gallons of water which resulted in a major service disruption.

FIGURE 18
NYCT Shops and Yards — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

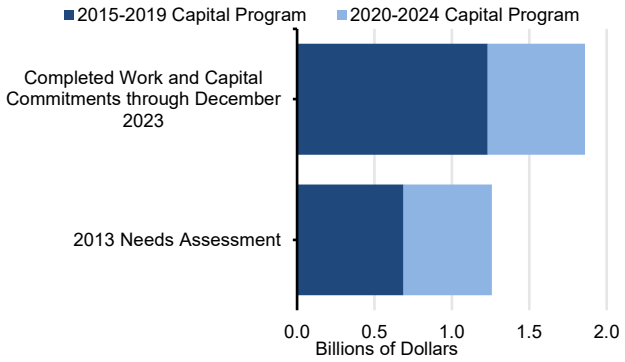
Long Island Rail Road

Stations

The Long Island Rail Road (LIRR) operates out of its main terminal in Penn Station and has just opened a new terminal at Grand Central Madison. It also serves 124 outlying stations in New York City and Long Island.

The 2013 TYNA estimated that an inflation-adjusted $1.3 billion would be needed for LIRR stations over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend nearly $2 billion on those programs for LIRR stations but as of December 2023, $733 million had been spent on completed station projects and another $1.1 billion has been committed (see Figure 19).

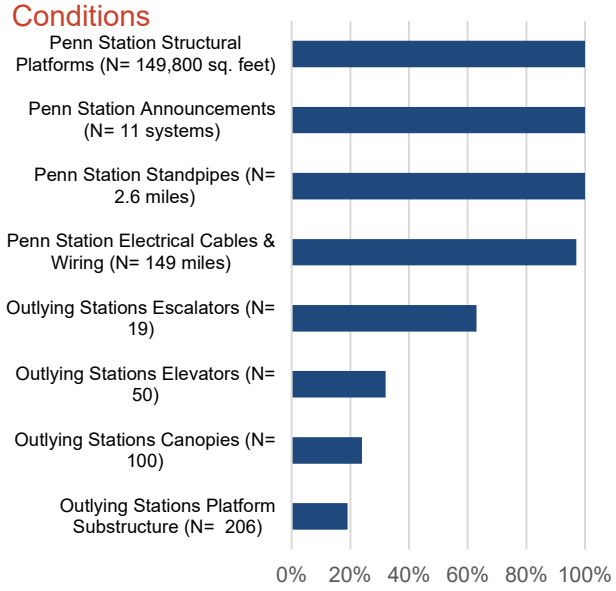
FIGURE 19
Progress of LIRR Station Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

Most of the $822 million for Penn Station in the two capital programs has been dedicated to a new spacious concourse at the station but all of the platforms that the LIRR is responsible for maintaining are in poor or marginal condition and have received minimal capital funding. Sixty percent of architectural elements such as stairs and doors are in poor or marginal condition as well. Escalators and elevators at outlying stations are at 63 percent and 32 percent, respectively, in poor or marginal condition (see Figure 20). The

FIGURE 20
LIRR Stations — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

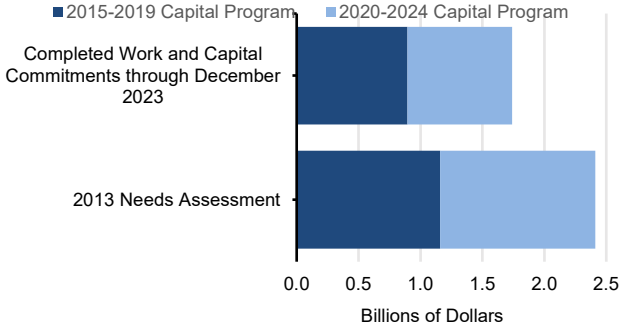
MTA shares these assets with Amtrak and New Jersey Transit and the three railroads are in preliminary engineering for a $7 billion Penn Reconstruction plan that is focused on addressing the condition of these critical assets, but full funding has not yet been identified.

Track

The LIRR has more than 500 miles of mainline track. The LIRR provides ongoing maintenance of the rail system and replaces track and track components on a life-cycle basis. Replacement is based on age, condition and physical inspection.

The 2013 TYNA estimated that an inflation-adjusted $2.4 billion would be needed for LIRR track projects over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $1.9 billion on those programs for LIRR track projects. As of December 2023, $895 million has been spent on completed track projects including the completion of a second electrified track from Farmingdale to Ronkonkoma and another $844 million has been committed (see Figure 21).

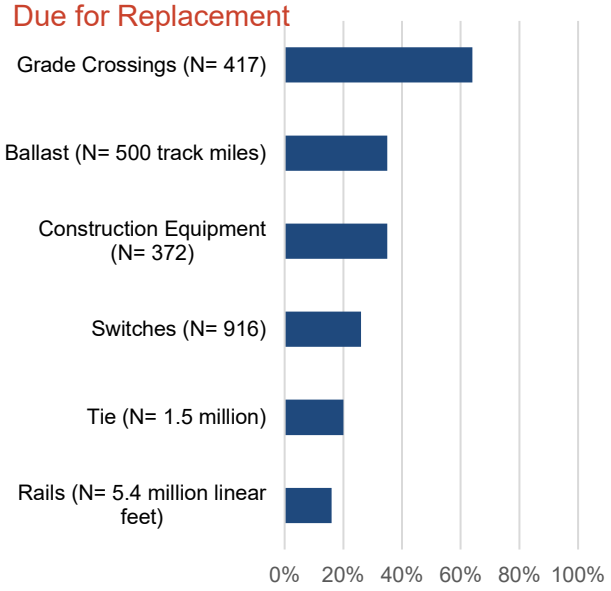
FIGURE 21
Progress of LIRR Track Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

According to the 2023 TYNA, 64 percent of grade crossings and 16 percent of rails are due for replacement (see Figure 22). Delays caused by track problems declined by 53 percent between 2019 and 2023 from 972 to 455.

FIGURE 22
LIRR Track Components — Percent Due for Replacement



Sources: Metropolitan Transportation Authority; OSC analysis

Passenger Trains

In 2013, the LIRR awarded a contract for 92 M-9 rail cars to replace the M-3 cars that were the oldest in the system. In 2017, an option for another 110 cars was exercised for a total of 202 new cars. The delivery of the cars has encountered many delays and as a result, the average age of the fleet has increased from 12- years-old in 2013 to 18 years in 2022.

The 2013 TYNA estimated that an inflation-adjusted $1.8 billion would be needed for new LIRR rail cars over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $762 million in those programs for LIRR rail cars but as of December 2023, there have not been any LIRR rail car projects completed but $614 million has been committed (see Figure 23) and the M-9 cars are currently being delivered. As of May 2023, the LIRR fleet included 164 M-9 cars and the LIRR expects to receive an additional 38 cars by early 2024. OSC recently released an update to its audit on the M- 9 procurement.

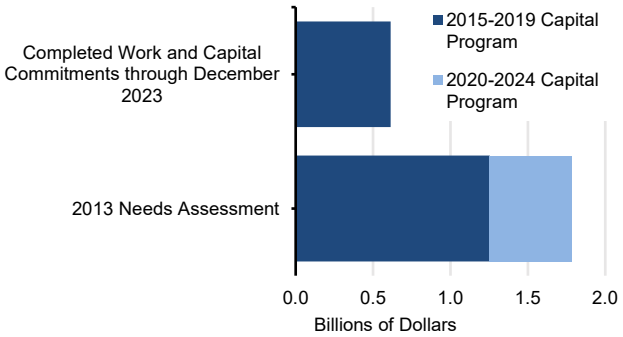
The MDBF for LIRR train cars improved over the past four years from 151,950 miles in October 2019 to 193,968 miles in October 2023 as the new cars were being introduced. The 2023 TYNA expects the MTA to complete the replacement of the M-3 cars, keep with the normal replacement of the fleet as well as expand the fleet to support increases in service made possible by the opening of Grand Central Madison.

Power

The LIRR has 129 electric substations that help power the system and allow the electric fleet to operate. More than half of the substations were constructed in the early 1970s and are past their useful life of 35 years.

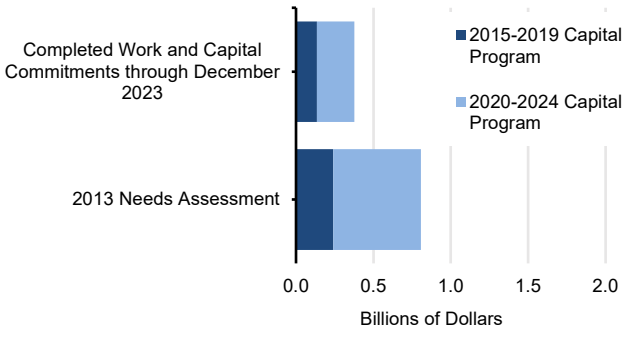
The 2013 TYNA estimated that an inflation-adjusted $807 million would be needed for LIRR power projects over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend

FIGURE 23
Progress of LIRR Rolling Stock Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

FIGURE 24
Progress of LIRR Power Projects

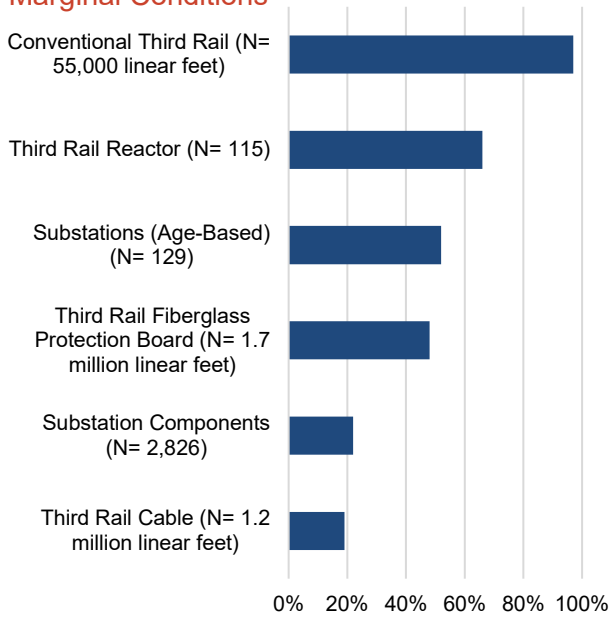


Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

projects. As of December 2023, $101 million has been spent on completed power projects and another $276 million has been committed (see Figure 24).

This disparity between what was needed and what is currently being spent for power-related assets has resulted in the increasing age of the substations as well as the declining condition of some of the electrical third rail. Although 94 percent of the LIRR's third rail is rated as in good or excellent condition as a result of replacing conventional third rail with newer aluminum or composite materials, 4 percent of the system still has conventional rail, almost all of which is in poor or marginal condition (see Figure 25).

FIGURE 25
LIRR Power Components — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

Metro-North Railroad

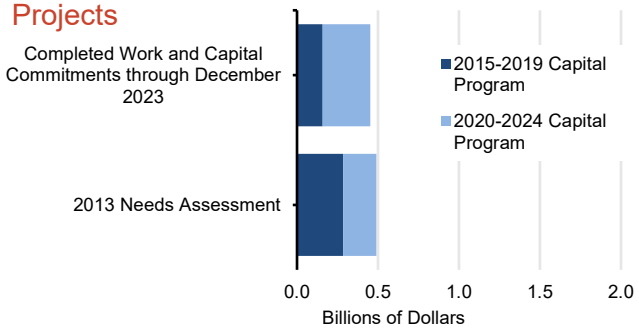
Grand Central Terminal

Metro-North Railroad operates out of its main terminal in Grand Central Terminal. Its 44 platforms and 67 operating tracks are housed in a 110-year-old train shed under Park Avenue. The train shed stretches from the terminal to East 57th Street. A tunnel under Park Avenue from East 57th Street to East 97th Street leads to and from the terminal. There is also the elevated Park Avenue Viaduct that carries trains north of East 97th Street that has historically been included in Metro-North's tracks and structures capital element so is not included in this analysis.

The 2013 TYNA estimated that an inflation-adjusted $490 million would be needed for Grand Central Terminal projects over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $551 million on those programs for Grand Central. As of December 2023, $80 million of this amount has been spent on completed station projects and another $371 million has been committed including the first work to repair the train shed (see Figure 26).

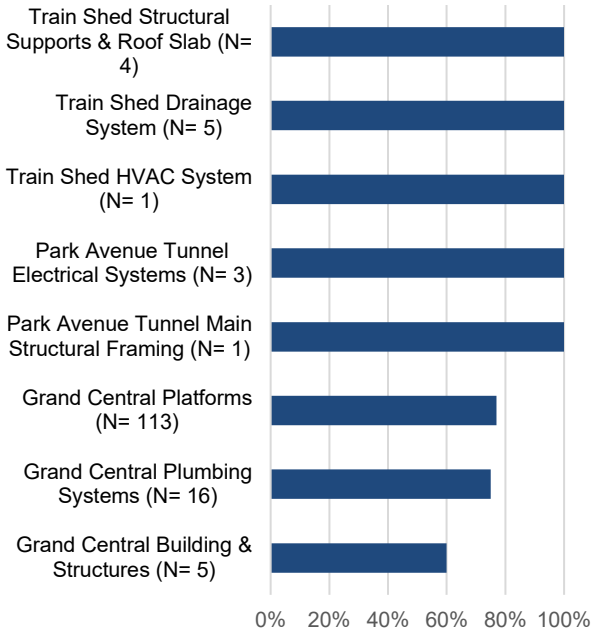
According to the 2023 TYNA, 100 percent of the train shed's structural supports and roof slab, drainage system and HVAC system is in poor or marginal condition, and more than 80 percent of

FIGURE 26
Progress of Metro-North Grand Central Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

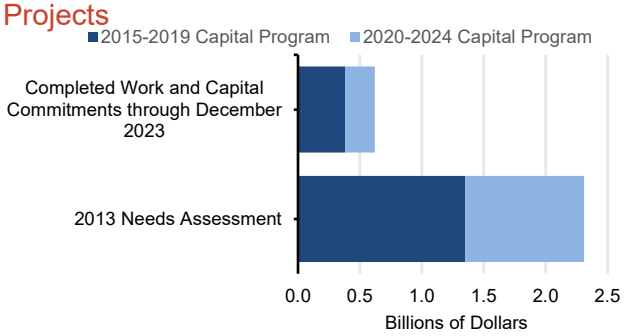
FIGURE 27
Grand Central Terminal — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

the train shed's main bridge structural framing and waterproofing system is in a similar condition. As a result, this is one of the MTA's most pressing priorities needed to be funded in future capital programs. The MTA estimates that the total cost of repairing the train shed could be $2.7 billion over 15 years. Almost all of the components in the Park Avenue Tunnel are in poor and marginal condition as well. Platforms at Grand Central are at 77 percent in poor or marginal condition (see Figure 27).

FIGURE 28
Progress of Metro-North Rolling Stock Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

Passenger Trains

Metro-North Railroad currently has 626 Electric Multiple Unit rail cars of which 142 are past their useful life. The average age of the fleet grew from 15-years-old in 2013 to 19 years in 2023. Metro-North also has 225 coaches that are pushed or pulled by 48 locomotives. The 2013 TYNA estimated that an inflation-adjusted $2.3 billion would be needed for new Metro-North rail cars over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $1.1 billion on those programs for Metro-North rail cars but as of December 2023, just $2.5 million has been spent on completed rail car projects but $618 million has been committed (see Figure 28).

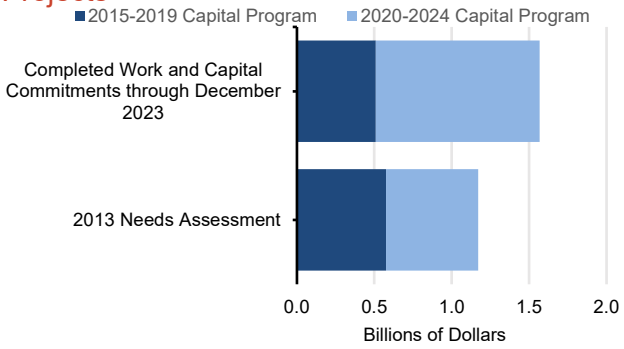
Over the next 20 years, Metro-North will need to replace over half of the fleet to keep its electric train cars within their useful life of 40 years.

Track and Structures

The Metro-North system in New York is composed of more than 1,000 miles of rails. In addition, there are 494 bridges which allow trains to travel over or under obstacles and 189 culverts which are designed to allow water to flow underneath to manage drainage and prevent flooding. Metro-North has developed a cyclical program of track rehabilitation and replacement that maintains track structure components and switch facilities in proper operating condition.

The 2013 TYNA estimated that an inflation-adjusted $1.2 billion would be needed for Metro-North tracks and structures over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $1.8 billion on those programs for Metro-North tracks and structures but as of December 2023, $336 million has been spent on completed track and structure projects and another $1.2 billion has been committed including $839 million of work on a segment of the Park Avenue Viaduct (see Figure 29).

FIGURE 29
Progress of Metro-North Track and Structure Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

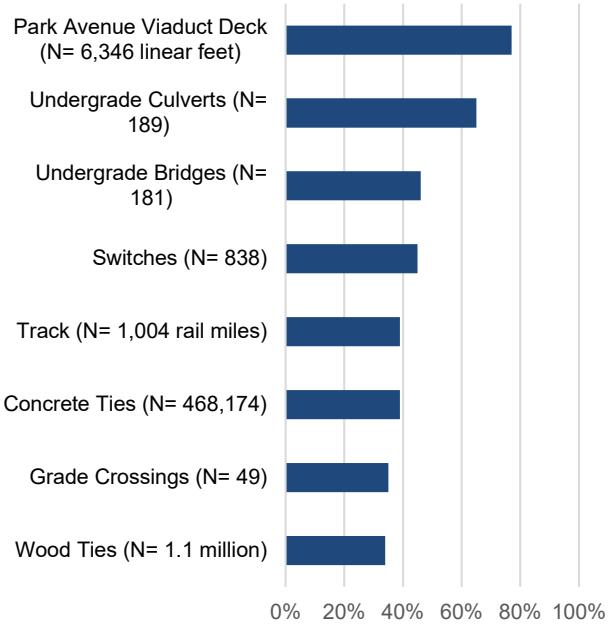
According to the 2023 TYNA, 77 percent of the components on the Park Avenue Viaduct are in poor or marginal condition and 65 percent of culverts are in poor or marginal condition (see Figure 30). Thirty-nine percent of rail miles of track is in such condition. Delays caused by track problems declined by 79 percent between 2019 and 2023 from 1,700 to 360.

Communications and Signals

The Metro-North system in New York is composed of more than 230 miles of signals and its communication systems are connected by approximately 300 miles of fiber optic cables.

The 2013 TYNA estimated that an inflation-adjusted $772 million would be needed for Metro-North communications and signals over the 2015-2019 and 2020-2024 capital programs. The MTA plans to spend $468 million on those programs

FIGURE 30
Metro-North Track and Structures — Poor or Marginal Conditions

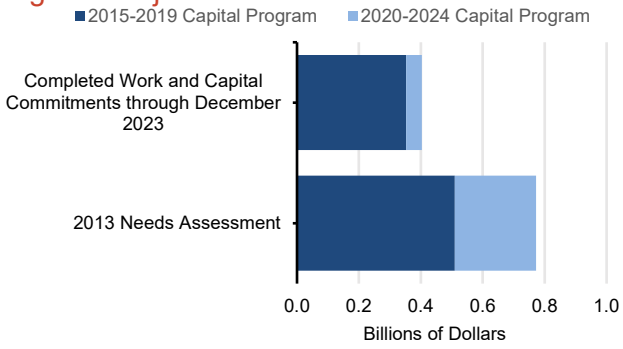


Sources: Metropolitan Transportation Authority; OSC analysis

for Metro-North communications and signals but as of December 2023, $249 million has been spent on completed communications and signals projects and another $153 million has been committed (see Figure 31).

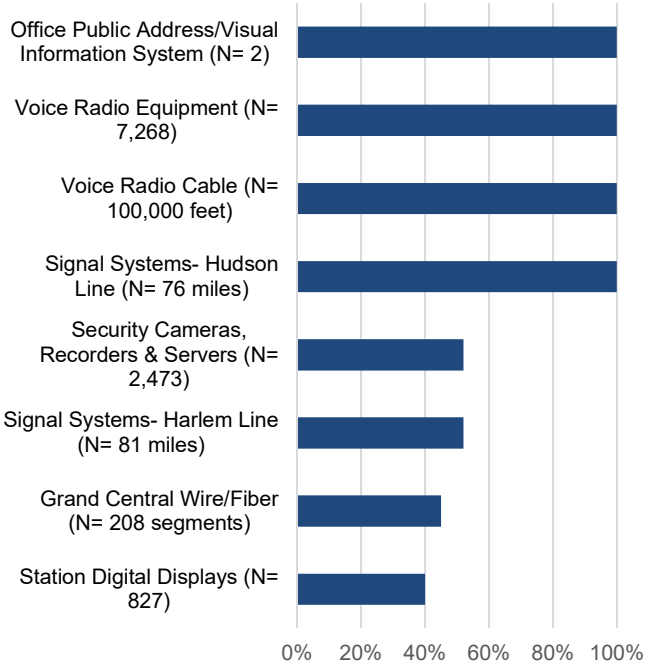
According to the 2023 TYNA, 100 percent of Metro-North's office public address and visual information systems and voice radio equipment and radio cable are in poor or marginal condition

FIGURE 31
Progress of Metro-North Communications and Signals Projects



Note: Needs assessment totals are adjusted for inflation.
Sources: Metropolitan Transportation Authority; OSC analysis

FIGURE 32
Metro-North Communications and Signals — Poor or Marginal Conditions



Sources: Metropolitan Transportation Authority; OSC analysis

as well as 100 percent of the signals on the Hudson Line (see Figure 32). More than 50 percent of the security cameras, recorders and servers and the signals on the Harlem Line are in similar condition. (None of the 14 miles of signals on the New Haven Line in New York State are in poor or marginal condition. The State of Connecticut is responsible for the capital needs of the rest of the New Haven Line).

Outlook

The release of the 2023 TYNA kicks off the MTA's capital planning process, which is critical in maintaining the system and enhancing the ridership experience. OSC has suggested the Authority must remain focused on enhancing safety, reliability and frequency of service; deterioration of assets is antithetical to these goals.

The MTA has taken steps to improve service through customer-focused initiatives such as real-time arrival time projects and increased accessibility as well as improving resilience of its system; future capital investment will be critical to maintaining that focus. The TYNA lays out, in an unconstrained manner, the MTA's still substantial capital needs making plain that additional funding will be needed to continue making progress to reduce the backlog of needed work. A review of capital spending, dollar cost needs and the condition of components of the system require more to be done to ensure the system can continue to work towards its goals in a cost-efficient manner, which will be especially important in a difficult funding environment.

Certain aspects of the subway system, such as stations, line structures and track, have seen or are expected to see investment that is at or nearly commensurate with needs outlined over the 10-year analysis period. In contrast, investment has lagged for certain assets, including depots, shops, yards and signals (which still lag needs substantially despite significant dollar investment). Metro-North requires major investments to replace assets that were restored to a state of good repair after Metro-North was formed in 1983 to save commuter rail service north of New York City. In addition, deficiencies to Penn Station platform and announcement systems and Grand Central Terminal's train shed remain high amid efforts to bring more trains into each station in the coming years.

The MTA has pointed out that given their historically constrained capital funding, dificult tradeoffs are necessary when making investment choices when developing capital programs. To further transparency, the MTA should explain, if it occurs, why it decides to fund investments in other areas instead of making investments where asset component conditions are in the most poor or marginal conditions. If the MTA fails to make investments in these components, it may face safety issues or structural breakdowns that could lead to longer-term issues in the system.

The MTA should also continue to align capital spending with operating indicators of ridership safety and reliability. The TYNA lays out in general what is necessary to increase the resilience of the MTA system against the effects of climate change but again it is difficult to determine the extent of the work needed or the estimated cost, particularly at the asset component level. The MTA expects to issue an update to its 2019 resiliency report in the coming months that will review the progress that has been made since that time and what is needed in the future.

Additional information should be publicized early in the process of developing the 2025-2029 capital program so the public can understand what is needed to be done in the short term and what can be put off to later capital programs and why.

When the MTA releases its proposed 2025-2029 program, it should also show how what is proposed will improve the assets in poor or marginal condition so the public understands what progress is being made to bring all components into good working condition. Repair projects included in the next capital plan should directly align with the share of the asset components that would be retuned to good condition. In addition, future TYNAs should continue to use the standard of poor and marginal condition to track progress towards state of good repair over time.

Despite the largest capital plan on record in 2020-2024, the MTA still has substantial needs when considering the conditions of components of the system. It is imperative that the MTA inform all stakeholders, as early as possible before the 2025-2029 capital program is proposed in September 2024, what projects need to be included and how much funding from non-MTA sources will be needed. The start of prior MTA capital programs was delayed by as much as 18 months when funding details were not worked out early enough for needed projects to be started, even as the system continued to deteriorate.

Prepared by the Office of the State Deputy Comptroller for the City of New York

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