



Needs and Wants

What to Look for in the MTA's Twenty-Year Needs Assessment

September 2023





FOREWORD

Founded in 1932, the Citizens Budget Commission (CBC) is a nonprofit, nonpartisan civic think tank and watchdog devoted to influencing constructive change in the finances, services, and policies of New York State and New York City governments. A major activity of CBC is conducting research on the financial and management practices of State and the City authorities.

This report was prepared under the auspices of the Transportation Committee, which I chair. The other committee members are: Kojo Asiedu, Jay Badame, John Breit, Thomas Brodsky, Robert Burch, Lawrence Bottenwieser, Michael Cassidy, Peter Cipriano, Laura Colacurcio, Robert Dailey, Douglas Durst, Jake Elghanayan, Pepe Finn, William Floyd, Bud Gibbs, Kirk Gravely, Jack Gutt, Peter Hein, Peter Hein, Jr, Kent Hiteshew, David Javdan, Elias Kefalidis, Gregory Kelly, Tom Kennedy, David Kiley, Margaux Knee, Robert Krinsky, Christopher Larsen, William Levine, Mayra Linares-Garcia, James Lipscomb, Anthony Mannarino, Nicholas Martin, James Normile, Charles John O'Byrne, Edward Piccinich, Laura Porter, Kevin Rampe, Juan Reyes, Carol Rosenthal, Eric Rothman, Tom Rousakis, Brian Sanvidge, Timothy Sheehan, Aaron Shirian, Monica Slater Stokes, John Williams, and Marissa Shorenstein, *ex-officio*.

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A draft of this report was reviewed by staff of the Metropolitan Transportation Authority. CBC greatly appreciates their feedback, which reflected their expertise and commitment to their organizations' goals; their participation is not an endorsement of the report's findings or recommendations.

Kenneth Gibbs, Chair



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EXECUTIVE SUMMARY

A stable, well-functioning, efficient, and accessible transit system is critical to the economy of New York City and the region, and to New Yorkers' quality of life. Sufficient and appropriately prioritized capital investment is needed to ensure the system is in a state of good repair, is reliable, does not cost too much to maintain, is modernized, and serves New Yorkers robustly and equitably.

To help determine its capital investments, the Metropolitan Transportation Authority (MTA) conducts a twenty-year capital needs assessment and then develops a five-year capital plan that lays out its planned spending and resources. This process has not always been methodical. Even with substantial improvements over the last 40 years, the needs assessments have not always been public nor included the information needed to best facilitate decisions by MTA leadership and input from the public and policy makers.

Given policy priorities and the constraints of available funding, contracting capacity, and possibly contractor or goods availability, after the needs assessment, the MTA develops and issues its five-year capital plan. The plan identifies available resources and capacity and prioritizes possible capital projects based on these constraints and the system's needs.

Based on analysis of past needs assessments, this report recommends how the MTA should improve its forthcoming Twenty-Year Needs Assessment (TYNA). The MTA recently has focused on enhancing its asset management system, which should provide more and better foundational data for the upcoming TYNA. While some of the Citizens Budget Commission's (CBC) recommendations may appear ambitious, given the real-world constraints in resources, contracting, management, and vendor capacity, choices among competing priorities must be made. This prioritization process requires the detailed data and analyses recommended here. Fortunately, the MTA still has a full year before it plans to release its 2025 to 2029 capital plan. During that time, the MTA can release additional data and analyses to inform the capital plan prioritization process.

Findings

- **Capital needs assessments were not comprehensive:** By prematurely winnowing selections, past TYNAs masked investment choices MTA leadership already made and obscured the true scope of need;
- **Data were aggregated at too high a level:** Over-aggregation denied policy makers and New Yorkers the necessary information to fully participate in a substantive discussion about prioritizing investments and making trade-offs during the capital planning process;
- **Changes in needs were not reconciled across TYNAs:** TYNAs provided a snapshot of needs at one point in time but did not show how needs changed over time. Reconciliation is critical to understand the impact of prior investments and the expected impact of future investments;

- **Identified needs were not tied to performance goals and the impact of investment:** To determine the needed investment in each asset, it is important to identify what its performance should be and how proposed investments would affect performance; and
- **Projections of future demand lacked key details:** Decisions about investment levels and priorities should be driven in part by expected changes in population, employment, and travel behavior and demand. Prior TYNAs did not provide sufficient detail.

Recommendations

To ensure the upcoming TYNA provides the necessary data and analysis for planning and prioritization, healthy public debate, and accountability, CBC recommends that it:

- **Include a complete accounting of the system’s current and potential future capacity needs:** The TYNA should be a complete accounting of system’s needs that does not prematurely omit anything. All options should be on the table, allowing MTA leadership, the public, and policy makers to provide input and make rational and data-driven choices. The five-year capital plan—not the TYNA—is the correct venue to prioritize projects based on constraints including funding.
- **Disaggregate data to the functional group and component level:** Disaggregating needs down to the functional group and component level is essential for the MTA to appropriately prioritize projects and to better inform public discussion. CBC encourages some grouping—for example, ventilation systems or elevators—but not so much aggregation as to hamper the quality of MTA decisions and vibrant and critical debate.
- **Include data on asset condition, needs, cost, and improvement timeframes:** The TYNA should detail condition, and cost and time needed to achieve a state of good repair for each investment category, functional group, and component. That means including data on the quantity of a given asset, the condition and distribution of need across the system, its useful life and average age, the method the MTA uses to determine a state of good repair, and cost and time needed to bring it to a state of good repair so that it can be on a normal replacement cycle.
- **Detail all projects’ benefits and costs based on rigorous analysis, standard measures, and MTA goals:** The MTA should rigorously estimate the benefits and costs associated with addressing each asset’s need, each potential expansion project, and each system improvement. The authority should standardize metrics to: a) identify the net benefit of each project, and b) bring transparency to the choices among investments, including between state of good repair work and network expansion.
- **Provide clear and complete data on future transportation needs:** Though projections are naturally imperfect, they are essential for long-term planning to be grounded in the best available data of needs, costs, and benefits. This upcoming TYNA should include detailed information about future service needs based on projected economic changes and user behavior, recognizing that there are forecast risks especially in this moment, given radical changes in technology and commuting patterns.



INTRODUCTION

A stable, well-functioning, efficient, and accessible transit system is critical to the economy of New York City and the region and to New Yorkers' quality of life. Sufficient and appropriately prioritized capital investment is needed to ensure the system is in a state of good repair, is reliable, does not cost too much to maintain, is modernized, and serves New Yorkers robustly and equitably.

To help determine its capital investments, the MTA conducts a capital needs assessment and then develops a five-year capital plan that lays out its planned spending and resources. This process has not always been methodical. Even with substantial improvements over the last 40 years, the needs assessments have not always been public nor included the information needed to best facilitate decisions by MTA leadership and input from the public and policy makers.

Overview of the Twenty-Year Needs Assessment and MTA Capital Process

The Twenty-Year Needs Assessment (TYNA) is a foundational step in the MTA's multi-step capital asset assessment, planning, lifecycle-preservation, and improvement process. As the foundation that provides needed information for capital planning and prioritization, ideally the TYNA should quantify the current state of the transit system's assets and its capital needs, as well as the information needed to consider system improvements and expansion. It should include all the data and analyses that stakeholders—MTA leadership, policy makers, and the public—need to decide or advocate for what should be done to maintain and improve the transit system, both for the near term and the long run.¹

Following the TYNA release the MTA shifts to the capital planning process, where policy and economic constraints of available funding, contracting capacity, and possibly contractor or goods availability come into play. Therefore, the capital planning process identifies available resources and capacity, and prioritizes possible capital projects based on these constraints and the system's needs.²

This process and the needs assessments date back to 1980 when the MTA released the *Staff Report on the Capital Revitalization for the 1980's and Beyond (Staff Report)*, which laid bare the grim condition of the system following a period of disinvestment.³ This assessment informed development of the MTA's first statutorily required five-year capital plan, for 1982-1986. In 1984, the MTA released an update to the *Staff Report* that quantified the needs for a ten-year period, from 1984 to 1993 and for the upcoming five-year capital plan, 1987-1991. In 1986, the MTA issued the first TYNA, covering 1987 to 2006. TYNAs were released periodically thereafter, but not on a consistent timeline.⁴

In 2018, the MTA did not release a 2019-2039 TYNA, although it reports conducting some assessment. In response to the skipped release, the New York State Legislature codified TYNA requirements, including submission to the MTA Capital Program Review Board by October 1, 2023, and every five years thereafter.⁵

Capital Needs Codes

The MTA classifies its capital needs and work into six groups.⁶ (See Table 1.) The MTA's goal is to keep assets in a State of Good Repair (SGR). Asset replacement within an asset's useful life is categorized as Normal Replacement (NR).⁷ When replacement occurs after an asset exceeds its useful life, it is no longer in a state of good repair; its repair or replacement is categorized as SGR. Thus, SGR is used both to describe the condition of an asset as well as a group of capital needs and projects.

Useful life can be overly simplistic for determining whether an asset is in an SGR because it does not consider the actual component's condition or performance. Some assets continue to be functional and need not be replaced before the end of their useful life, while others may degrade before the end of their useful life and should be repaired or replaced earlier. The NYCT publicly refined its definition of SGR as a function of three factors—asset condition, asset age relative to useful life, and asset performance—for certain assets.⁸

System Improvement (SI) projects enhance the network through new capabilities and improvements to the customer experience. Network Expansion (NE) projects increase existing or create new services or capacity. Some capital projects can and do accomplish multiple goals; overlapping projects may be classified as various (VAR).

Table 1: MTA Needs Codes

Needs Code	Description
State of Good Repair (SGR)	Either renew/replace assets that surpassed useful life (for most assets for most MTA agencies), or for NYC Transit (and some assets for other agencies): 1) asset condition 2) asset age vs useful life 3) asset performance vs identifiable performance standard
Normal Replacement (NR)	Renew/replace assets near their useful life
System Improvement (SI)	Enhances assets; new capabilities and improved customer experience
Network Expansion (NE)	New network capacity
Various (VAR)	Projects meet multiple goals
Administrative	Needs for certain functions, such as insurance or scope development are not assigned needs codes

Note: SGR definitions based on *Twenty-Year Needs Assessment for 2010-2029*, but MTA reports all agencies use more nuanced definitions for certain assets.

Source: Metropolitan Transportation Authority, *Project Listings for Amendment No. 3 in Excel format* (June 2023, access September 7, 2023), <https://new.mta.info/document/114176>.



PRIOR TYNAS HAVE BEEN INSUFFICIENT TO INFORM A ROBUST PLANNING PROCESS

The content and format of the MTA's previous TYNAs varied, but they typically provided:

- A summary list of assets grouped by investment category;
- An assessment of the share of each investment category in a SGR;
- An estimated valuation of aggregated needs over the next twenty years, in five-year windows; and
- A narrative description of conditions and needs by investment category.

Investment categories are broad groups of similar assets, such as passenger stations, buses, and signals for New York City Transit (NYCT), rolling stock, track, and power for Long Island Rail Road (LIRR) and Metro-North Railroad (MNR), buses and depots for the MTA Bus Company, and roadway, decks, structures, and painting for the MTA Bridges and Tunnels.

Five shortcomings of the prior TYNAs reduced their usefulness for planning and prioritizing capital investments. Specifically:

1. Capital needs assessments were not comprehensive;
2. Data were aggregated at too high a level;
3. Changes in needs were not reconciled across TYNAs;
4. Performance goals, targets, and impact were lacking; and
5. Projections of future demand lacked key details.

Capital Needs Assessments Were Not Comprehensive

Rather than identifying the full scope of the system's needs, prior TYNAs presented a subset of identified needs. For example, the 2015 TYNA included a "Summary Table of Continuing Needs" and stated, "On a fully unconstrained basis, the agencies' needs are even greater than what is included in this assessment since more backlogged state of good repair needs exist than can be implemented."⁹ (See Table 2.)

Table 2: MTA Summary of Continuing Needs: 2015-2034
(2012 dollars in millions)

AGENCY	2015-2019	2020-2024	2025-2029	2030-2034	TOTAL
NYC Transit	\$16,256	\$16,703	\$19,472	\$15,807	\$68,237
Long Island Rail Road	\$3,459	\$3,244	\$3,627	\$3,074	\$13,404
Metro-North Railroad	\$3,451	\$2,222	\$1,458	\$1,805	\$8,936
MTA Bus Company	\$832	\$523	\$690	\$462	\$2,507
MTA Bridges and Tunnels	\$2,410	\$2,771	\$3,187	\$3,665	\$12,033
MTA Police and Security	\$199	\$150	\$140	\$125	\$614
TOTAL	\$26,607	\$25,613	\$28,574	\$24,938	\$105,731

Source: Metropolitan Transportation Authority, MTA Twenty-Year Capital Needs Assessment, 2015-2034 (October 2013).

Prioritizing possible investments should be a function of the five-year capital plan. Premature winnowing does not provide policy makers or the public with a full accounting of the current system’s needs or the costs and benefits of possible improvements and expansions. By not providing a complete accounting of the system’s full need and condition, prior TYNAs masked investment choices MTA leadership already made, excluding them from scrutiny and debate. For example, instead of the \$16.3 billion reported in Table 2, were the 2015-2019 continuing needs for NYC Transit \$18.0 billion, \$22.0 billion, or some other amount? Which of the various investment categories—stations, tracks, cars, or something else—needed greater investment than reported, for what, and what will be the impact of the investment gap?

Data Were Aggregated at Too High a Level

While TYNAs included substantial information on the system and its needs, the data were too highly aggregated. (See Table 3.) Failing to provide more details inhibited understanding of the state of repair and need at important units of function. While the MTA likely had more disaggregated data internally, it did not disclose it publicly. Furthermore, the lack of publicly available data limited New Yorkers’ and policy makers’ understanding of the system’s needs and made it impossible to have a fully informed discussion of the necessary trade-offs and choices during the capital planning process.

Table 3: MTA NYC Transit Summary of Continuing Needs: 2015-2034
(2012 dollars in millions)

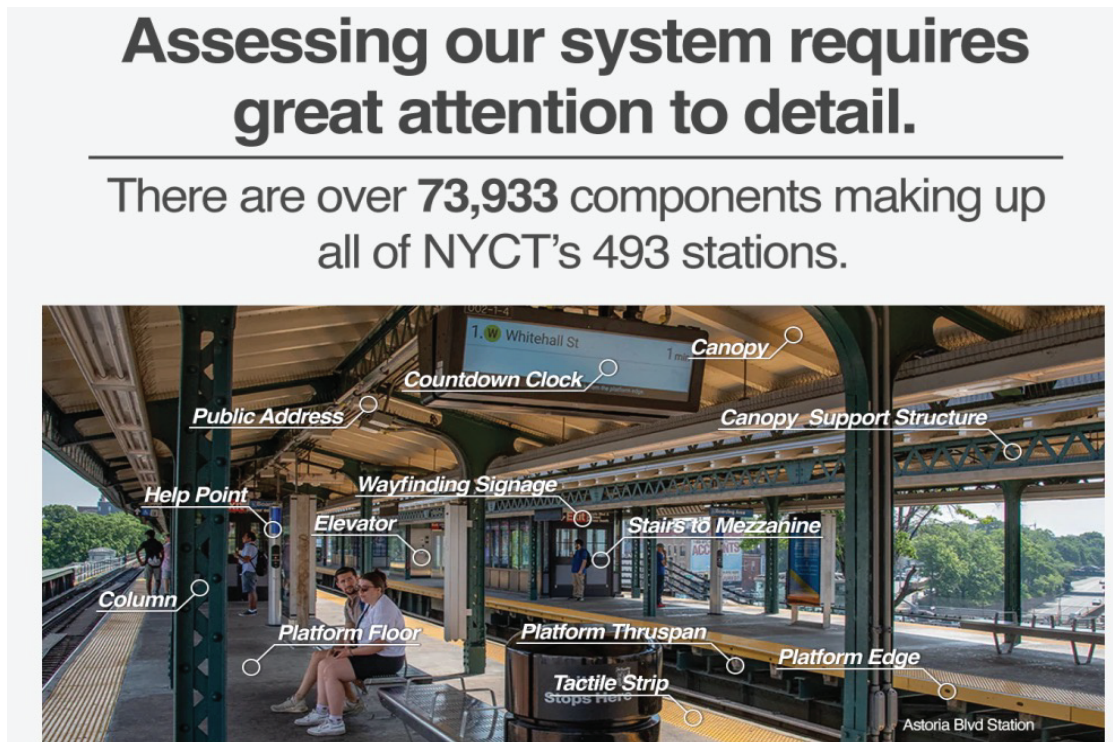
INVESTMENT CATEGORY	2015-2019	2020-2024	2025-2029	2030-2034	TOTAL
Subway Cars	\$2,717	\$1,920	\$3,789	\$0	\$8,426
Buses	\$1,150	\$1,661	\$1,841	\$1,538	\$6,190
Passenger Stations	\$2,256	\$2,350	\$2,443	\$2,400	\$9,449
Track	\$1,450	\$1,426	\$1,406	\$1,390	\$5,671
Line Equipment	\$882	\$765	\$835	\$957	\$3,439
Line Structures	\$792	\$767	\$640	\$816	\$3,015
Signals	\$3,050	\$3,837	\$4,366	\$4,357	\$15,610
Communications	\$944	\$365	\$765	\$570	\$2,644
Traction Power	\$681	\$914	\$854	\$651	\$3,100
Shops & Yards	\$396	\$847	\$606	\$624	\$2,473
Depots	\$669	\$597	\$448	\$558	\$2,271
Service Vehicles	\$409	\$102	\$93	\$110	\$714
Passenger Security	\$19	\$29	\$4	\$4	\$56
Added Capacity	\$0	\$0	\$500	\$1,000	\$1,500
Miscellaneous/Emergency	\$730	\$892	\$734	\$712	\$3,068
Staten Island Railway	\$111	\$231	\$147	\$120	\$609
TOTAL	\$16,256	\$16,703	\$19,472	\$15,807	\$68,237

Source: Metropolitan Transportation Authority, MTA Twenty-Year Capital Needs Assessment, 2015-2034 (October 2013).

For example, the TYNAs qualitatively explained that some passenger station components were among the most deficient assets systemwide but did not present disaggregated data quantitatively describing the components' current condition, the distribution of need for components, the cost, and time needed to bring them to a state of good repair, or the impact of the reported conditions on service delivery.

The estimated cost for passenger station continuing needs between 2015 and 2034 was \$9.4 billion. Seventy-eight percent of stations were rated as being in good repair, based on an assessment of the various components of stations; the TYNA states that of the 14,000 station components rated in condition surveys, 22 percent were rated a 3.0 or worse (on a five-point scale from 1.0 being the best to 5.0 being the worst). However, the TYNA for 2015 to 2034 did not present the component detail and tie it to the high-level assessment that 78 percent were in good repair. Specifically, the TYNA did not include a list of station components (such as public address systems, platform elements, canopies, or ventilation systems), the SGR share for each component, the associated capital need, or the results of the referenced 2007 and 2012 station condition surveys.¹⁰ Fortunately, the MTA now appears focused on disaggregating the component data, as evidenced by a graphic on their current TYNA website. (See Figure 1.)

Figure 1: MTA TYNA Station Components



Source: Metropolitan Transportation Authority, MTA Twenty-Year Capital Needs Assessment (accessed September 7, 2023), <https://new.mta.info/20YN>.

Some of this additional detail can be found in the MTA's Transit Asset Management Plan (TAMP), required by the U.S. Department of Transportation.¹¹ The TAMP sets definitions for state of good repair for different types of assets, while also allowing transit agencies to customize them. For facilities, such as passenger stations, assets are rated on a 5-point condition scale, with 1.0 the worse and 5.0 the best (the MTA and TAMP scales are reversed).¹² Facilities rated a less than 3.0 are not in a state of good repair, while those rated 3.0 or higher are. This assessment is then presented as the percent of each facility group that is not in a state of good repair. The MTA's 2019 TAMP included information about its passenger stations and the distribution of needs over time and across categories of specific elements.¹³ For example, 99 percent of lighting, 84 percent of stairs, 56 percent of platforms, and 36 percent of platform edges were in an SGR.

Furthermore, some data in the TYNAs were presented without the context needed to understand their relevance to the system's condition or needs. For example, the NYCT communications section of the 2015 to 2034 assessment reported that the "network is supported by 472 miles of fiber optic cable."¹⁴ Without contextualizing within a complete assessment of the NYCT transit communication network condition and need—how much cable was needed, the existing cable's condition, and the time and cost to maintain the cable in a SGR—this information cannot be used to help prioritize capital investments and identify the benefits of that investment or deficiencies if it is not made.

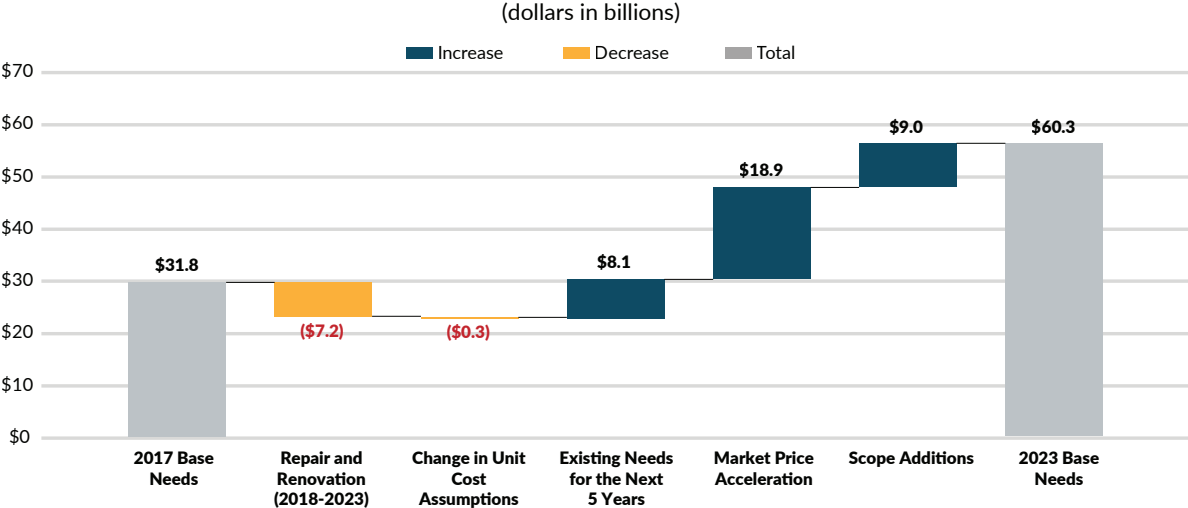
Lastly, the TYNAs often did not provide geographic information, so needs by community were not available. For example, information showing whether passenger station deficiencies varied across neighborhoods or how those differentially affected travel experiences was absent. Without geographic information, communities cannot identify the needs in their neighborhood, or how they compare to conditions across the system.

Changes in Needs Were Not Reconciled Across TYNAs

Each TYNA provided its point in time estimate of the system's needs. However, each was not connected to or reconciled with the prior TYNA. Such a reconciliation—reporting the state of the system previously, the investment made in the intervening period and its impact, declines due to deterioration, the current state of the system, and new needs—is critical to understanding the impact of investments and the system's changes in state of repair, modernization, or capacity.

A reconciliation could take many forms. The New York City Housing Authority's Physical Needs Assessment, released August 2023, provides an illustrative example.¹⁵ Its charts explain how the \$31.8 billion base capital needs in 2017 increased to \$60.3 billion in 2023. (See Figure 2.) While \$7.5 billion in 2017 base needs had been addressed through capital investments or reduced by changes in unit costs, capital needs increased by another \$36.0 billion, due to capital needs in the next 5 years (\$8.1 billion), price escalation (\$18.9 billion), and newly added investment areas (\$9.0 billion).

Figure 2: New York City Housing Authority's Change in Five-Year Capital Needs, 2017 to 2023



Source: New York City Housing Authority, *New York City Housing Authority 2023 Physical Needs Assessment Final Report* (prepared by NYCHA PNA 2023 JV: | AECOM, June 2023).

Identified Needs Were Not Tied to Performance Goals and Impact of Investment

Achieving the MTA’s desired service volume, efficiency, reliability, access, and quality goals requires having the right quantity and mix of capital assets in a sufficient SGR. Specifying the expected performance of an asset or a service—its performance goals—is essential to accurately identify the investment needed to achieve the condition that delivers that level of service. Without data on how investments affect performance, it is difficult to effectively prioritize investment decisions to maximize benefits in the next phase of the capital process.

Past TYNAs have not quantified the investment needed to achieve the system’s performance goals, nor the impact of specific investments and levels of investment on system performance. For current assets, the core method of determining need was based on achieving a state of good repair, without directly connecting condition and investment to service delivery and quality.

The need for rolling stock, for example, was based on SGR and useful life, but was not tied to a reliability service target, which is most often measured by mean distance between failures (MDBF, or how far subway cars, train cars, or buses run before needing maintenance or repairs). MTA performance metrics currently report MDBF of 127,602 miles for subway cars, 220,611 miles for LIRR train cars and 309,313 miles for MNR train cars. The TYNA, however, did not specify the target MDBF for each system, or whether the rehabilitation or replacement needs for buses and rolling stock over the next twenty years would be sufficient to achieve those targets. Conversely, it did not quantify the impact on MDBF and service quality and reliability if investments were not made. The TYNAs also do not provide the MDBF of different classes of rolling stock within a travel mode, such as subways, buses, or commuter rail, which could help the public better understand the importance of replacing older rolling stock on service reliability.

Further, the 2013 TYNA identified 5-year NYCT needs of \$3.0 billion for signals and \$2.7 billion for subway cars. However, it did not estimate the impact of those investments on meeting performance goals, or the impact on performance were those investments only partially made. If the MTA invested \$3.0 billion in signals, how much would average speeds increase, how much time would the average commuter save; if this investment was not made, what would be the expected increase in travel time as signals degraded further. Conversely, what was the projected average age of the subway rolling stock with and without a \$2.7 billion investment in subway cars. This information is needed to compare and choose projects when developing the five-year capital plan.

Projections of Future Demand Lacked Key Details

The capital needs and desires for a transit system—for current infrastructure, modernized systems, and expanded capacity—depend on projections of future demand. Decisions about investment levels and priorities should partially depend on expected changes in population, economic activity, environmental risks, and—very importantly—travel behavior and demand, among other factors.

While past TYNAs have provided some relevant information, including projected growth in the population, labor force, and employment, and their impact on travel demand, TYNAs did not paint a sufficiently complete picture of future demands of the transit system. Travel demand increases were presented regionally and only included the aggregate percent increased demand in select areas. Greater detail on the timing of ridership usage, mode split (bus, subway, rail, paratransit), transit volume, and geographic distribution was absent.

Disaggregated data are especially critical when comparing potential network expansion projects. However, this information is also important when choosing to allocate resources among SGR and NR projects. For example, knowing the aggregate and per-person travel time savings for both a potential investment in tracks and signal, and the impact of the same investment in expanding the network, helps identify the tradeoffs and facilitate policy makers' choices. Still, some core infrastructure investment is more difficult to tie to proximate service impact; therefore, it may be important to prioritize some aspects of the system based on the need to achieve and maintain the system in a state of good repair. Furthermore, this level of analysis and detail better inform equity-focused decisions.

Past TYNAs included limited discussion of forecasting methods and forecast uncertainty. The TYNA estimates were based on long-range forecasts of the region's economy and the impact of that projected economic growth on transit demands. The TYNA did not include a detailed description of the methodology and its assumptions. Furthermore, given the challenges in forecasting, the TYNA also did not identify the risks around the forecast; for example, how much higher or lower demand might be if projected economic growth is slower than forecasted.



RECOMMENDATIONS FOR THE UPCOMING TYNA

The upcoming TYNA should include the foundational information needed to develop a realistic, prioritized five-year capital plan and set the course for the system's long-run operational stability, efficiency, and access.

It should address the shortcomings of the prior TYNAs: an incomplete accounting of system needs, excessively high aggregation of asset condition and need, insufficient performance measures that should drive assessment of a SGR and capital needs, and too generalized projections on future transportation needs.

Including all the data and analyses recommended here in the upcoming TYNA may be ambitious. The MTA has publicly reported making significant strides in an essential step—realistically assessing and tracking the condition of its current assets, including centralizing and standardizing data and data collection. The MTA also has emphasized its focus on SGR projects given the substantial need. Lastly, the MTA reports undertaking a rigorous and systematic assessment of expansion and improvement projects, which will use standardized metrics of benefits, as well as up-to-date cost projections.

Still, much more information and analysis should be available to develop a well prioritized five-year capital plan and set the direction for the next generation. Even if the data needed to address the shortcomings of prior TYNAs are not fully included in this TYNA, the MTA has ample time before releasing its next five-year capital plan in fall of 2024 to identify and publish the data needed to facilitate optimal decision-making, prioritization, and public discussion of investment choices.

To appropriately quantify the current state of the transit system's assets, capital needs, and expansion desires for the near- and long-term, including the data and analyses stakeholders need to identify and prioritize capital investments to maintain and improve the transit, the TYNA should:

1. Include a complete accounting of the system's current and potential future capacity needs;
2. Disaggregate data to the functional group and component level;
3. Include data on asset condition, needs, cost, and improvement timeframes;
4. Detail all projects' benefits and costs based on rigorous analysis, standard measures, and MTA goals; and
5. Provide clear and complete data on future transportation needs.

Include a Complete Accounting of the System's Current and Potential Future Capacity Needs

The upcoming TYNA should provide a complete accounting of the current system's full needs, including the projected cost of bringing current assets to a state of good repair, and the costs and benefits of modernization and improvement investment. It also should include a complete accounting of all investments that would be needed for desired potential capacity expansion.

Nothing should be prematurely omitted. The only way to make choices among the options is for all those options to be on the table. The five-year capital plan—and not the TYNA—is the correct venue to prioritize projects based on constraints, including funding.

Disaggregate Data to the Functional Group and Component Level

The TYNA should provide disaggregated data to the extent practicable and helpful to decision making and an informed public debate. Disaggregating needs beyond investment category, down to the functional group and component level, would allow stakeholders to have a deeper understanding of the transit systems needs and would facilitate better-informed public discussion about investment priorities and tradeoffs.

Excessive and poorly organized data can obfuscate, just like a lack of detail. Finding the correct balance between too much and too little data is an art as well as a science. The MTA has multitudinous assets and components across its vast network and realistically cannot, and should not, provide data on every component of the system. The TYNA should group data to facilitate decision making and prioritization among projects, such as grouping components into functional groups—those that together complete a discrete activity like public address systems in subway stations.

Still, the TYNA should take care not to collapse data so much that stakeholders do not know the condition and expected needs for specific components. Furthermore, the definitions of SGR at each grouping should be transparent. The impact of a level of investment on service reliability—including whether that investment is within an asset’s useful life or after—is important to prioritize investments.

Include Data on Asset Condition, Needs, Cost, and Improvement Timeframes

The TYNA should have detailed condition, cost, and timeline data for investment categories, functional groups, and components. The TYNA serves multiple audiences and needs to be accessible to the public, policy makers, and stakeholders alike. The TYNA should include the following data elements

- Quantity and the unit of measure, such as the total number of electric trains on the LIRR and the number by model;¹⁶
- Condition, including percent and quantity in SGR;
- Severity of those not in a SGR, such as the number and share of NYCT passenger station components rated a 3.0 or higher (on 5-point scale with 1.0 being the best and 5.0 being the worst);
- Useful life and average age;
- Method used to determine SGR condition;
- Cost to bring to SGR and/or keep in normal replacement cycle; and
- Time needed to bring to SGR or keep on NR cycle.

For system improvement and network expansion projects, the TYNA should include the costs and time to complete each project over 20 years in 5-year increments. For state or good repair or normal replacement projects, the TYNA should include the 20-year need—the investment needed to either maintain normal replacement cycles, or achieve a state of good repair and get the asset on a normal replacement cycle—and the level of funding is needed over the next five years to be on that path. This will provide data especially relevant to making choices for the next five-year capital plan.

Understandably, these cost and time data would be preliminary estimates based on standardized assumptions. Actual project costs and times will be determined when projects are implemented and will be affected by how and when they are contracted; bundling projects in various ways, for example, will affect their costs and speed. However, by providing consistently based preliminary cost and time estimates, the TYNA will give a good sense of the magnitude of investment and time needed and facilitate critical comparisons among potential projects and to the actual projects if implemented.

For data where geography is relevant, contextual information is critical to understanding the quality of the infrastructure in the region's communities and working toward an equitable system. Equity, when representing any differences among groups and neighborhoods access to the same level of service, is affected by, among others, proximity, scheduled service availability, and service reliability which is affected by asset condition. Finally, the TYNA should identify the timeframes and impacts of currently planned projects from the current and prior five-year capital plans.

Detail All Projects' Benefits and Costs Based on Rigorous Analysis, Standard Measures, and MTA Performance Goals

The TYNA should include rigorous analyses that identify the benefits and costs of each investment that addresses a current need or expands the network. This would not be a wholly new activity; the MTA already regularly analyzes projects and highlights compelling data points to accompany project announcements and updates at monthly board meetings.

The TYNA cost-benefit analyses should standardize metrics—enabling transparent choices between projects, including SGR and NE.¹⁷ The TYNA also should identify the costs and benefits of not fully addressing a need. For prioritization of projects in the five-year capital plan, it is important to know the impact of investing less than the full need.

The benefits quantified should include the impact on system performance, where appropriate.¹⁸ The TYNA should tie the impact of investment or lack of investment to achieving the system's performance standards and the MTA's goals and objectives.

These cost-benefit analyses should help answer questions like:

1. What is the impact of investments on reliability and accessibility?
2. Which are the best investments to make given the various needs for scarce public funds?
3. How do the benefits and costs of all projects compare?

The analysis of benefits and costs should enable comparisons among projects, even those of different types. Comparisons are facilitated by standardizing the measures of impact. It is not enough to know how many people may be served by a network expansion project; the analysis should identify how much time people would save in total and on average. Furthermore, such an analysis should also consider additional travel time if some commuters are made worse off from a project. Similarly, since SGR projects affect the system's performance—by increasing the reliability of its infrastructure—these too will affect average and total travel time. Examples of standard benefits include impact on:

- Average and total travel time saved;
- Average headway (the interval between subways, trains, or busses);
- On-time performance;
- Number of new passengers served;
- Operating expense per passenger mile, for the line, and system; and
- MDBF for rolling stock and buses.

Standardizing metrics is especially important to be able to compare expansion projections to investments to achieve a state of good repair and maintain normal replacement cycles. Expanding the network to provide access to more people and communities is an important objective, whose benefits are often readily identified. However, these should be weighed against the needs of the existing infrastructure. In the upcoming TYNA, the MTA has said it would quantitatively assess 23 improvement and expansion projects. These data, if adequately rigorous and comparable, will be critical to deciding which, if any, of these projects should be pursued, and perhaps prioritized over some state of good repair investments given resource constraints.

Provide Clear and Complete Data on Future Transportation Needs

The TYNA should include a detailed review and analysis of economic, demographic, and environmental factors that will drive the demand for transit system. While forecasting is always important, it is especially critical now, as changes in the economy and work patterns open the door for transformative shifts in travel demands. Based on these factors, it should develop and use scenario-based models to estimate future transportation needs and desires. While the projections of future demand are imprecise—being themselves based on different projection models and assumptions—they are necessary to inform decisions on resource allocation and priorities.

Specifically, the TYNA should present the analytical methods and provide data inputs, assumptions, and modeling outputs related to needs assessments, including:

- The economic, demographic, environmental, and data and assumptions; and
- Expected travel demand, including demand by geography and mode split data for MTA-served communities.

Transparency will be well served if the sources of TYNA assumptions, data and models are clearly identified.

The TYNA's future travel demand data should include demand by geography across the network, by time of day, day of the week, and provide a common point for reference data (the current data value, the current average value for the data type, for example). Too often these data are only selectively used to justify expansion projects, rather than describe the entire system.

The future is uncertain, and even the best scenario planning cannot reliably predict all outcomes. As such, the MTA should provide the possible ranges of outcomes when uncertainty is high. This is an especially uncertain time, with remote and hybrid work changing travel, commuting patterns, and the economy. Modes are also evolving, potentially significantly, both due to cultural norms and new technologies. Including analysis or discussion of risks when relevant can also prove beneficial. These quantitative and qualitative discussions regarding the nature and sources of risk and uncertainty are useful to understanding the MTA's analysis and decision-making process.



CONCLUSION

A high-functioning, efficient public transportation network is inextricably linked to the economic well-being of New York City and the region.

While the MTA faced significant challenges during and after the pandemic, it is critical that smart decisions meet this challenging moment to ensure a successful future. The right continued investment in the transit system will be determined through a data-driven capital planning process. It will ensure the quality of the ridership experience by improving on-time performance, reducing breakdowns, restraining unnecessary maintenance costs, and ensuring the smooth functioning of things like elevators and buses. It is also necessary to determine what investments are needed now, given the uncertain but changing transportation demands in the region. This is what is needed to keep and grow ridership through this transitional moment.

Given financial and some operational constraints, investing in the right things to maximize impact is essential. A high-quality Twenty-Year Needs Assessment is essential. With a comprehensive assessment of need and richer, more detailed data, it can support deeper and more thoughtful analysis of the costs and benefits between two investments, or between investment and non-investment. Looking deeply at previous capital planning processes and decisions can reveal their impacts and provide guidance on how to do better today, and set thoughtful, data-driven performance goals for our investments into the future.



ENDNOTES

- [1] The MTA describes the TYNA as “a comprehensive strategy for the investments we need to make to rebuild and improve the existing system, and to expand and enhance the transit network.” Metropolitan Transportation Authority, “MTA’s 2025-2044 20-Year Needs Assessment” (accessed August 18, 2023), <https://new.mta.info/20YN>.
- [2] The MTA writes the TYNA “helps us prioritize investments to maximize benefits for riders and meet long-term goals.” Metropolitan Transportation Authority, “MTA’s 2025-2044 20-Year Needs Assessment” (accessed August 18, 2023), <https://new.mta.info/20YN>.
- [3] The Permanent Citizens Advisory Commission, *The Road Back (2012) and Addendum (2014): A Historic Review of the MTA Capital Program*, (2014), <https://pcac.org/app/uploads/2016/09/The-Road-Back-and-2014-Addendum.pdf>.
- [4] Additional TYNA were released 1990, 1999, 2009, and 2013.
- [5] Article 5 of New York Public Authorities Law, § 1269-C (2019).
- [6] Metropolitan Transportation Authority, *MTA Capital Program 2020-2024*, (September 2019), <https://new.mta.info/document/10511>.
- [7] The Federal Transit Administration provides specific benchmark ratings for transit assets and defines useful life as “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.” U.S. Department of Transportation, Federal Transit Administration, “Performance Management” (accessed September 7, 2023), www.transit.dot.gov/PerformanceManagement.
- [8] Metropolitan Transportation Authority, *Twenty-Year Capital Needs Assessment: 2010-2029* (August 2009).
- [9] Metropolitan Transportation Authority, *Twenty-Year Capital Needs Assessment: 2015-2034* (October 2013), <https://new.mta.info/document/11976><https://new.mta.info/document/11976>.
- [10] Metropolitan Transportation Authority, *Twenty-Year Capital Needs Assessment: 2015-2034* (October 2013), <https://new.mta.info/document/11976><https://new.mta.info/document/11976>.
- [11] U.S. Department of Transportation, Federal Transit Administration, “Performance Management” (accessed September 7, 2023), www.transit.dot.gov/PerformanceManagement.
- [12] U.S. Department of Transportation, Federal Transit Administration, *Transit Asset Management: TAM Performance Measures* (October 2021), www.transit.dot.gov/sites/fta.dot.gov/files/2021-11/TAM-Performance-Measures-FactSheet.pdf.
- [13] Metropolitan Transportation Authority, *FTA Transit Access Management Plan*, (October 1, 2019).

- [14] The full sentence is: “The network is supported by 472 miles of fiber optic cable, extensive copper telephone cable installations, eight major PBX sites, wireless radio systems for use in the subways by NYC Transit and the New York City Police and Fire Departments, 190 miles of subway antenna cable, and one or more communications rooms located in every station.” Metropolitan Transportation Authority, *Twenty-Year Capital Needs Assessment: 2015-2034*, p. 45, <https://new.mta.info/document/11976>.
- [15] New York City Housing Authority, *New York City Housing Authority 2023 Physical Needs Assessment Final Report* (prepared by NYCHA PNA 2023 JV: STV |AECOM, June 22, 2023), www.nyc.gov/assets/nycha/downloads/pdf/2023-PNA-Report-Physical-Needs-Assessment-NYCHA.pdf.
- [16] Subtracting the costs from the benefits ultimately measures the net benefit society receives (or costs imposed) of action or inaction. Buying a bus, for example, and adding it to the fleet may marginally improve service on a given route. The benefit provided from the improvement in the quality of service can be measured and quantified, along with other benefits it provides, to help compare the value of the improvement against the cost of purchasing the asset. This valuation can help determine which action provides the greatest net benefit to society: to purchase the vehicle, to purchase a different vehicle (perhaps an electric vehicle, which may confer benefits of a different type), to pursue an alternative approach that accomplishes a similar goal, or to do nothing altogether. Such an analysis would also list the various costs associated, including direct costs like purchase price, and also include costs imposed on society.
- [17] More specifically, how many electric multiple units does the LIRR own in total and by model, such as M-3, M-7, or M9/M-9A.
- [18] In certain cases, the investment is needed to maintain the transit system in an SGR, but there is no direct line between investment and improved performance. Nonetheless, these projects are critical for the system and achieving and maintaining an SGR for all assets is a key goal for the MTA.

Needs and Wants

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What to Look for in the MTA's Twenty-Year Needs Assessment

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