



Transforming the MBTA Commuter Rail

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May, 2024

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Introduction

The Commuter Rail forms the most extensive part of the MBTA system, linking disparate parts of the growing metropolitan area with Boston in the center. Trains extend as far as Worcester to the west, central Rhode Island to the south, and close to the New Hampshire border to the north. While its reach is geographically large, the Commuter Rail's service is inadequate in the face of Greater Boston's growing traffic congestion and housing costs. This report outlines the problems facing the current system and proposes a transformed Commuter Rail, with frequent service and modern conveniences, making it a more useful and accessible system that better unites the entire region. While the work needed is costly, this report lays out project phasing and identifies appropriate sources of additional funding, while considering the stakeholders that will have to be convinced in the process.

The Existing System



Figure 1: Existing Commuter Rail System. Source: MBTA

The commuter rail as it exists now is an extensive system with a narrow scope of service. Trackage extends for nearly 400 miles, covering 137 stops on 14 lines in eastern Massachusetts and Rhode Island³. The system averaged 97,000 rides per weekday in the last quarter of 2023, making it the 5th busiest commuter rail system in the United States, per the American Public Transportation Association⁵. Currently, the system is run with an entirely diesel push-pull fleet, operating out of two unconnected terminals, North Station and South Station, essentially forming two networks. Although the Commuter Rail System is physically large, service is more restricted. Like most American commuter rail systems, it operates on a peak-focused schedule, with higher frequencies (generally 30-45 minutes) during the AM and PM rush times, and lower frequencies (generally 1-2 hours) at all other times. Additionally, the cost of riding can vary significantly with the distance traveled, with rides within the inner 1A zone costing \$2.40, the same as the MBTA subway, doubling to \$6.50 at the next zone⁶. Meanwhile, rides from the outermost zone 10 into Boston cost \$13.25. While the system is owned by the MBTA, it is operated under contract to a private company, currently Keolis.

The Problem

Regional Trends

Greater Boston is experiencing a growing population and economy causing **traffic congestion as well as high housing prices** in the urban core. Two-thirds of all commuters in the Boston Metropolitan Area commute by private vehicle, and this rises to 80% when working from home is excluded¹. Car commuting in the region is causing high levels of traffic congestion. The 2022 Inrix Global Traffic Scorecard ranks Boston number two in the United States and number 4 in the world in per-person hours lost to congestion, with Boston commuters losing on average 134 hours a year. Furthermore, the Boston Region Metropolitan Planning Organization (MPO) predicts continued population and employment growth in Greater Boston out to 2040 (14% and 8%, respectively, with 2016 as the base year)³. This means, barring dramatic changes in commuting patterns, and without improvements in alternative modes of transportation, the issue of traffic congestion will only intensify. Greater Boston therefore needs a regional rail system to meet this challenge.

The high cost of housing in the urban core is another defining challenge in Greater Boston. The City of Boston itself is one of the most expensive in the United States, with the 8th highest home values and 3rd highest rents of the top 50 largest U.S. cities per Zillow estimates. These costs necessitate that many working- and middle-class people move further out into the metropolitan area to find affordable housing. This situation points to the need for a reliable and accessible regional rail system that connects these outlying areas with Boston and the urban core.

System Problems

The existing regional rail system in Greater Boston, the MBTA Commuter Rail, cannot adequately meet these challenges. In its current form, the system is **antiquated, underutilized, and expensive**.

The system is antiquated in its physical infrastructure and methods of fare payment. The service is exclusively run by diesel powered push-pull train sets. This type of trainset has slower acceleration, less doors per car, and lower fuel efficiency than self-powered multiple-unit (MU) trainsets, making them poorly suited for frequent urban service⁴. Additionally, low level platforms remain prevalent at Commuter Rail stations, slowing boarding times and hindering accessibility on the system, as passengers are required to step up to board the train on these platforms. Finally, the system relies on an inconsistent method of fare payment, making the system more difficult to use, especially for inexperienced riders. While passengers can buy tickets from machines at some stations, others require passengers to pay on board, or use the mTicket app on their phones. Modern trains, platforms, and payment will make the system easier to ride and allow for more frequent service.

The Commuter Rail is also underutilized as a regional asset. Ridership per mile is only about 6% that of the MBTA subway system (see Figure 2). Furthermore, the system’s peak-focused schedule means it is not well-suited for workers with non-traditional working hours, or non-work travel in general. More frequent service could attract higher ridership by making it useful to more commuters and for a variety of trip types.

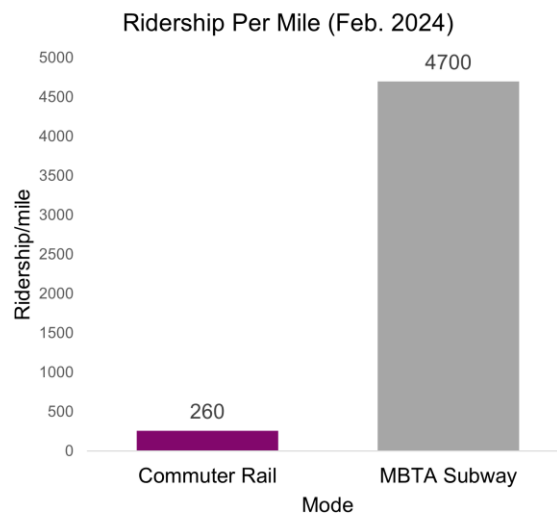


Figure 2: Ridership per Mile Comparison. Source: MBTA

Finally, the system is expensive to operate and ride. Due to the large capital and operational expenses (such as having multiple conductors on each train to check and sell tickets), as well as relatively low ridership per-mile, the Commuter Rail system is expensive to operate. Running the service takes up nearly 25% of the MBTA’s operating expenses while accounting for only 14% of total system ridership. The distance-based fare structure can also make the system expensive to ride. For example, a rider from Fitchburg, MA (on the Fitchburg line), where typical home values are only about half that of Boston’s (\$370,000 per Zillow) pays \$12.25 one way for a trip to North Station. In the meantime, a rider who can afford to live in the inner suburb of Belmont, where typical home values are early double that of Boston’s (\$1.4 million per Zillow), pays only \$6.50 for the same trip. With housing in the inner core of the system becoming more expensive, this fare structure takes on a regressive nature.

System Transformation

To meet the challenges of congestion and housing costs, Greater Boston needs a frequent and accessible regional rail system that serves a diverse set of riders and needs. Several upgrades are required to meet this vision. These include operational improvements that will make the system easier to use as well as capital improvements to modernize the system and increase performance.

Operational improvements include:

- **Shorter headways**, at best 15 minutes all-day, making the system more useful for those with non-traditional working hours and for non-work trips.
- **Clock-face scheduling**, with trains leaving at consistent minutes past-the-hour, making riding the system more convenient and predictable.
- **Consistent fare payment**, allowing riders to pay with a Charlie Card, or eventually, a credit or debit card, and enabling free transfer between modes.
- Better **integrating the Commuter Rail with subway and bus services**, involving aligning schedules and improving physical transfers. For instance, the Boston Foundation's 2017 "Increasing Ridership on the Fairmount Line" report recommends improving pedestrian pathways between Commuter Rail stations and nearby bus stops, and even relocating stops if necessary. This will encourage ridership and allow the system to function more like an urban transit service.
- **Fare restructuring**. Reduced fares, especially in the outer zones, will not only attract more riders, but will be fairer to lower-income commuters seeking affordable housing in further-out towns and cities.

Capital improvements vary in scope. They include:

- **High level platforms** at all stations to lower boarding times and increase accessibility.
- **Double tracking** at remaining single-track sections to enable increased service frequency.
- Replacing the existing fleet with **electrical multiple units (EMUs)**. These types of trains have higher acceleration and typically more doors per car than the existing push-pull train sets⁴, making them better suited for the frequent service being proposed.
- **System electrification**, required to run EMUs. Though a large capital expense, electrification will create a much more sustainable system in the long term, and in the short term mitigate the local noise and air pollution that would come from running so many diesel-propelled trains.

- **The North-South Rail Link** tunnel between North and South Stations. This project would not only create a new high-frequency subway-like service through congested Downtown Boston but allow through-running between the north and south sides of the system as well mitigate capacity issues at the existing terminals.

Phasing

The amount of work needed is considerable, so it is best to divide the project into 3 phases of increasing scope. First, in consideration of cost and time constraints, the MBTA should implement a pilot project on the Fairmount Line lines to prove the viability of a larger project. Second is to implement an Urban Rail system, where service improvements are extended to the inner core of the wider system. Third is the Full Transformation, involving full system electrification and the North-South Rail Link.

Phase 1 (Fairmount Line)

A strong ridership base and recent improvements to build on make the Fairmount Line the best candidate for the pilot project.

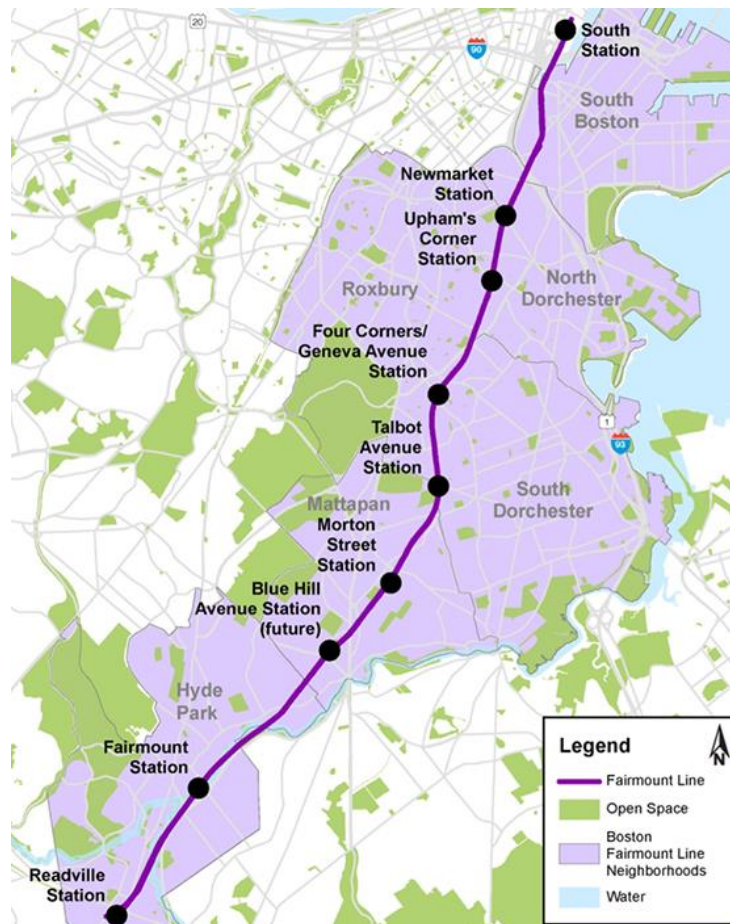


Figure 3: The Fairmount Line. Source: Boston Region MPO

The existing characteristics of the Fairmount Line and the areas it serves give it a strong ridership base for frequent rail service. It is the shortest line in the MBTA Commuter Rail system and the only one to run entirely within the City of Boston. The average station spacings are closer to that of a subway line than the other Commuter Rail lines, and little dedicated parking exists around stations⁴. Situated between the Red and Orange lines, it also serves an area without nearby subway service. The “Increasing Ridership on the Fairmount Line” report found that the areas of Dorchester, Mattapan, and Hyde Park served by the line are predominantly non-white (about 80%) and about one-quarter of households along the line are low-income, while population densities and rates of transit usage are comparable to areas directly served by the MBTA subway. Furthermore, the lack of existing rapid transit service means riders along the Fairmount corridor rely mainly on slower local buses, and as a result have “among the longest commutes in the Greater Boston region”⁴.

Realizing the potential for increased ridership on the line, the MBTA has also made significant improvements to the line in the past decade, providing a strong base for improved, rapid transit-like service. Unlike other lines in the system, which have a peak-focused service, the Fairmount Line runs with consistent 45-minute headways throughout the weekday (except for early mornings and nights)⁷. Starting in 2007 and continuing into the 2020s, several improvements have been made to the line. Four infill stations were built, all with high level platforms. The existing Uphams Corner and Morton Street stations received high level platforms of their own, while Fairmount and Readville stations, at the end of the line, were made ADA-compliant⁴. These upgrades were matched with increased service, including extended evening hours and new all-day weekend service⁴. All stations, except Readville, are now in zone 1A, meaning fares are equal to those on the subway. Furthermore, the Fairmount Line is the only Commuter Rail line that accepts Charlie Card payment; since 2020 riders can tap their cards at platform validators, easing the payment process and allowing free transfers to bus and subway⁸.

These improvements on the line were met with significantly increased ridership, with daily boardings nearly tripling from 2012, when the new stations began coming online, to 2016. Continued ridership gains after the implementation of this pilot project will be the best gauge of its success. Past improvements also mean that there is less work to be done to bring the Fairmount Line up to the standards of this project, namely electrification, 15-minute headways, and improved bus connections as discussed above, as well as building full high-level platforms at Fairmount and Readville stations. While these are not small changes, the Fairmount line offers a relatively manageable scale.

Phase 2 (Urban Rail)

The next phase is to expend service improvements to the rest of the system’s urban core, on the inner portions of some lines and on the entirety of the shorter Needham line (see Figure 4). Conventional service will continue in outer areas. This is the “Urban Rail” alternative outlined in the MBTA’s 2020 “Rail Vision” report. Like the Fairmount Line pilot project, this phase taps into existing transit demand, “providing higher all-day frequencies to areas of the network with similar land use patterns as areas served by rapid transit”³.

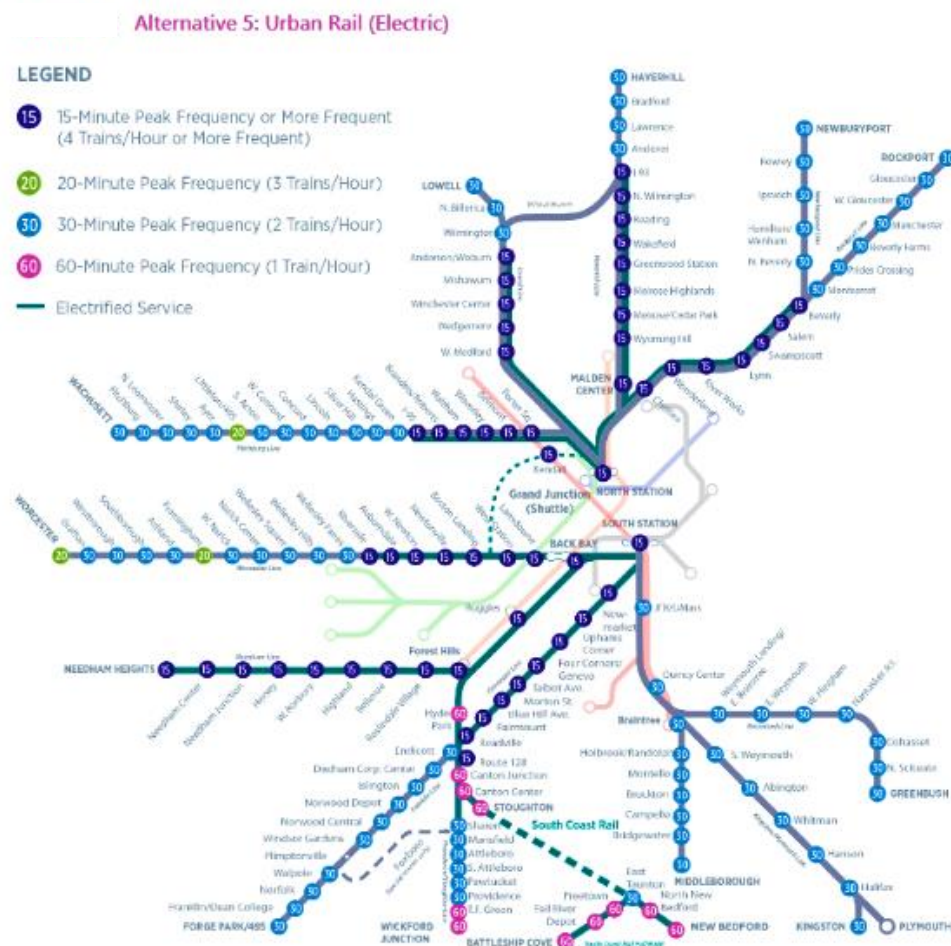


Figure 4: Urban Rail Proposed Service. Source: MBTA Rail Vision

Phase 3 (Full Transformation)

The final phase is a “Full Transformation” of the existing system, as described in “Rail Vision”. Full operational and capital improvements are brought to stations across the system, except at branches, which will see 30-minute headways (allowing for 15-minute headways where the branches converge – see Figure 5). This requires the two largest capital expenditures: full system electrification, and building the North-South Rail Link tunnel, the latter of which will allow for through running to both sides of the system and increased capacity.

Alternative 6: Full Transformation



Figure 5: Full Transformation Proposed Service. Source: MBTA Rail Vision

Funding

Due to the capital-intensive nature of the proposed system transformation, estimated project expenses are high. They are as follows:

- Phase 1: \$500 million⁹
- Phase 2: \$13 billion³
- Phase 3: \$35 billion³

Meanwhile the MBTA's current capital budget for FY24-28 is \$9.7 billion. As outlined in the five-year Capital Investment Plan (CIP), these funds come from a variety of sources. Federal funding includes FTA formula funds and competitive, discretionary funds. The Commonwealth of Massachusetts provides bond funding for specific projects. The MBTA can issue its own bonds, take out loans from the USDOT Build America Bureau (BAB), or transfer funds from its operating budget and Capital Maintenance Fund (CMF). Funding can also come from a variety of refundable sources.

As predicted costs for this project greatly surpass the current capital budget, alternative funding sources will be needed. This is especially important given the various other capital needs of the MBTA, at a time when many parts of the system require significant maintenance and upgrades.

There are a variety of sources from which to secure funding for transportation projects in the U.S., and a few that are particularly appropriate for this project. These include:

- Funding from the **Bipartisan Infrastructure Law**: Currently \$4.6 billion per year is available under the Fixed Guideway Capital Investment Grant Program, which covers commuter rail service¹¹.
- Diverted **highway toll revenues**: MassDOT, as the overseeing body of the MBTA, could divert revenue from its toll facilities (e.g. the Mass Turnpike) to partially fund this project. There is precedence for this: the Port Authority of New York and New Jersey subsidizes the Port Authority Trans-Hudson (PATH) rapid transit service with highway toll revenue³.
- **Tax Increment Financing (TIF)**: This involves designating a TIF district along a rail corridor where Transit Oriented Development (TOD) is planned. Value capture from rising real estate prices (and associated taxes) due to service improvements and concurrent TOD, over the expected unimproved values, can be used to repay bonds issued for the project. This sort of financing could first be used on the Fairmount Line. The “Increasing Ridership” report recommends building higher-density, mixed-use developments adjacent to Fairmount Line stations to support local economic development, increase housing availability, and bolster ridership. This is especially crucial given the lack of large ridership generators along the line, which is currently dominated by mid-density residential⁴, making TIF particularly appropriate. Although TIF is not commonly used for rail transit projects, some notable examples exist, including the Portland MAX light rail airport extension and Chicago CTA Blue Line modernization program¹².
- **Joint Development** on individual projects: The MBTA occasionally works with developers on Transit Oriented Development (TOD) projects, and secures funding by leasing or selling land, receiving developer contributions, and by other means¹³. For example, when building the new Assembly Station on the Orange Line, the T received substantial funding from the private developer of the adjacent Assembly Row project to help cover construction costs¹⁴. While these projects are typically undertaken along the subway system, they could act as a blueprint for future joint development along the transformed Commuter Rail.
- While more in the realm of project delivery, the MBTA should consider a **Public-Private Partnership (P3)** agreement to carry out this project. A current example of this is in Toronto, where the regional transportation agency Metrolinx is carrying out very similar improvements to their GO commuter rail system. They recently contracted ONxpress, a private consortium, to not just design and build the system improvements, but operate and maintain it after completion (a Design-Build-Operate-Maintain, or DBOM model)¹⁵. This sort of partnership can save money by introducing efficiencies into project implementation, as well as by securing an operator that is better prepared for future maintenance duties. Furthermore, a P3 is appropriate for the MBTA as it already operates the Commuter Rail under contract to a private company.

Stakeholders

There are many stakeholders whose support will be needed to carry out this project, starting with the MBTA itself. Leadership at the T has undergone recent changes. Since 2023 the agency is led by General Manager and CEO Phillip Eng, a 40-year veteran of the transportation field and most recently the head of the Long Island Railroad, one of the New York City area's commuter rail systems¹⁶. As a division of the Massachusetts Department of Transportation (MassDOT), the MBTA is also overseen by the eleven member MassDOT board, chaired by current MassDOT secretary Monica Tibbits-Nutt¹⁸. The T is also governed by its own 9-member Board of Directors. The board was established in 2021, replacing the governor appointed Fiscal and Management Control Board (FMCB), which was tasked with reigning in the agency's fiscal troubles. The FMCB "oversaw a threefold increase in long-term capital investments" as well as the Green Line Extension and Fairmount Line service improvements¹⁷. The same kind of leadership will be needed by the Board of Directors to see through the Commuter Rail Transformation. The membership of the board breaks down as follows^{18, 19}:

- The MassDOT Secretary
- 1 appointee by the City of Boston
- 1 appointee by the MBTA Advisory Board
- 6 Gubernatorial Appointees, composed of:
 - 1 MBTA rider
 - 1 resident of an environmental justice population
 - 1 person recommended by the AFL-CIO.
 - 1 person each with experience in transportation, finance, and safety

With 7 of 9 members appointed by the governor (the MassDOT Secretary is also a gubernatorial appointee), a level of cohesiveness is possible despite the size of the board. Furthermore, requiring riders, transportation experts, and others with a strong interest in MBTA service to populate the board means it could be a willing ally for a complex project like the Commuter Rail Transformation. The downside to this appointment system is that the makeup of the board is largely at the whim of the current state administration. Given the long-term nature of the project, changing administrations with different views on the MBTA could prove a challenge.

The MBTA Advisory Board, which has its own appointment to the Board of Directors, consists of elected officials from the 176 cities and towns in the MBTA service area and has authority to review the MBTA annual budget, making it another critical stakeholder for a large capital project like the Commuter Rail Transformation.

Finally, there are two important stakeholders involved in the operation of the Commuter Rail system, the private contractor and the workers. While it is owned by the MBTA, the Commuter Rail system is operated under contract to Keolis, a French company, until at least 2025^{20, 21}. The MBTA will need to ensure it has an operator with experience running a system like the one that is proposed. Furthermore, as discussed above, a public-private partnership could be appropriate for delivering this project, requiring the contracting of a company that can both build and run the new system. Employees of the Commuter Rail, meanwhile, number around 2,400 are represented by 14 different labor unions²⁰. As this project proposes a radical shift in operations, extensive collaboration and negotiation with the system's workers will be needed to ensure a smooth transition in service

without making anyone worse off. While not an impossible task, this is complicated by the multitude of unions with their own leadership and interests.

Future Issues and Opportunities

There are some issues that threaten the viability of the project, as well as opportunities that can serve it.

Issues

- Difficulty in implementing **land use changes** along the system: For Tax Increment Financing (TIF) and Joint Development funding to be feasible, the suburban towns served by the system need to allow denser redevelopment near stations. The state recently passed “MBTA Communities Law”, requiring every city and town served by the MBTA to have at least one zoning district for multi-family housing within a half-mile of a station. This is intended to relieve the state’s housing crisis discussed in the beginning of this report. The effectiveness of this law remains uncertain though, with residents of some towns with commuter rail service voting against rezoning or even filing lawsuits to block changes²².
- **Post-Covid ridership drops:** The Commuter Rail system has not fully recovered from the Covid pandemic, with most lines seeing ridership recovery rates of 50% to 80%²³ (see Figure 6). The notable exception to this trend is the Fairmount Line, which is seeing slightly higher ridership than before the Covid-19 pandemic, according to the 2022 MBTA GM report. This goes to show that proper service improvements, focused on areas with high ridership potential, will be matched with consistently higher usage of the system, indicating that the benefits of this project can outweigh the ridership drag brought on by the pandemic.

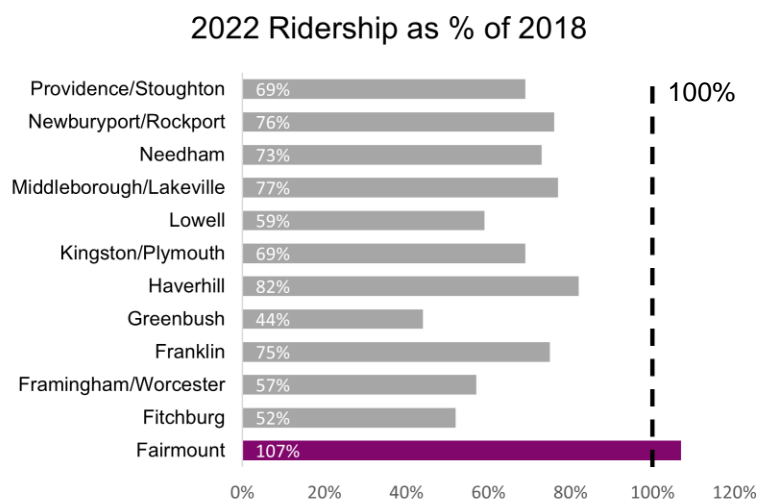


Figure 6: Ridership Recovery by Line. Source: MBTA

Opportunities

- Signs of **political support** for elements of this project:
 - In 2023, state lawmakers filed a bill requiring the MBTA to “develop a plan to electrify the Fairmount Line”, extend subway-equivalent fares to the Readville terminal, and coordinate Fairmount Line service with local bus service²⁴.
 - Current Boston Mayor Michelle Wu has advocated for reducing fares at all stations in the City of Boston to \$2.40, the same as the subway²⁵.
- The MBTA **Fare Transformation** Project: The T is currently in the process of overhauling its fare payment system, with the ultimate goal of contactless payment on all modes. This is an important component of the Commuter Rail Transformation
- Although the technology is relatively new and not widely adopted, **battery-electric trains** promise the benefits of system electrification without the upfront capital expense. Keolis, the current operator of the Commuter Rail system, has submitted a proposal to the MBTA to operate battery-electric trains on the Fairmount Line, along with more frequent service, by 2027.

Conclusion

With the improvements proposed in this report, the Commuter Rail can become the backbone of the MBTA system and of Greater Boston’s transportation network. Higher frequencies, easier fare payment and other operational improvements matched with new trainsets, high platforms, and other capital improvements will make the system easier to use and more convenient for a wider array of area residents. More attractive service can help combat growing traffic congestion while improving access to areas with more affordable housing, especially if complemented with new housing development near stations. There will be a number of stakeholders to convince, while the difficulty of redevelopment in suburban areas and post-covid ridership drops threaten the feasibility of the project. Despite this, there are a number of funding sources available to support the project, while growing political will and technological improvements provide hope for implementation.

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