Massachusetts Bay Transportation Authority

FMCB Productivity Report

Fiscal and Management Control Board

June 21, 2021

Mike Muller

Overview

- Investment in Public Transit Can Address Public Challenges
- Productivity and Controlling Operating Cost Growth
- Future Focus: Green Line Supercars and Subway Automation
- Benefits of Fare Transformation
- Bus Transformation
  - Improving the Bus Experience
  - Investments in Facilities and Infrastructure
- Regional Rail Transformation
  - Creating a More Productive, Equitable, and Sustainable Rail System
  - Capital Investments Unlock Productivity Improvements
  - Onboard Productivity Improvements
- Future Funding Considerations
- Equitable and Competitive Fare Policy

Investment in Public Transit:
Addressing socioeconomic and environmental challenges

- Over the last decade, the Greater Boston area has experienced **significant growth both economically and demographically**
- MBTA and the region are faced with a **confluence of challenges** to the transportation system **creating critical moment**.
    - Climate Change
    - Income Inequality
    - Social Inequity
    - Affordable Housing Shortage
    - Traffic Congestion
    - Inaccessibility
- **Exacerbated by** the effects of the **COVID-19 pandemic**
- Investment in **public transit** is a **means to address these challenges**, while at the same time **improving passenger experience**.

Productivity gains needed to control operating cost growth

- Significant **capital investments required** to deliver transformation projects addressing socioeconomic and environmental challenges
- Operating and maintenance **costs are projected to continue growing** at an **unsustainable rate**
- Since the FMCB's inception, MBTA has implemented several **technological enhancements**, **operational efficiencies**, and **productivity initiatives** to control **operating cost growth**
- Explore opportunities for **further productivity improvements**, made possible by **smart capital investments** and **advancements in technology**

Ongoing Initiatives and Issues for Future Focus

- **Green Line Type 10 Vehicles**
  - **One vehicle** carries the **same number of passengers** the MBTA currently serves with two vehicles
  - **Reduces costs** of maintenance, materials, utilities, and operations training
  - Delivers the **same carrying capacity** and reliability with **fewer operators.** (Each Supercar requires one fewer operator than does a two-car legacy train.)
  - MBTA accepting proposals from vehicle manufacturers in summer 2021
- **Subway Automation/Driverless Trains**
  - Subway trains **once required four** employees onboard; the **current fleet only requires one** employee onboard
  - As technological advancement allows, **automated, driverless trains** may reduce or **eliminate the need for a human train operator**
  - Study underway to explore **newest signal technology** for future **investments in the Blue Line**, including **feasibility of automation**
  - Report scheduled for completion in late 2021

Fare Transformation:
Providing lasting benefits to riders and the MBTA

- More **policy flexibility** and **regional mobility integration** options will provide **new revenue and partnership opportunities** to the MBTA and **new fare product options to riders** and institutional customers.
- Technology platform will support policies that **prioritize revenue, ridership, and equity** goals.
- **Increased payment convenience** and improved bus service speeds will **improve the customer experience**, reduce barriers to ridership and expand mobility.
- **All door boarding** will **reduce dwell times** on bus, light rail, and regional rail.
- New fare media and tools will **make fare inspection faster and more consistent** across transit modes and payment methods.
- New system **enables productivity improvement** on regional rail—if combined with **high-level platforms and automated doors**—by changing the **role of the conductor** with regard to fare collection.
- Payments to key contractors made **when the technology is fully operational** and are **contingent on sustained excellent performance.**
- Strict **contractual system reliability assurances** for fare equipment will help **reduce avoidable fare leakage.**

Bus Transformation:
Improving the bus experience

- **Bus Transit Priority** - MBTA partners with communities to implement Bus Transit Priority projects to increase and improve bus transit service in areas with significant congestion and high ridership.
  - Projects include deploying **dedicated bus lanes**, as well as infrastructure like **queue jumps** and **transit signal priority**, enabling the MBTA bus network to provide **faster, more reliable service** and a **better customer experience.**
  - **Enhanced productivity –** If buses can **run faster** and **stay on schedule**, it would allow the MBTA to provide **more service with the same number of buses.**
- **Bus Electrification –** Transition to **battery electric bus ("BEB")** fleet will **improve service** to passengers, **reduce lifecycle costs**, **improve air quality**, and **achieve climate goals**
  - Utilizing a combination of hybrid electric-diesel and battery-electric buses will ultimately **reduce bus fleet emissions by 80% by 2032**
  - BEB fleet will ultimately result in **increased productivity** and **cost-optimization** (Electric buses generally have fewer maintenance activities, resulting in **maintenance and labor cost savings**)

Bus Transformation:
Investment needed in facilities and infrastructure

- Timeline for **transition to BEBs** and success of the program is largely dependent on the availability of **maintenance and storage facilities** equipped for electric vehicles.
- **Significant capital investments** are needed to support **bus electrification**, including **renovation or replacement of maintenance facilities**
  - MBTA operates **9 bus maintenance facilities**, with the **oldest dating back to 1904** and the newest to 2004
  - First step is planned **renovation of the old Quincy facility**, slated to be operational by 2024 and service/house **up to 120 buses**; needed for the **80 electric buses** due to arrive in **FYs 2023 and 2024**
- Significant **investment required** for **charging infrastructure**, including chargers, **grid connection** upgrades and **generation** of sufficient grid capacity
- Having a **clearly defined energy demand and use profile** will ensure there is sufficient capacity and will result in **greater cost certainty** over the long term.

Regional Rail Transformation:
Creating a more productive, equitable, and sustainable rail system

- Transformational restructuring of the Commuter Rail system into a **more productive, equitable, and sustainable Regional Rail** system
- **Regional rail** service is characterized by:
  - **Consistent bidirectional service throughout the day**, moving away from focus on commuter service during morning and evening peaks;
  - **More frequent "clock face" service** to facilitate turn-up-and-ride journeys and bus schedule integration;
  - **Modern, electrified rolling stock** coupled with **accessible high-level platforms** providing **faster journey times** through **faster acceleration**, **step-free boarding**, **automatic doors** and **pre-boarding fare validation**, **reducing dwell times** and **increasing safety.**
- Will allow the MBTA to **better tailor the service, size of trainsets** and **staffing model** to better meet **passenger demand**
- **Operations and maintenance cost savings** resulting from:
  - A need for **fewer trainsets** by leveraging "short turns" and cross platform connections/transfers;
  - Modern **electrified trainsets require less maintenance** (and have monitoring, which enables **more efficient predictive maintenance**);
  - A more efficient **staffing model.**

Regional Rail Transformation: Capital investments unlock productivity improvements

- Capital investments in both the **rolling stock and infrastructure** are needed to achieve **operational productivity improvements**
- Investing in an **electrified rail fleet** will enable the MBTA to provide a more efficient, customer-focused, and cost-optimized service with more frequent trips.
  - **Quicker acceleration and braking** results in faster travel times
  - **Automatic doors** reduce station dwell time
  - **Lower fleet maintenance costs** – fewer maintenance activities required
  - **Reduction in emissions,** as the electricity grid continues to de-carbonize
  - **Long-term fuel cost savings**, as cost of renewable energy continues to decline
- Significant **investments in infrastructure** are needed to **support electrification** and provide **operational improvements** such as **reduced dwell time**, **passenger safety**, and **improved service**.
  - **Updating low-level platforms** at stations
  - Ensuring sufficient **grid resilience and capacity**
  - **Maintenance and layover facility** modernization

Regional Rail Transformation: Onboard Productivity Improvements

- **Fare Collection** – Currently, **staff members on board each train** are responsible for fare collection
  - Alternative is a **"proof-of-payment"** system whereby riders **purchase tickets before boarding** and are subject to **random fare checks**
  - Benefits of proof-of-payment include **increased efficiency**, **reduction in fare leakage**, and **reduction in fare collection costs**, ultimately resulting in **time savings** and an **improved service** for passengers
- **Required Staff Onboard** – Current operating agreement with Keolis requires **1 train staff person for every 300 passengers**
  - **Automated doors** and **high-level platforms remove the need for staff** to manually open doors and lower traps (Boarding/detraining incidents are currently the largest cause of staff injury)
  - As such, the **number of conductors and assistant conductors per passenger decreases**.
- The **reduction in operational needs** to raise and lower traps between platforms, **all doors opening automatically**, and **pre-boarding fare validation** will
  - Reduce dwell time
  - Increase transit speeds
  - Improve boarding and alighting speed
  - Free up staff to operate the (more frequent) trains
  - Result in improved rail service for passengers, and
  - Allow upskilling of conductors to do more responsible work.

Future Funding Considerations

- There is a need for **innovative and alternative sources of funding** to deliver **unfunded transformation projects**.
- Estimated need of up to **$28.9 billion for the full, systemwide Rail Transformation**.
- Cost of **Phase 1** (Fairmount Line, Providence/Stoughton Line, and the EJ Corridor) **estimated at $3-3.5 billion**.
- **Bus Transformation** costs estimated at **$4.5 billion to replace existing facilities** to support phased introduction of BEBs, and **$100-130 million annually to replace the bus fleets**.
- While some other transit systems have pursued **DBFOM contracts**, the MBTA currently **does not have the legal authority** to use this procurement tool, and a **legislative change is required** to make this possible.

Equitable and Competitive Fare Policy

- As the MBTA plans for these future productivity initiatives, the need to provide an **equitable service must be at the forefront**
- The MBTA currently offers **reduced fare programs** for people with disabilities, seniors, and low-income young adults
  - There is a **gap for non-disabled, low-income adults** between 26 and 64 years of age.
  - Other transit agencies have **expanded their programs** to include all income-eligible adults
  - Using **other state benefits as a proxy for eligibility** can **reduce the administrative burden**
- Importantly, an **equitable and competitive fare** is a critical element of **Regional Rail Transformation** realizing its **full ridership potential**.
  - In order to maximize the **utility and competitiveness of Regional Rail** service and increase **accessibility to all communities** in the service area, MBTA must **operate a cost-efficient system** at **fares comparable to rapid transit** and **competitive with the cost of driving**.
  - **Equitable and competitive fares**, if combined with **increased frequency** and **consistent bidirectional service**, can attract a **new and durable ridership**, and **generate the revenue** required to **offset the costs** of the increased service.