

CHAPTER 2

Progress Since the Last PMT



The 2003 PMT outlined the actions needed to bring the MBTA transit system into a state of good repair (SGR). It evaluated and prioritized a number of specific enhancement and expansion projects proposed to improve the system and better serve the regional mobility needs of Commonwealth residents. In the intervening years, the MBTA has funded and implemented many of the 2003 PMT priorities.

The transit improvements highlighted in this chapter have been accomplished in spite of the unsustainable condition of the Authority's present financial structure. A 2009 report issued by the MBTA Advisory Board¹ effectively summarized the Authority's financial dilemma:

For the past several years the MBTA has only balanced its budgets by restructuring debt liquidating cash reserves, selling land, and other one-time actions. Today, with credit markets frozen, cash reserves depleted and the real estate market at a stand still, the MBTA has used up these options. This recession has laid bare the fact that the MBTA is mired in a structural, on-going deficit that threatens its viability.

In 2000 the MBTA was re-born with the passage of the Forward Funding legislation. This legislation dedicated 20% of all sales taxes collected state-wide to the MBTA. It also transferred over \$3.3 billion in Commonwealth debt from the State's books to the T's books. In essence, the MBTA was born broke.

Throughout the 1990's the Massachusetts sales tax grew at an average of 6.5% per year. This decade the sales tax has barely averaged 1% annual growth. The underperformance of the sales tax coupled with too much debt has been slowly strangling the T for years. In FY10 the MBTA faces a \$160.4 million deficit and without external assistance in the form of debt relief or new revenue the Authority will be forced to make draconian service cuts and impose dramatic fare increases.

¹ Source: "Born Broke: How the MBTA Found Itself with Too Much Debt, the Corrosive Effects of This Debt, and a Comparison of the T's Deficit to Its Peers," Brian Kane, MBTA Advisory Board, April 2009.

As noted above, in the absence of new revenues for SFY 2010, the 'T' will be in the unfortunate situation of having to raise fares and/or cut services following a period of historic ridership growth and at a time when demographic change, growth policies, and transportation economics portend a tremendous opportunity to continue to attract new customers for Boston region transit that is reliable, convenient, and affordable. There are ongoing discussions in the Patrick administration and the Legislature regarding transportation reform and new revenues. The product of these deliberations, it is to be hoped, will address the underlying challenges of transportation finance in Massachusetts and put the Authority on a track toward fiscal stability.

Notwithstanding the current situation, it is important to recognize the actions that the MBTA has taken since 2003 to improve its service. Many of these measures have prevented an even more severe financial situation and have established a foundation for ridership growth and improved fiscal management. These accomplishments are described below, organized according to eight principles upon which the MBTA's customer-focused strategy rests.

IMPROVING SERVICE RELIABILITY

- **Bus Replacements and Maintenance:** The MBTA committed to a program of bus vehicle procurement and maintenance. Early in this decade, the average age of the MBTA bus fleet exceeded 12 years; today it is 5 years and the Authority is carrying out vehicle purchase plans to ensure that the average age will never exceed 7.5 years. Since 2003, the MBTA replaced more than half of its bus fleet through seven vehicle procurements and added system capacity with expanded use of 60-foot articulated buses.

Specific bus procurements and fleet overhaul initiatives completed or underway since 2003:

- 44 new Neoplan 60-foot CNG buses were delivered in 2003–2004

- 124 new NABI 40-foot CNG buses were delivered in 2003–2004
- 175 new NABI 40-foot CNG buses were delivered in 2004
- 28 new Neoplan 40-foot Electric Trolley Buses (ETBs) were delivered in 2004. These replaced the 1976 Flyers, which did not include air conditioning and were not ADA (American with Disabilities Act) accessible.
- 193 new Neoplan 40-foot Emission Control Diesel buses (ECDs) were delivered in 2004–2005
- 32 new Neoplan 60-foot Dual Mode Articulated buses (DMAs) were delivered in 2004 for use in the Silver Line Waterfront tunnel and surface routes.
- 310 new New Flyer 40-foot Emission Control Diesel buses (ECDs) were delivered in 2006–2009



NEW FLYER 40-FOOT ECD BUSES

- 125 Nova RTS buses were overhauled by MidWest Bus in 2004–2005
- 123 NABI 40-foot CNG buses are slated to be overhauled by MidWest Bus in 2009–2011

- 175 NABI 40-foot CNG buses are slated to be overhauled in-house by Everett Maintenance Facility in 2009–2011
- Key Route Improvement Program: The Key Route Improvement Program was put in place to reduce crowding and improve on-time performance on the MBTA's most heavily used bus routes (the Key Routes serve 41% of the MBTA bus system ridership). In addition to strategic deployment of operation and inspection resources, the program involves upgrades to customer amenities, including signage, shelters, and map/schedule displays.
- Centralized Monitoring of Bus Operations: Deployed an enhanced bus dispatch system. The centralized bus control center is now in operation, and all buses in the MBTA system have computer-aided dispatch and automatic-vehicle-locator capabilities (CAD/AVL). The CAD/AVL system facilitates more efficient, centralized management of bus operations and improved bus scheduling. This state-of-the-art technology allows the MBTA to better respond to traffic congestion and roadway incidents, especially when coordinated with other local and state transportation agencies that implement traffic signal priority for transit.
- Moving Customers Faster: Track reconstruction and infrastructure upgrades were implemented, reflecting the MBTA's strategic focus on eliminating subway speed restrictions. In 2003–2009, this resulted in trip-time reductions on the Green Line branch routes ranging from 2–4 minutes on the C Branch to 9–11 minutes on the E Branch. Since 2003, the collective impact of work to remove subway speed restrictions has reduced travel delays by more than 80%.
- Green Line Signal Upgrade: America's oldest subway has new state-of-the-art signal systems installed between Science Park and Lechmere Stations, and also between North Station and Haymarket on the Green Line. This includes a new 4-track interlocking at North Station to allow vehicle turnback and storage. New signals between Beaconsfield and Brookline Village Stations should be completed by May 2009.
- Green Line Cars: The addition of the full complement of 95 Type 8 Green Line low-floor vehicles enabled the MBTA to operate more cars and more service during the morning and evening peak periods (the most vehicles ever in service during the peak periods).
- Red Line Cars: Procurement was initiated for No. 4 Red Line cars with estimated production delivery between 2015 and 2019. In addition, selected systems of the No. 2 Red Line fleet are scheduled to be overhauled, with estimated delivery between late 2009 and 2011.
- Columbia Junction Signal Upgrade: Design plans for installing a Columbia Junction signal upgrade are underway. Malfunction of the interlocking system has been responsible for about 20% of the Red Line operating delays.
- New Orange Line Cars: Procurement was initiated for the next generation of No. 14 Orange Line cars, with estimated delivery between 2015 and 2019.



MBTA BUS OPERATIONS CENTER

- The Orange Line Haymarket North Signal Upgrade Project: This project was completed in 2008 after three years of construction. It provides automatic train operations on the entire length of the Orange Line, improving reliability and safety, and making shorter vehicle headways possible.
- Orange Line Community College Interlocking: Interlocking was reconfigured to allow Subway Operations to use the third track between Community College and Wellington Stations, providing the opportunity to implement service flexibility and express options responsive to customer demand.
- Wellington Tram: The Wellington tram (which frequently broke down in bad weather) has been replaced with a covered walkway.
- Blue Line Cars: The Blue Line Fleet is being replaced and expanded to 94 cars. The first car in the fleet replacement program was delivered in 2007, and delivery of all vehicles is expected to be completed in 2009.



NEW BLUE LINE CAR

- Blue Line Modernization: All Blue Line Stations underwent station upgrades, including accessibility improvements and platform extensions to accommodate six-car train

operations. The modernization program and fleet replacement together produce an effective carrying capacity increase of 50% on the line. Blue Line six-car train operation began in September, 2008. A new diamond crossover and switch turnouts were installed at Orient Heights Yard to accommodate the six-car train operation.

- Commuter Rail Procurements of Coaches and Locomotives: Commuter rail vehicles were procured in connection with restoration of Greenbush service and to increase general capacity.
 - 33 Kawasaki Bi-Level Commuter Coaches delivered in 2005–2006
 - Procurement initiated for 75 Hyundai Rotem Bi-Level Commuter Cars to be delivered 2011–2013
 - Procurement initiated for approximately 20 new locomotives for delivery between late 2012 and early 2014
- Commuter Rail Vehicle Upgrades: The Commuter Rail Coach Reliability and Safety Program was initiated with the goal of upgrading system components (trucks/brake/couplers/HVAC) of 270 coaches. This includes an overhaul to 75 Kawasaki bi-level coaches, planned for delivery in 2012–2015. Delivery of overhauled locomotive engine top decks began in March 2008 and is expected to continue through February 2011.
- Tie and Rail Rehabilitation: New ties, ballast, grade crossings, platforms, and pedestrian walkways installed in the following locations resulted in the removal of speed restrictions and improvement in ride quality:
 - Green Line B Branch along Commonwealth Avenue
 - Green Line C Branch along Beacon Street
 - Green Line E Branch between Brigham Circle and South Huntington Avenue (the roadway was repaved in this section also)

- Green Line Lechmere Viaduct
- Orange Line between Oak Grove and Community College
- Blue Line between Wood Island and Aquarium Stations
- Red Line between JFK and North Quincy Stations
- Red Line on Longfellow Bridge
- Red Line at Columbia Junction
- Red Line at Shawmut Station
- Red Line at Fields Corner Station
- Red Line at North Quincy Interlocking
- Red Line at Clayton Street Curve
- Reducing Motor Failures During Winter: Until 2007, the No. 7 cars on the Green Line and the No. 12 cars on the Orange Line regularly failed when snow accumulations caused electrical short-circuiting of motors. Simple, cost-effective insulation measures were put in place to prevent snow from being ingested into the motors, reducing failures during snowstorms by 30%.
- Vehicle Maintenance Management System: The MBTA implemented a centralized maintenance management system for vehicle maintenance, replacing obsolete systems, improving accountability, and ultimately improving service reliability.
- Maintenance Training: The Maintenance Training Facility was enhanced to include updated equipment to allow for hands-on training on new technology systems.
- Reducing Vehicle Start-Up Failures: Bus Maintenance began using ultra-capacitor technology, first in prototype testing and subsequently in the 310-vehicle bus procurement, to increase system power capacity on MBTA buses and improve performance reliability. The new battery technology will be included in vehicle overhauls and future bus purchases.
- Fort Point Channel Bridge: Construction of a fourth track on the Fort Point Channel Bridge eased the congestion bottleneck into South Station from the commuter rail Southampton maintenance facility, the Fairmount Line, and the Old Colony lines.
- Commuter Ferries: In 2007, mid-life overhauls were performed on the two MBTA-owned passenger ferries, and included new fuel tanks, hull repairs, and full repainting.



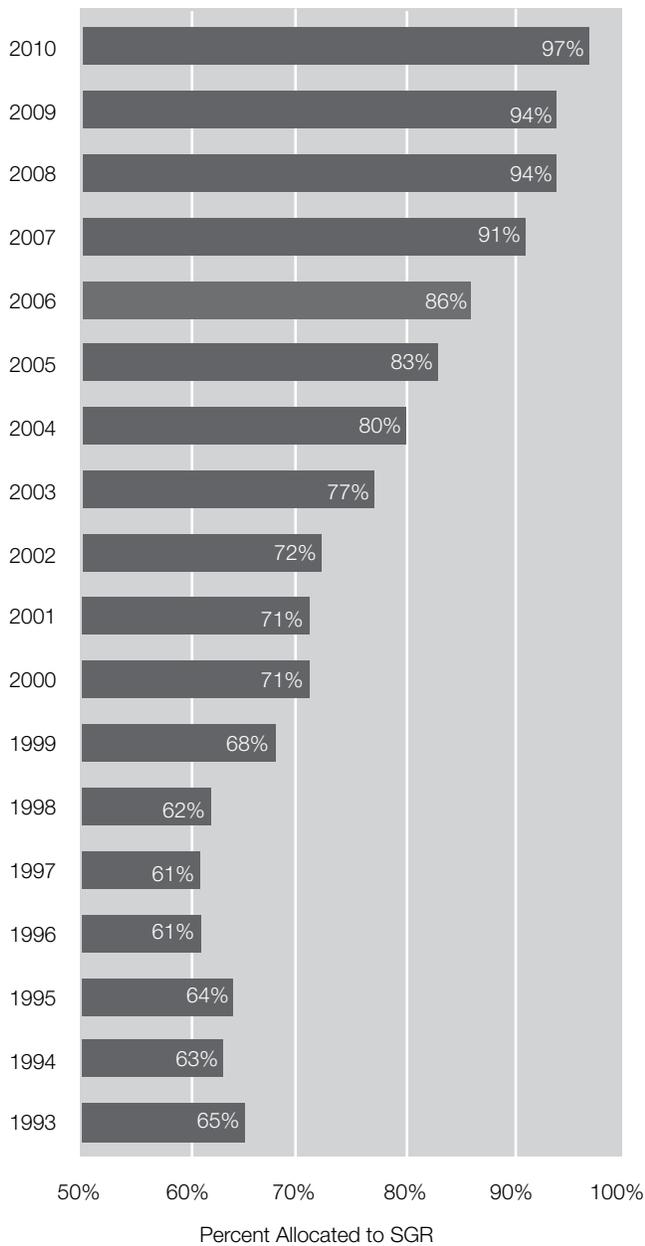
MBTA HARBOR EXPRESS

REVERSING DEFERRAL OF SYSTEM INFRASTRUCTURE PRESERVATION NEEDS

The MBTA is focusing an increasing share of its capital resources on infrastructure system preservation. In 2003, 77% of the MBTA funds budgeted in the Capital Investment Program (CIP) were directed to state-of-good-repair activities; in the most recent CIP, 97% of MBTA capital dollars go toward infrastructure reinvestment. Based on data analysis from the MBTA asset management system, the Authority must spend at least \$470 million annually over 20 years to keep its backlog of deferred maintenance needs from increasing. To achieve a state of good repair systemwide by

the 2030s, an estimated capital spending level of \$620 million annually would be required.

**FIGURE 2-1
CIP Funds Budgeted for SGR**



Activities undertaken to reduce the state-of-good-repair backlog include:

- **Bridge Inspection and Rating:** The MBTA owns and maintains over 470 bridges, including bridges that carry commuter rail and transit service as well as highway and pedestrian bridges. Over the past five years, the MBTA instituted a bridge management program,
 - **Bridge Repair and Rehabilitation:** Awarded contracts for the repair of a number of systemwide bridges. Repairs allow the state of good repair to be maintained and extend the useful life of bridges. Among the bridges repaired or rehabilitated within the last five years are:
 - Ruggles busway viaduct
 - Geneva Avenue Bridge
 - Dudley Street Bridge
 - East Cottage Street Bridge
 - Norfolk Street Bridge
 - Lechmere viaduct
 - **Bridge Replacements:** Bridges that have reached the end of their useful life are replaced, subject to available funding. In these instances, the bridge superstructure is replaced and the substructure or foundation is replaced or repaired, depending on the condition. Among the bridges replaced over the past five years are:
 - Hyde Street Bridge
 - Langley Road Bridge
 - Columbia Road Bridge (ongoing)
 - Quincy Street Bridge (ongoing)
 - Massachusetts Avenue Bridge (ongoing)
 - **Bridge Design:** Continued efforts to maintain the state of good repair for MBTA bridges require advanced design. Bridges currently in design for replacement or repair include:
 - Neponset River Bridges (2)



LECHMERE VIADUCT

- Dean Road Bridge
- Clayton Street Bridge
- Lagrange Road Bridge
- Central Subway Station Upgrades: The Central Subway stations were upgraded through the Revive and Guide Program. Renovations included painting, leak repairs, and replacement of benches, stair treads, and platform edging.
- Red Line Dorchester Branch Station Modernization Program: Stations at Savin Hill, Fields Corner, Shawmut, and Ashmont were reconstructed, with new headhouses, full accessibility, and improved bus-subway connections.
- Mattapan Station Renovation: This project included removal of the old, dilapidated structures at Mattapan and construction of a new terminal (station), including new platforms for buses and the Mattapan High Speed Line and a new building to house Operations and Transit Police staff.
- Mattapan High Speed Line Station Reconstruction: The Mattapan High Speed Line extension stations were refurbished, with additional accessibility features, lighting, and tactile edging.
- Facility Repair: Stations, parking garages, traction power, signal facilities, and all other capital assets must be maintained in a state of good repair. Facility repair projects undertaken include:
 - Alewife garage, structural repairs
 - Blue Line, platform repairs
 - Subway tunnel, inspection and repairs
 - Quincy Ferry, facility improvements
 - South Shore, garages engineering assessment
 - South Boston, environmental abatement
 - Cabot facility, groundwater remediation
 - Cabot bus garage, sprinkler upgrades
 - Cabot bus garage, additional bus bays
 - Charlestown bus garage, heating unit replacement
 - Quincy Ferry terminal, pile repairs
 - Albany bus garage, installation of replacement lifts
 - Quincy bus garage, structural evaluation of inspection pits
 - Everett Maintenance Facility, roof replacement and fire alarm
 - Everett Maintenance Facility, CNG modifications
 - North Cambridge bus facility, new lifts and equipment
 - Orient Heights carhouse, rehabilitation
- Facility Replacement and Construction: A number of facilities across the system replaced in-kind or at alternate locations when existing facilities have reached the end of their useful life. Included in this group of projects are:
 - South Station unit substation, including vent shaft
 - Cabot CNG bus maintenance building

- Arborway CNG bus maintenance building

- Facility Improvements for Vehicles: Protecting the MBTA's investment in vehicles requires ongoing investment in maintenance capacity. Over the past five years, the Everett Maintenance Facility was rehabilitated and converted to service CNG-fueled buses; the Pawtucket commuter rail layover facility opened; and bus garage upgrades, which were planned through the Authority's environmental management system and which improved energy efficiencies and employee safety, were carried out.



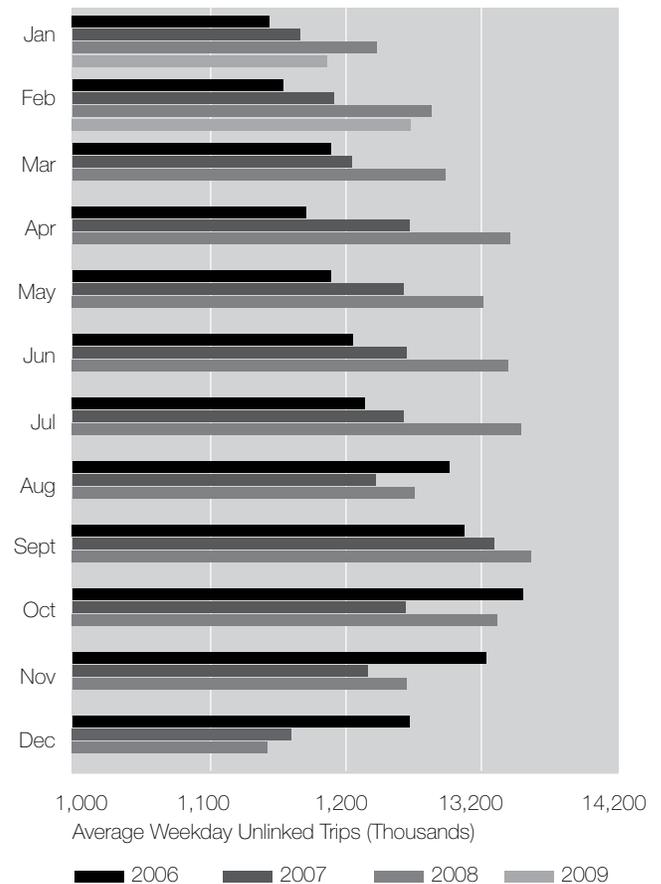
EVERETT MAINTENANCE FACILITY RECONSTRUCTION

- Power System Improvements: The MBTA upgraded power distribution systems through investments that include trackless trolley pole replacement and new transformers at the Wellington and Wonderland Traction Power Substations.

IMPROVING CUSTOMER SERVICE: CLEANLINESS, COURTESY, CONVENIENCE, AND COMMUNICATIONS

- System Ridership Growth: In 2008 the MBTA experienced record ridership, with 1,258,379 average weekday unlinked passenger trips on its system.

**FIGURE 2-2
System Ridership Growth**



- Automated Fare Collection: The automated-fare-collection (AFC) system was successfully introduced on the bus and rapid transit systems. New fare media and gates replaced tokens and turnstiles in January 2007. By mid-2008, more than 1.2 million CharlieCards were in active use and almost 70% of MBTA bus/subway customer transactions were made with the CharlieCard. In 2007, an additional \$13 million of revenue was realized (over and above the fare increase). Plans call for phased expansion of the CharlieCard system to commuter rail and commuter boat between 2009 and 2011. Automated fare collection also reduces fare evasion.
- Station Management Initiative: This initiative, which includes the AFC system, delivered efficiencies and customer service improvements to MBTA Operations. Chief among these efficiencies are time savings in vehicle

boarding and more reliability in data collection and revenue accounting.

- **Customer Service Department:** The Authority transformed its customer feedback operations by establishing a Customer Service Department to centralize processing of service-related inquiries and complaints. Automatic Call Distribution systems better manage intake, response, and monitoring of customer contacts. The MBTA Customer Care Call Center, on average, processes more than 50,000 customer communications each month.
- **Customer Information On-Line:** The Authority launched its updated user-friendly website focused on customer service and featuring T service alerts and an interactive trip planner. The MBTA's website, www.mbta.com, has received industry recognition for excellence.
- **Customer Communications on Vehicle and In Station:** Public Address/Variable Message Signs (PA/VMS) announcing stop locations were installed on all MBTA Buses and Subway Cars. Through the Operations Control Center, the capability is in place to provide the rapid transit system and bus stations with visual and audio announcements via visual electronic signs and a public address system. The system announces the arrival and destination of trains entering stations. This initiative addresses a long-term customer issue by making audible messages intelligible throughout T stations and relaying timely information to customers.
- **Public Address/Variable Message Signs for Commuter Rail:** Solari information boards and monitors are in use at North Station, South Station, and Back Bay Station. Planning/design is underway for an LED Sign System upgrade to include provision of next-train information; implementation is planned for 2009.
- **Connected on the T:** Wi-Fi Internet access was introduced on the commuter boat and commuter rail systems.



COMMUTER RAIL CUSTOMERS ENJOYING ONBOARD Wi-Fi ACCESS

- **Silver Line Intelligent Transportation Systems (ITS):** Real-time customer information “count-down” messages implemented along Silver Line Washington Street, as well as Traffic Signal Priority (TSP) at four key intersections along the route (which extends the green light for buses operating behind schedule).
- **Informing Customers When the Next Vehicle Will Arrive:** Began design work on a system-wide real-time customer information system, to provide bus and subway customers with accurate minute-by-minute predictions of vehicle arrivals and departures via electronic signs, mobile devices, the MBTA website, and other devices; two pilot programs are planned for 2009.
- **Rider Oversight Committee:** The Rider Oversight Committee (ROC) was established in 2004 as a forum for MBTA management to review and discuss Authority operations with customers. The 2009 Committee is comprised of 28 members: eight public members, four alternate public members, eight advocacy members, and eight MBTA members.

- The Committee meets with MBTA staff in standing subcommittees throughout the month. The full membership meets once each month and quarterly meetings are held with the Secretary of the Executive Office of Transportation and Public Works (EOT), the MBTA General Manager, and the Deputy General Manager and Chief Financial Officer.
- The Committee addresses various transit-related issues including MBTA fare policy, fare structure and equity issues, service improvements, service quality standards, ridership data collection as well as financial sources for both the capital program and operating budget.
- Members of the general public are encouraged to participate at the MBTA ROC meetings.
- Making the T Customer Friendly: A recertification program developed to address issues involving courtesy and customer interactions. All bus operators participated in this program, which was implemented in late 2008. The Courtesy Counts marketing campaign was initiated. The campaign focused on customer relations and accessibility issues.
- Less Crowding at North Station: Cramped conditions at North Station were alleviated with the expansion of the station's lobby area. The passenger waiting area quadrupled in size and was outfitted with additional customer seating, as well as with increased commercial-vendor space.
- Cambridge Restroom Improvement Program: Red Line restrooms were renovated and open to the general public.
- Station Cooling: Station cooling devices and fans were deployed in subway stations to improve the customer waiting experience.
- Mattapan High Speed Line HVAC System: The fleet of PCCs built in 1945–1946 were retrofitted with air conditioning and heating

units. These are the first PCC cars at the MBTA with HVAC systems.

- Recycling: Through a recently initiated recycling program, more than 550,000 tons of paper have been collected each year, generating revenue for the Authority.

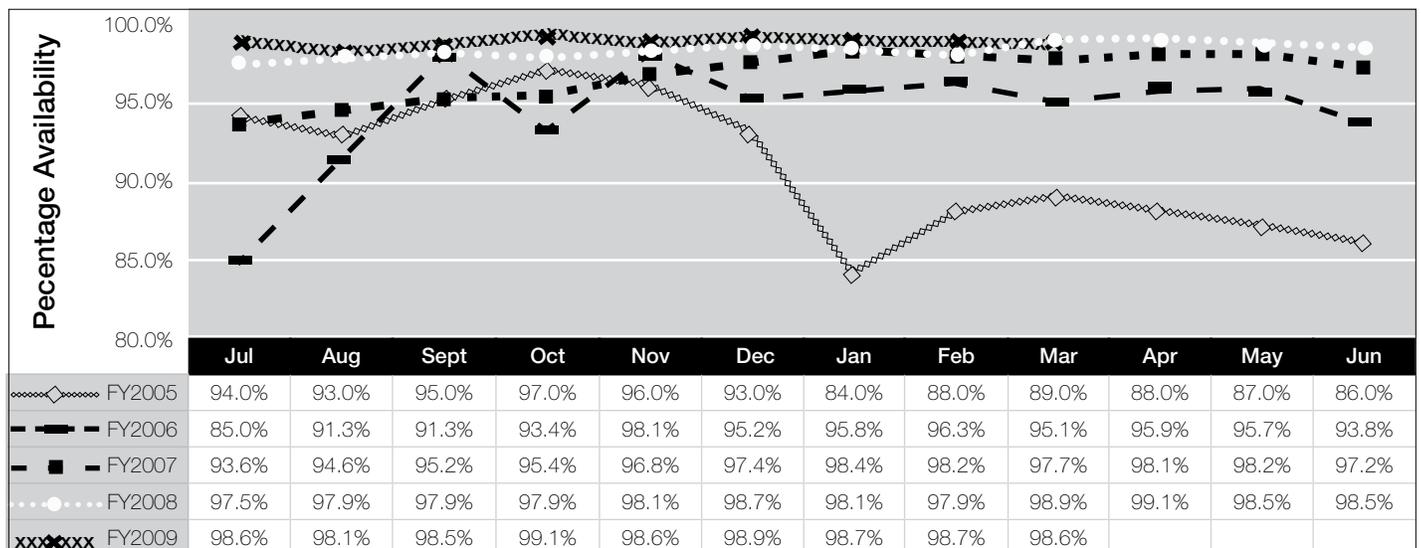


REPOSITORIES FOR THE MBTA'S RECYCLING PROGRAM

- Commuter Rail Windows: Discolored windows were replaced on single-level commuter rail coaches.
- Fiber-Optic Installations: Fiber-optic cable was installed for improved communications at:
 - Green Line D Branch
 - Arborway bus garage
 - Reservoir carhouse
 - Green Line, Science Park to Lechmere
 - Red Line, Central Square to Alewife
 - Green Line, Copley to Symphony
 - Riverside Station and Yard

- Escalators: All escalators to be evaluated and prioritized for replacement and/or modernization (This action anticipated to be complete during the 2nd quarter of 2009). A new contract for Vertical Transportation Consulting Services is in development to accommodate the implementation of the Systemwide Escalator Replacement Program. A program is underway to install escalator operation switches (one key for all units-systemwide) for use by station officials. Installation will coincide with the Escalator Energy Savings Initiative implementation to minimize unit down-time. Other escalator initiatives include an investigation of the feasibility of installing escalator energy savings devices (Results and recommendations expected during the 2nd Quarter of 2009);
- Redundant Elevators: The MBTA commenced a program to introduce additional elevators at a number of heavily used stations across the system. The program will improve service reliability at each of these locations. The stations currently in design include:
 - Porter Square Station
 - Harvard Square Station
 - Park Street Station
 - State Street Station
 - Downtown Crossing Station
- Newly Accessible Stations: As a result of ongoing station accessibility improvements, the following stations became accessible: Charles/MGH, Savin Hill, Fields Corner, Shawmut, Capen Street, Central Avenue, Milton, Butler, and Cedar Grove.
- Station Reconstruction: The MBTA is currently in the process of making a number of stations across the system accessible to people of all abilities. Many of these projects include the introduction of elevators, upgrades to escalators, station modernization, and, on the Green Line, platform elevation. Among the projects completed over the past five years or currently underway are:
 - Savin Hill Station
 - Field Corner Station
 - Shawmut Station
 - Ashmont Station (ongoing)
 - Kenmore Station (ongoing)
 - Copley Station (ongoing)

FIGURE 2-4
Average Monthly Escalator Reliability SFY 2006–SFY 2009



- Arlington Street Station (ongoing)
- State Street Station (ongoing)
- Government Center Station (in design)
- Maverick Square Station (ongoing)
- Airport Station
- Orient Heights Station (in design)
- Science Park Station (in design)
- New High-Level and Mini-High-Level Platforms: Mini-high platforms and raised platforms have been deployed in selected stations to replace crank lifts; this allows for faster and easier service for persons with disabilities.
- Fully Accessible Bus Fleet: The bus fleet became 100% accessible in 2006 when older buses were replaced with new low-floor buses.



MBTA LOW-FLOOR BUS

- Public Address/Variable Message Sign System (PA/VMS): The MBTA equipped all buses with automatic-stop-announcement systems that have both visual and audio capabilities, to announce every stop, which further enhanced the system. This was done in response to the settlement agreement with the

Boston Center for Independent Living.

- Low-Floor Green Line Cars: The Green Line Type 8 car procurement was completed in 2009, allowing for a low-floor car to operate on every Green Line train. These cars offer faster boarding times for wheelchair users.
- THE RIDE Paratransit Computer System: A state-of-the-art computer system was introduced. It provides:
 - Enhanced scheduling and dispatching capabilities, with integrated mobile data computers on all RIDE vehicles
 - Internet and voice recognition access for customers
 - New electronic fare/debit system
 - Enhanced Automatic Vehicle Locator real-time monitoring tools for Authority personnel
- THE RIDE Fleet: Approximately 635 vehicles, including sedans and lift-equipped vans, provide RIDE service. All vehicles are equipped with radios, Automatic Vehicle Locators (AVL), and Mobile Data Computers (MDC). Digital event recorders have been installed in 200 vehicles. Recent vehicle purchases include:
 - 69 vans and 174 sedans in November 2004
 - 50 vans and 21 sedans in 2006
 - 84 vans in December 2007
 - 42 vans in August and September 2008
- THE RIDE Ridership:
 - Record ridership in SFY 2008 of 1,764,113 trips, up 437% since the passage of the Americans with Disabilities Act (ADA) in 1990
 - Over 61,000 registered RIDE customers
 - Ridership has increased at least 8% each year since SFY 2006
 - Eligibility applications are averaging 1,400 per month

- THE RIDE Service:
 - 0% trip denials since SFY 2006.
 - On-time service is 98.7% for the category “within 30 minutes of scheduled pickup time,” and 92.2% for “within 15 minutes.”
 - Complaints have been reduced by 20% for year-to-date SFY 2009, as compared to the prior year.
 - Service contracts for SFY 2010–14 have been approved for all three contractors, with a total contract value of \$440 million.
 - THE RIDE supported the newly formed MetroWest RTA by continuing to provide service to Framingham and Natick customers until June 30, 2009.



MBTA BIKE CAGE FACILITY

- Bicycles: Cyclist access to the MBTA system expanded significantly, as 50% of the bus fleet was outfitted with front-mounted bike racks; two bike cage facilities (including 6 closed-circuit-television (CCTV) cameras and 2 Police Emergency Call Boxes) were constructed at Alewife to accommodate 300 additional spaces, for a total of approximately 500 spaces; bike parking expanded at other stations as well; and bike coaches were intro-

duced for weekend service on commuter rail.

- Parking: More than 5,300 parking spaces were added to the MBTA system as part of ongoing efforts to meet regional transit access demand. Parking projects that have been completed include Walpole, Gloucester, Lawrence, North Leominster, Fitchburg, Westborough, and Wilmington, as well as station lots on the Greenbush Line.
- Signage:
 - Replaced out-of-date porcelain enamel subway system maps with updated, easier-to-maintain system maps.
 - Added neighborhood maps and bus network maps in subway stations.
 - Deployed route-specific bus stop signs listing the bus routes and destinations at selected stops.
 - Developed a wayfinding signage pilot program at Alewife Station.
- Rowes Wharf: Negotiated a new dock license for Rowes Wharf, paving the way for future improvements to that facility with regard to ADA accessibility.

ENSURING SAFETY AND SECURITY

- Hub Area Network: Hub Area Network was established as a key component of the Station Management Initiative; it includes a system of monitoring subway stations via closed-circuit TV. Hubs are located at Harvard, South Station, North Station, Back Bay, Ruggles, JFK/UMass, and Airport. Subway officials were assigned to these locations to monitor remote areas and verify employee rule compliance, with the added benefit of improving customer safety and security. Security cameras were installed on 310 New Flyer ECD buses, and 17 of the NABI CNG buses were retrofitted with camera systems. Future plans are to retrofit all MBTA buses during their midlife overhaul.

- License Monitoring: Implemented an Automated License Monitoring Program in coordination with the Registry of Motor Vehicles to ensure that every bus operator has a valid license every day.
- Rules Compliance Program Database: Developed a Safety Rules Compliance Program database to record and monitor inspections performed by field officials.
- Homeland Security Needs Assessment: Authority-wide analysis completed in order to facilitate federal funding for improvements.
- Bus Simulator: This equipment replicates a variety of driving conditions designed to improve the skills of both new and veteran drivers. Although the simulator is not a substitute for on-the-road training, which constitutes the majority of the training, it is designed to improve driver skills.
- CCTV: CCTV systems were installed at Charlestown and Cabot bus garages, and in



MBTA OPERATIONS CONTROL CENTER – CCTV UPGRADE

support of the Blue Line six-car-train implementation at Bowdoin, Government Center, State, and Suffolk Downs Stations.

- Green Line Event Recorder Program: Event

recorders were installed at all Green Line interlockings, allowing for data retrieval to aid in incident investigation. These devices capture the status of all wayside signal devices, allow train movements to be replayed, and are useful in diagnosing maintenance problems.

- Interoperability: Transit Police and Metro Fire radio channels were installed at the Operations Control Center at 45 High Street. Cambridge fire and police departments, as well as ITAC channels, were incorporated into the Systemwide Radio Project.
- Emergency Ventilation Fans: Remote monitoring and control units were replaced with programmable logic controllers.
- Fire Alarm Pull Stations: These were installed in Orange Line stations at Forest Hills, Green Street, Stony Brook, Jackson Square, and Massachusetts Avenue.
- Other security features: Other security features that have been implemented include intrusion detection, emergency lighting, and a wide-area-network (WAN) system. This include new door contacts and wiring for emergency exits at 42 transit stations, and new emergency exit crash bars on doors at 8 stations. New key cabinets were installed for improved security.

INSTITUTING BEST MANAGEMENT PRACTICES

- Attendance Policy Tools: An Attendance Policy tracking and enforcement system was implemented to automate and standardize the process of counting employee absences and determining when corrective action is needed.
- Time Clock: A biometric hand-scanning Time Clock system was implemented in all vehicle and facility maintenance departments to improve accountability.
- Substitute Coverage List Tools: The MBTA

implemented this system to assist in the management of the Substitute Coverage List program, designed to ensure fair and consistent coverage of vacancies in certain critical supervisory positions in Operations.

- Overtime spending in Bus and Subway Operations was reduced 54% from SFY 2005 to SFY 2009, while the Operations employee headcount increased less than 6%, from 4,026 employees in SFY 2005 to 4,267 in SFY 2009.

INSTITUTING NEW TECHNOLOGIES AND PRACTICES TO INCREASE ENERGY EFFICIENCY AND IMPROVE THE ENVIRONMENT

- Transit-Oriented Development (TOD): The MBTA worked with municipalities and the development community in promoting transit-oriented development, which creates new markets for transit while minimizing auto trips and parking requirements. TODs completed since 2003 or currently under construction include the Landing at Wellington Station, Avenir at Bulfinch Triangle near North Station, Arborpoint at Woodland Station, Cordage



TOD PROJECT – TROLLEY SQUARE IN CAMBRIDGE

Park in Plymouth, and the Carruth development at Ashmont Station.

- New Diesel Engines: In 2005, five new diesel engines were procured for the two MBTA-owned passenger ferries to meet the Environmental Protection Agency (EPA) Tier II emissions requirements, at a cost of \$795,000.
- Emissions:
 - A Bus Emission Monitoring and Control Program was put in place. All MBTA locations are tested three times per year.
 - The use of low-emission fuels was adopted for the bus fleet and commuter rail.
 - Environmental Management System policies and procedures were instituted in operations facility management.
 - Selected non-revenue vehicles were replaced with Ford Escape hybrid vehicles.
- Environmental Remediation Initiatives Implemented: These include Lynn Bus Garage Gasoline Tank and Dispensing System Removal; Quincy Garage fuel tank replacement; treatment systems installed at maintenance facility bus wash; and maintenance facilities energy conservation projects.

ENHANCING AND EXPANDING SERVICE TO INCREASE RIDERSHIP AND IMPROVE REGIONAL MOBILITY

- Greenbush Line Opening: This new line, the third branch of the Old Colony lines, opened in October 2007, providing new commuting options between Boston and the South Shore. The average daily ridership is over 2,000.
- Expanded Commuter Rail Service: Additional service was provided to the Anderson Regional Transportation Center, Providence, Worcester, and Fitchburg.

- New Station at T. F. Green Airport: The Rhode Island Department of Transportation commenced station construction at T. F. Green Airport. Under the Pilgrim Partnership initiative, the station will be available for MBTA commuter rail service.
- Fairmount Line Improvements: The first phase of the Fairmount Improvement Program has been completed. It included modernization of existing stations and upgrading of the signal system, including interlockings. The second phase, major bridge reconstruction and the addition of four new stations in Roxbury, Dorchester, and Mattapan, is under design; construction should be completed by 2011.
- Silver Line Phase III: The planned bus rapid transit (BRT) tunnel connection between South Station and Boylston Street advanced through preliminary engineering and into the federal New Starts funding process.
- Green Line Extension: EOT initiated project development with the MBTA for a Green Line extension to Somerville and Medford, with operations anticipated to begin by the end of 2014.
- Track Acquisitions for Planned New/Additional Service: EOT, on behalf of the Commonwealth, reached agreement in 2008 with CSX Inc. regarding the purchase of rail corridors. It is anticipated that the Commonwealth will purchase from CSX the New Bedford–Fall River Line, along with CSX's rights in the Boston Terminal Running Track and West First Street Yard in South Boston, and the Grand Junction secondary line that extends from Beacon Park Yard through Cambridge, Somerville, Everett, Chelsea, and East Boston. This agreement is a major advance in promoting expansion of rail service to Fall River and New Bedford, enhanced rail service to Framingham and Worcester, and Urban Ring Phase 2. EOT issued an Action Plan for South Coast Rail and began planning for a commuter rail extension to Fall River and New Bedford. The target date for completion of the project is 2016.
- Red–Blue Connector: EOT, on behalf of the Commonwealth, will complete design and engineering of the Red–Blue Connector by the end of 2011.
- New Commuter Boat Vessel: A third vessel was introduced in 2005 to provide additional AM and PM peak-period commuter boat trips between Hull and Boston. In addition, procurement was initiated for new commuter ferry boats for estimated delivery in late 2011.
- Hingham Shipyard Ferry Terminal Expansion: The MBTA performed a land swap with the Department of Conservation and Recreation in 2006 for land located at the Hingham Shipyard. The MBTA property was privately redeveloped into a 1,796-space parking lot, which includes new access roadways, and improvements to signalization, lighting, curbing, pedestrian walkways, landscaping, and signage.
- Additional Green Line E Branch Service: E Branch peak-period service has dramatically improved, accommodating a long-standing request from Northeastern University and the Longwood Medical and Academic Area. This nearly doubles the number of trains and increases train frequency from 9 to 5 minutes just before and just after the PM peak period.
- Contracted Bus Service in Winthrop: A six-year contract for Route 712/713 bus service between Orient Heights and Winthrop commenced in 2006, with improved scheduling and six new El Dorado low-floor, 35-passenger buses with wheelchair ramps.