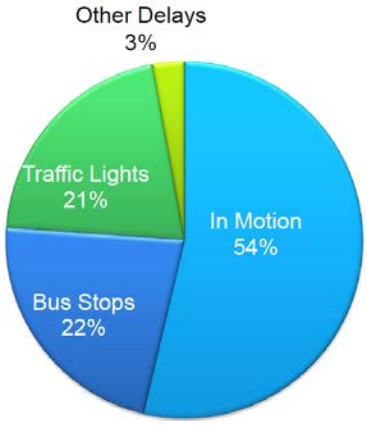
New York City's Select Bus Service: A Potential Model for Metrobus?

Earlier this year, a small team of planners from Metro's Office of Planning, the Office of Bus Planning, the District Department of Transportation (DDOT), and DC Surface Transit had an opportunity to visit our colleagues in New York and to see their Select Bus Service in action. Metrobus riders know we need to greatly reduce travel times and improve customer service, and we think the Select Bus Service provides an excellent real-world model of success (and a few cautionary tales) for our region.

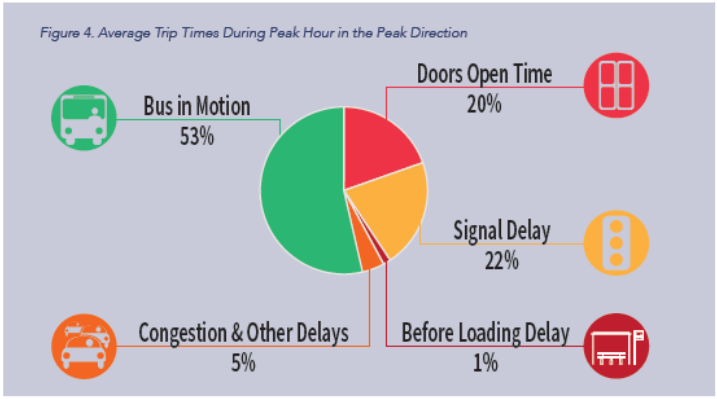
Just as we've experienced in and around DC, bus speeds in New York have fallen steadily over the past three decades, and continue to do so. The system-wide average speed of a bus in New York has fallen to 7.5 mph, and routes serving some of the most congested corridors in Manhattan and Brooklyn are down to 4-5 mph. The greatest impediment to faster bus service is congestion generated by ever-growing densities of people and jobs, but traffic isn't the only factor. Just like in our region, buses in New York spend only around half of their in-service time actually moving forward; movement and speed are also constrained by traffic signals and passenger boarding:

Bus Run Time Components - NYC



**Source: MTA New York City Transit*

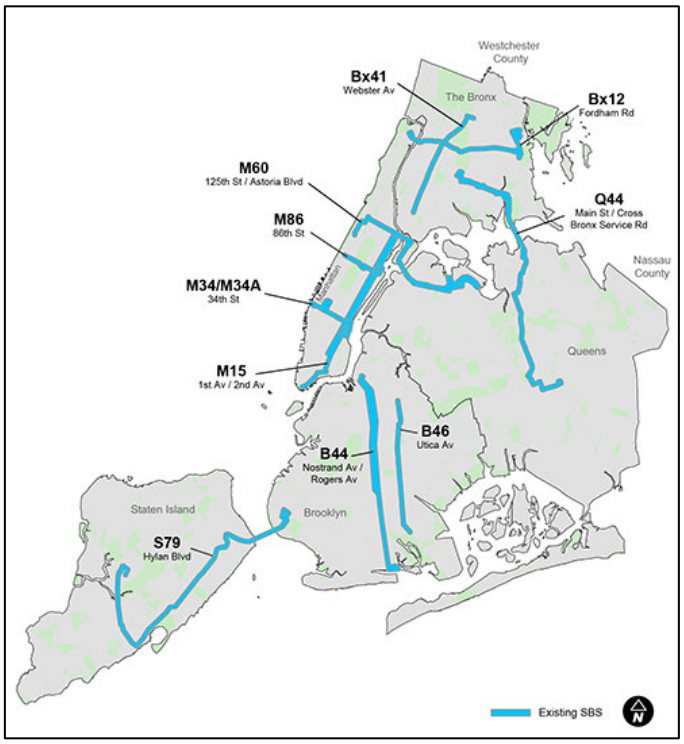
Bus Run Time Components – 16th Street, DC



**Source: DDOT, 16th Street NW Transit Priority Planning Study*

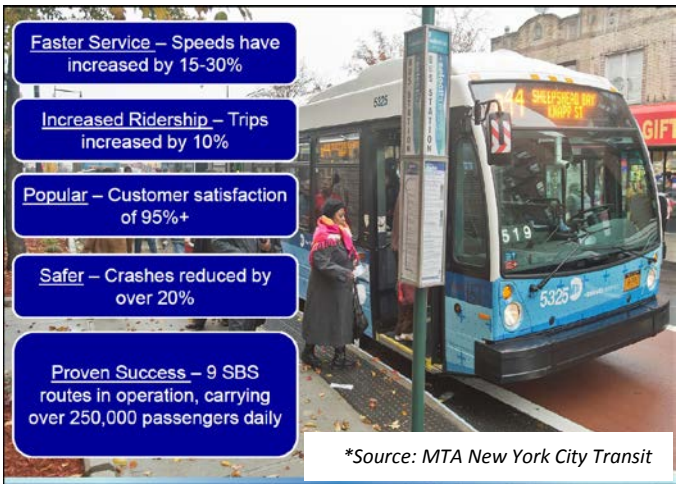
That consistent decline in service quality deflated demand, meaning ridership and fare revenue didn't grow in step with the city's population. New York City added around a million new residents since the late 1990s, but while subway ridership shot up to an all-time peak of 1.75 billion trips per year in 2014, bus ridership has remained essentially flat at around 660 million annual boardings. And just as we've seen with the Metrorail system, growth in densities and ridership hasn't been spread evenly throughout the system; some subway lines have plenty of excess capacity, while others carry crush loads that create safety and service reliability issues. NYC transportation officials knew they needed to provide some sort of high-performance alternative to overcrowded subway lines, and decided the best strategy was to make bus services faster, more effective, more attractive, and easier to use.

MTA New York City Transit (NYCT) and the New York City Department of Transportation (NYCDOT) teamed up to craft such a strategy, and the Select Bus Service is the result. The SBS network currently consists of ten routes, with at least one line in each of the city's five boroughs, and another 13 lines in various stages of planning and development. The ten current routes alone carry around 250,000 riders every weekday.



Since the inception of SBS service, average travel speeds in these corridors have increased by 15-30%; ridership has grown by 10%; crashes have been reduced by over 20%; and customer satisfaction has risen to 95%. Those results are quite impressive, especially considering that each SBS route replaced existing local routes in high-demand travel corridors, rather than expanding into new areas.

So how did SBS produce those results? How does the system actually work? Well, for a start, NYCT and the NYCDOT adopted the "toolbox" approach of developing a high-performance transit system, rather than trying to adhere to a rigid definition of "bus rapid transit" (BRT). They carefully analyzed the current and near-future travel needs, problems, and barriers to transit demand in each corridor, and assembled the right mix of transit prioritization strategies and technologies to address those particular needs. In most corridors this meant a full BRT treatment consisting of:



Source: MTA New York City Transit

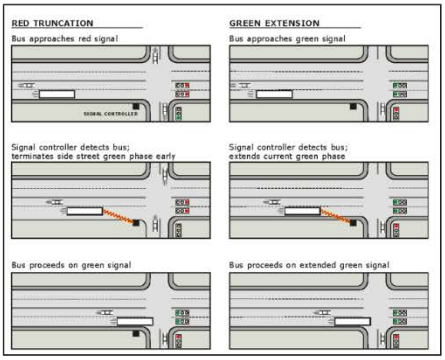
Bus Transit Prioritization and Service Improvement Strategies

60-foot Articulated Buses

Limited Stops and High Frequencies (5-10 Minutes)

Dedicated Bus Lanes

Off-Board Fare Payment



Transit Signal Priority (TSP)

Formal Stations and Real-Time Passenger Information

In some cases the partnership determined traffic congestion didn't warrant - or political pressures wouldn't allow - dedicated bus lanes, but service was still improved by reducing stops, implementing TSP, and speeding passenger boarding by removing fare payment from the vehicle. Indeed, two lines in Manhattan utilize only off-board fare payment as the primary prioritization strategy, yet still delivered similar benefits. The partnership has not yet undertaken a through performance analysis of the off-board fare payment component itself, but staff believes it has had a substantial and beneficial impact. They noted that under the SBS proof-of-payment system (described in more detail below), boarding time per passenger has decreased from around 5 seconds per boarding using a MetroCard to one or two seconds per passenger on SBS routes, and that these two routes have delivered similar travel time benefits, ridership increases, and customer satisfaction results as the other lines. These two SBS lines provide a particularly important example for Metro, as off-board fare payment is one of the only transit prioritization strategies we can pursue directly, and with a lower level of financial and political commitment from our partner jurisdictions.

Off-board fare payment system (OBFPS)

The OBFPS for SBS deserves special mention, both because Metro and its partners are moving in that direction, and because it offers some useful cautionary lessons for implementation. Customers pay the $2.50 fare using either a MetroCard or coins (no cash) at special Select Bus kiosks (see the photo below), which prints out a time-stamped paper ticket. When the bus arrives, customers can walk on or off without interacting with the farebox or operator. Riders must retain the paper ticket from the kiosk as proof of fare payment, ready to show to roving fare enforcement officers. Each fare is good for one trip on that specific corridor, and must be used within one hour of purchase. Transfers between routes are free when paying with a MetroCard, but the rider does need to get a new paper ticket for the connecting route from the payment kiosk; customers who paid with coins need to board at the front door and ask the operator for a transfer.

Each SBS station includes at least two kiosks: A MetroCard payment machine similar to the larger and more complex Ticket Vending Machines (TVMs) used in the subway system, and a coin payment machine similar to solar-powered Parkeon® parking meters. Both provide SBS paper tickets. This approach of using two different machines is another aspect of SBS that makes a compelling test case. The coin machines add considerable capital costs and complexity to service implementation, but because they are solar-powered they have little impact on annual operating costs. The MetroCard machines, on the other hand, use an older technology with higher power draw, requiring a connection to the power grid and adding substantially to annual operating costs. Metro needs to find an option that somehow delivers both operational cost efficiencies and maximum fare payment flexibility.

SBS MetroCard Ticket-Vending Machines

SBS Coin-Based TVM

The decision to include two different machines at each stop may sound odd, and certainly added to the project costs, but the NYCT/NYCDOT partnership was (correctly) very sensitive to the needs to low-income and unbanked customers, and worried that a system based entirely on smart cards would disenfranchise those riders. And since fareboxes on the rest of the bus system only accept MetroCards and coins, it didn't make much sense to introduce an entirely new component that handled cash (cash handling and processing is more expensive than most people would think!). Those concerns were well-founded, as approximately 90% of all bus riders use smart cards and 10% use coins, but to date only around 1% of SBS customers use the coin machines. Unfortunately fare payment technology at the time hadn't progressed as far as it has today, with the possibility of account-based payments by phones and other devices, and the NYCT/DOT partnership felt it needed both machines at bus stops in order to meet its fare payment policies and Title VI obligations. Metro and its partner jurisdictions are lucky to have this example as a cautionary tale to draw on as we plan for OBFP, as we must also carefully balance efficiency, costs, access, and our legal and ethical obligations under Title VI.

OBFP enforcement

During the first two weeks of service, NYCT used roving teams of ambassadors to demonstrate the new fare payment system and did not issue summonses for fare evasion. Following that introductory period, however, fare payment has been enforced by roaming squads of the NYCT Security Department's fare enforcement officers, known as "Eagle Teams." These special police staff have legal authority to issue civil summonses to people who aren't carrying proof of payment. They also have a close working relationship with the New York Police Department, and can call upon NYPD officers for backup if needed. The Eagle Teams started with a staff of 15 in 2008, and have since grown to number 200 officers today. Eagle Teams generally operate in groups of

six, with two plainclothes officers riding the line and making observations, while four others board buses and make quick fare-checking sweeps. They attempt to cover approximately 10% of riders every day. Their stated mission is enforcement of fare payment, but management noted that much of their strategy centers on behavior modification rather than punishment. Currently, only 16% of their interactions with fare evaders result in a summons, but NYCT and the police department estimate that fare evasion is down 45% - 80% (depending on the corridor) since implementation.

Project funding and implementation

Each agency assumes financial and project management responsibilities for its typical share of the project components, through their own various funding sources. NYCDOT handles all the on-street components and right-of-way capital projects, while NYCT pays for vehicles, bus technology, branding, fare payment systems, and the route's operating costs. On a system-wide average, one SBS line costs NYCDOT approximately $10 million for in-street investments, and NYCT pays approximately $5 million in capital costs and $2-3 million per year in operating costs.

In general, full deployment of these services takes around one to two years for corridor planning and system development, then another six months to two years from construction to opening of service, depending on the scope and complexity of work.

What is Metro doing, and how does this help?

The point of this trip was not to meet our colleagues in New York, or to enjoy its myriad culinary options. All of our regional transit service providers know we need to deploy some variation of bus rapid transit in several high-demand corridors, but full implementation of Metro's Priority Corridor Network Plan (PCN) and other BRT plans will take many years and a lot of money. Policymakers and funding partners can be hesitant to commit to those investments when so many other urgent needs are competing for limited resources. Real-world examples of successful systems can help mitigate concerns and even stoke excitement by providing applied models of benefits, costs, performance improvements, and lessons learned. This first-hand experience with the Select Bus Service helped convince participants of the importance of pursuing the PCN, and gave them information and data points to take back to leadership.

The trip was also tied to a pending project. Metro, DDOT, Arlington, and Federal City Council are working together on a pilot project to engage private-sector investors in supporting an OBFPS on several regional Metrobus routes. This pilot project is a terrific opportunity to identify the most effective fare technology and deployment strategy for substantially reducing passenger boarding times and operating costs, while maintaining access and ease of fare payment for our customers. It will also allow us to test the viability of private-sector financial support for Metro projects. We know the business case for this pilot is solid, but it truly helped to see a successful OBFPS in action.

In the end, an OBFPS will be one step forward in a larger effort to implement BRT services. NYCT and DOT undertook detailed studies to demonstrate the value of prioritizing bus services, but had the resources and political capital to implement them relatively quickly. The resources of WMATA and its funding partners are greatly constrained and subject to numerous competing demands, so we need to take a more incremental, compartmentalized approach to BRT. If we can engage the interest and resources of the private sector and do it faster, so much the better.