Benefits of Long-Range Capital Planning

Presentation at the Transportation Research Board
9th National Conference on Transportation Asset Management

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New York Metropolitan Transportation Authority

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1. MTA System Overview
2. Origins of the Capital Plan
3. Capital Planning and the Twenty Year Needs Assessment
4. Benefits to Date
The Nation’s Largest Transit System
NYC Transit/Staten Island Railway

Key Facts on Subways

- Avg. Weekday Riders: 5,284,930
- 2011 Ridership: 1,640,327,811
- Lines Operated: 23
- Daily Trains Operated: 8,279
- Stations: 468
- Track Miles: 631
- Subway Cars: 6,311
- Signals: 12,080
- Mainline Switches: 3,259
NYC Transit/MTA Bus

Key Facts on Buses

Avg. Weekday Riders: 2,522,290
2011 Ridership: 783,562,437
Bus Routes: 297
Buses: 5,900
Bus Stops: 15,226
Metro-North Railroad

Key Facts

Avg. Weekday Ridership: 281,445
2011 Ridership: 82,037,786
Lines Operated: 8
Daily Trains Operated: 728
Stations: 120
Track Miles: 775
Rolling Stock: 1,193
Long Island Rail Road

Key Facts

- Avg. Weekday Riders: 283,248
- 2011 Ridership: 80,983,003
- Lines Operated: 11
- Daily Trains Operated: 735
- Stations: 124
- Track Miles: 594
- Rolling Stock: 1,185
8

MTA Bridges & Tunnels

Key Facts

7 Bridges 2 Tunnels

Daily Vehicles: over 800,000
2011 Vehicles: 280 million
Avg. Daily Travelers: 1 million
Toll Revenue: $1.3 billion
% to transit: over 50%

E-ZPass Information
800-333-TOLL
(800-333-8655)
Origins of the Capital Plan

By 1982 the system was on the brink of collapse

- Graffiti, crime and poor image
- Subway ridership fell 40%
- Crumbling network of legacy railroads
- Frequent breakdowns and derailments

*Photo Credit: "The Carasie Kid" on Flickr*
Origins of the Capital Plan

*Paradigm shift to rescue the system*

- Five year investment plan mandated by state legislature since 1982.
- Establishment of an Independent Engineer Consultant for better oversight
- Twenty Year capital planning and asset management process:
  - Identify needs to maintain state of good repair
  - Support long-term service goals
The Process

1. Asset Inventory and Condition Assessment Update.
2. Long-term priorities and impacts in five year increments.
3. Integration of a Transit Asset Management (TAM) Model.
4. Regional Strategic Review.
1. Asset Inventory and Condition Assessment Update
- MTA agencies inventory and rate conditions of all assets.
Long-Term Priorities and Impacts in Five-Year Increments

MTA Uniform condition rating framework

Worse 4 3 2 1 Better

- Asset conditions rated on a scale of 1 (best) to 4 (worst) and informs capital needs 5 year and beyond
- **4 = Deteriorated:** Serious functional deficiencies; unacceptable stoppage expected.
  - *Priority capital investment.*
- **3 = Deficient:** Serious functional deficiencies; stoppages can be minimized through maintenance.
  - *Capital investment can be deferred at some expense.*
- **2 = Acceptable:** Considered to be adequate; stoppages addressed through maintenance.
  - *Capital investment can be deferred.*
- **1 = Modernized:** meet most standards.
  - *Replacement not needed in next 5 years.*
The Data: Asset Inventory & Condition Assessment

- Evaluates asset investment strategies for optimal replacement:
  - Cyclical or needs-based, component or renewal needs
- Develops strategies for each asset category to prioritize critical needs.
- Projects the SGR backlog.
- Prioritizes SGR needs.
- Constrained only by:
  - operations
  - market for construction
  - Internal resources
### Part A: Summary of Capital Assets
#### T-4 Stations

<table>
<thead>
<tr>
<th>Component</th>
<th>Total Units</th>
<th>Condition Distribution</th>
<th>Recent Investment</th>
<th>Asset Status</th>
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<tbody>
<tr>
<td><strong>Passenger Stations</strong></td>
<td>467</td>
<td><img src="chart1.png" alt="Chart" /></td>
<td>Program Units Norm $</td>
<td><img src="status1.png" alt="Status" /></td>
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<td><strong>Platforms</strong></td>
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<td>Program Units Norm $</td>
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<td><strong>Platform Edges</strong></td>
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<td>Program Units Norm $</td>
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<tr>
<td><strong>Mezzanines</strong></td>
<td>1,014</td>
<td><img src="chart4.png" alt="Chart" /></td>
<td>Program Units Norm $</td>
<td><img src="status4.png" alt="Status" /></td>
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<td><strong>Stairs</strong></td>
<td>5,105</td>
<td><img src="chart5.png" alt="Chart" /></td>
<td>Program Units Norm $</td>
<td><img src="status5.png" alt="Status" /></td>
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</table>

*Units of Measure: Stations, Platforms, Platform Edges, Mezzanines, Stairs*
2. Long-term priorities and impacts in five year increments
The results of this process include…

- Identification of investment options to maximize passenger service benefits.
- Descriptions, costs, and time periods for all investment categories.
- Framework for next five-year capital plan.
- Future capital investment informed through asset class strategy.

“If you don't know where you're going, chances are you will end up somewhere else.”
- Yogi Berra
## Long-term priorities and impacts in five year increments

### Part B: Capital Needs by 5-year Period

**Category:** T-4: Passenger Stations  
**Date:** 7/15/2009

<table>
<thead>
<tr>
<th>Subcategory</th>
<th>2010-14</th>
<th>2015-19</th>
<th>2020-24</th>
<th>2025-29</th>
<th>TOTAL</th>
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<td><strong>Units: Stations</strong></td>
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<tr>
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<td>46</td>
<td>46</td>
<td>46</td>
<td>136</td>
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<tr>
<td>SI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>44</td>
<td>46</td>
<td>46</td>
<td>46</td>
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<td>81</td>
<td>331</td>
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<td><strong>TOTAL</strong></td>
<td>84</td>
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<td>83</td>
<td>81</td>
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<td>14</td>
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<td>81</td>
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<td>Other</td>
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<td>$56.0</td>
<td>$188.0</td>
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<td>30</td>
<td>14</td>
<td>47</td>
<td>81</td>
<td>172</td>
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</table>

**Notes:**
- NR: Not Required
- SI: Small Improvement
- Other: Other

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**Total Overdue Amounts:** $4,483.4

**Total Cyclatical Rehabilitation Work: $3,107.0**

**Total Station Elevators:** $482.8
3. Integration of a Transit Asset Management (TAM) Model
Integration of Transit Asset Management Model

Transit Asset Management Continuum

Pro: Assessment of "big picture"
Con: Can not predict unexpected events

What is our inventory of projects? / Which projects have priority for next CIP?

What are our long term capital needs? What is the funding gap? What is the SGR backlog?

Decision Support Tools

Capital Projects Database

Pro: Strong understanding of current needs
Con: Not focused on large, long-term events

5 Year CIP, Condition Assessments

What do we need to do now to keep assets in good operating condition?

Pro: "Real time" info on conditions
Con: Very detailed, not suitable for assessing the "big picture"

Maintenance Management Systems

Time Frame of Analysis

Tactical

Medium-Term

Strategic

Long-Term
Leverages 30 years of experience
Builds on evolving asset maintenance management capabilities to develop a compelling argument for sufficient and continual capital funding

- Analytical, off-the-shelf decision support software tool to examine impacts of alternative funding scenarios on future asset conditions
The Output:

- Run scenarios:
  - Asset-based projections of state-of-good-repair (SGR) backlog
  - Future SGR needs
  - Future condition of MTA assets
  - Operating implications in fiscally constrained scenarios

- Prioritize SGR needs:
  - Age
  - Operational Impact
  - Cost Effectiveness

- Integrate into Capital Planning Process:
  - Twenty Year Needs Assessment
  - Five-Year Capital Program

- Graphical Representation
4. Regional Strategic Review
A regional scan is conducted every five years to help identify the need for strategic investments that could be made over the next several capital plans:

- Analyze demographic, economic and travel trends
- Determine the ability of the future network to accommodate these trends
  - Evaluate alternate growth, network and development scenarios
- Previously identified studies/capital initiatives will address capacity/travel deficits
  - New Fare/Customer Information technology
  - Reverse-peak commuter rail capacity
  - Bus network enhancements
  - Corridor studies
Regional Strategic Review

Proposed Strategic Enhancements: 2010-2029

Citywide Improvements
- New Payment Technology Systems
- Improve Accessibility for Physically-Challenged Riders
- Replace Obsolete Signals with Communications-Based Train Control
- Additional Bus Rapid Transit Strategies
- Provide Real-Time Information for Bus and Subway Service

Midtown Manhattan Detail
- 1 Line Extension
- Moynihan Station
- Full-Length SAS
- LIRR East Side Access

New Subway Transfer Points:
- 7th Av Line Corridor Enhancements
- New Subway Transfer Points
- LIRR Jamaica Complex Enhancements

Additional Areas:
- MNR Woodlawn Flyover Improvements
- Gun Hill Rd Intermodal Hub
- SBS/BRT Routes

Full-Length SAS

Queens Blvd Corridor Enhancements
Benefits to Date
Benefits to Date

In the 1980s: Stabilized the System

- Old rolling stock overhauled or replaced
- Eliminated graffiti
- Rebuilt track and stations
- Reduced derailments and breakdowns.

1982 – 1991 Program

- Normal Replacement 5%
- System Improvement 25%
- State of Good Repair 70%

$15.4 billion

Emphasis on stabilizing the system

Photo credit (upper left): www.nycsubway.org, collection of Joe Testagrose
Benefits to Date

In the 1990s: Emphasis shift to Normal Replacement

- One third of subway stations rebuilt
- Lift-equipped buses for better ADA compliance
- High-level rail platforms for faster boarding
- Bi-level coaches increased LIRR capacity
- Introduced MetroCard

1992 – 1999 Program

- Normal Replacement: 41%
- State of Good Repair: 39%
- Network Expansion: 17%
- System Improvement: 1%
- Other: 2%

$18.1 billion

Emphasis shifted to Normal Replacement
Benefits to Date

In the 21st Century: Shift to System Improvement

Improved stations & connections

Developed Bus Rapid Transit

Addressed delays with technology & information

Benefits of investment have freed up funds for System Improvements

2000 – 2004

- State of Good Repair: 27%
- Normal Replacement: 38%
- Network Expansion: 14%
- System Improvement: 19%
- Other: 2%

$21.1 billion
Benefits to Date

And a shift to Network Expansion

Network Expansion now a major focus

New subway and rail projects

Station component renewal program

2005 – 2009 Program

- State of Good Repair 21%
- Normal Replacement 44%
- System Improvement 12%
- Network Expansion 21%
- Other 2%

$21.3 billion

2010 – 2014 Program

- State of Good Repair 23%
- Normal Replacement 40%
- System Improvement 13%
- Network Expansion 22%
- Other 2%

$24.3 billion

$24.3 billion

Benefits to Date
Then and Now

$72.4 billion later (or $107.5 billion in 2012 dollars)……

<table>
<thead>
<tr>
<th></th>
<th>1982</th>
<th>Today</th>
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<tr>
<td><strong>Subways</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridership (in millions)</td>
<td>989.0</td>
<td>1,640</td>
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<td>On Time Performance %</td>
<td>50</td>
<td>85.4</td>
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<tr>
<td>Train Delays</td>
<td>319,500</td>
<td>18,502</td>
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<tr>
<td>MDBF (miles)</td>
<td>10,800</td>
<td>172,700</td>
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<td>Major Felonies</td>
<td>17,497</td>
<td>2,034</td>
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<tr>
<td><strong>Buses</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridership (in millions)</td>
<td>584.5</td>
<td>784.0</td>
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<td>On Time Performance %</td>
<td>83.8</td>
<td>89.1</td>
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<tr>
<td>Bus Delays</td>
<td>276,958</td>
<td>216,503</td>
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<tr>
<td>MDBF (miles)</td>
<td>2,466</td>
<td>3,910</td>
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<td><strong>Long Island Rail Road</strong></td>
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<tr>
<td>Ridership (in millions)</td>
<td>71.4</td>
<td>80.9</td>
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<td>On Time Performance %</td>
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<td>95.2</td>
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<td>4118</td>
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<td>MDBF (miles)</td>
<td>16,168</td>
<td>169,724</td>
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<tr>
<td><strong>Metro-North Railroad</strong></td>
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<tr>
<td>Ridership (in millions)</td>
<td>48.7</td>
<td>82.0</td>
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<td>On Time Performance %</td>
<td>80.5</td>
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<td>MDBF (miles)</td>
<td>18,520</td>
<td>114,347</td>
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</tbody>
</table>

1 As of 1990; 2 As of 1989; 3 As of 1996; 4 As of 1985.
Thank you!

• For more information:
  • [www.mta.info/capital](http://www.mta.info/capital)
  • [www.facebook.com/MTA.info](http://www.facebook.com/MTA.info)
  • [www.youtube.com/mtainfo](http://www.youtube.com/mtainfo)
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