

Keeping on the Right Track: Regional transportation infrastructure & equity initiatives

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ClimateAdaptation Forum

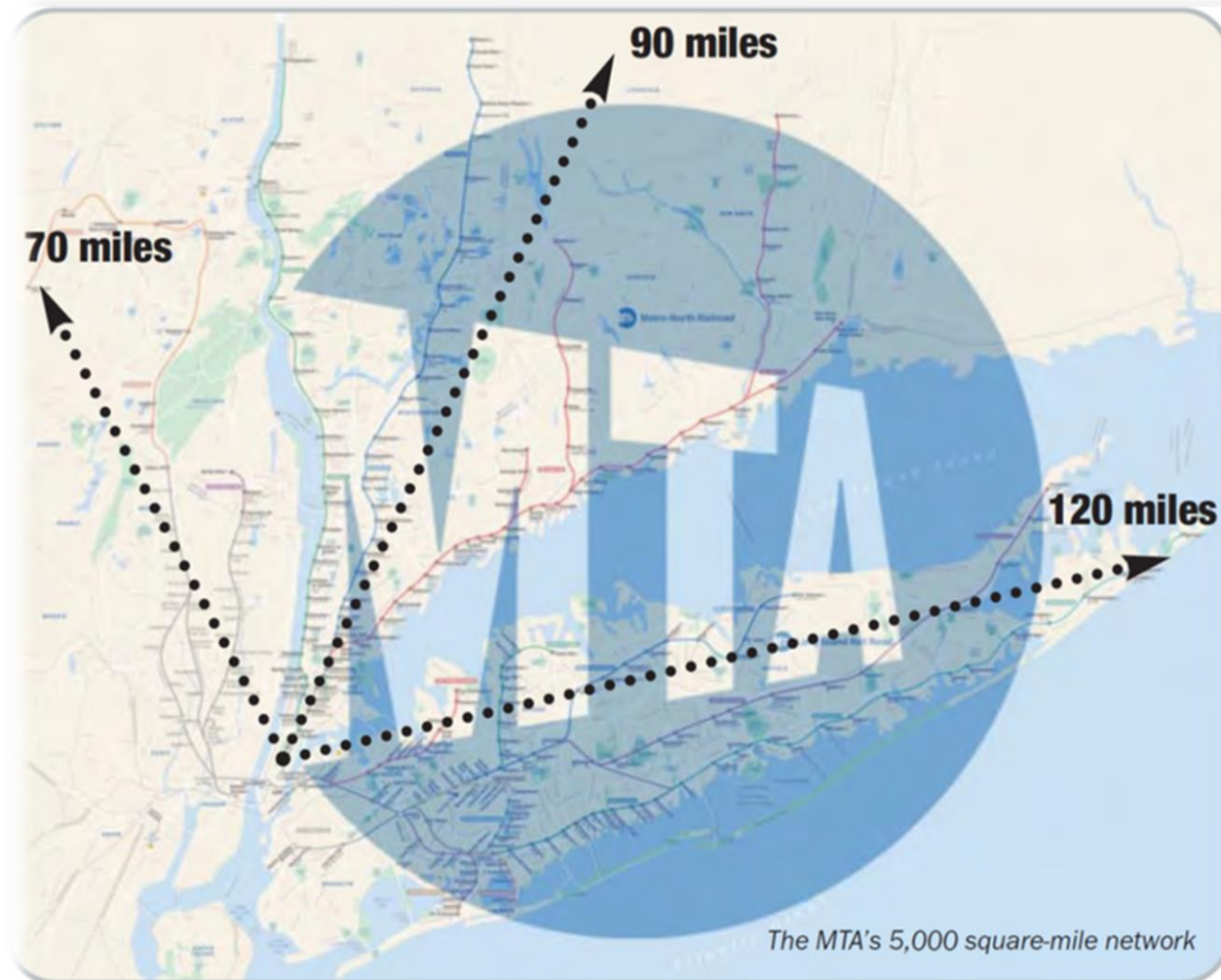
Creating Connections: Resilience and Equity in Transportation

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MTA NY

The MTA at a Glance

- 8-9m Riders/weekday
- 5000 Sq. Mile Operating Territory
- Assets & Infrastructure:
 - ✓ 2000 Miles of Track
 - ✓ 9000 Train Cars
 - ✓ 6000 Buses
 - ✓ 700 Stations
 - ✓ 7 Bridges
 - ✓ 2 Tunnels



MTA Operating Agencies

1

**MTA
Bus**

2

**NYCT
Subways
& Buses**

3

**Long
Island
Rail Road**

4

**Metro-
North
Railroad**

5

**Bridges
&
Tunnels**



**MTA
MISSION**



**Keep Employees Safe
Keep Customers Safe
Keep the System moving**

MTA and New York

MTA Network: Lifeblood of the \$1.4 trillion regional economy

**\$1.4
trillion**
metro area
real GDP

70%
of metro area
wages in MTA
service area

7 million
workers in
MTA service
area

**MTA transit network cover 75%
of the NY metro population**

Sources: MTA; Bureau of Labor Statistics

- 
- 1 – Orange County
 - 2 – Dutchess County
 - 3 – Putnam County
 - 4 – Rockland County
 - 5 – Westchester County
 - 6 – Fairfield County (CT)
 - 7 – New Haven County (CT)
 - 8 – Richmond County
 - 9 – Bronx County
 - 10 – Kings County
 - 11 – Queens County
 - 12 – New York County
 - 13 – Nassau County
 - 14 – Suffolk County

MTA and New York

The Triple Bottom Line

Regional economic strength

- A flexible network that fosters continued growth
- A resilient network that insulates the region's economy from extreme weather events

Social equity

- Low-cost fares for all residents with reliable service

Revitalization/rebirth of urban & suburban neighborhoods

- Reliable service with low-cost fares
- Expanded affordable housing in emerging neighborhoods

Lowest per capita energy consumption & GHG emissions

- Moves the masses translating to fewer cars avoiding CO2 emissions

MTA and New York

Regional Economic Strength

MTA Contributes More Than 400,000 Jobs to Local Economy

| | Annual | Total 5 Year Program | | |
|------------------------------------|----------------|----------------------|-------------------------|-------------------|
| Region | Employment | Employment | Labor Income (Millions) | Output (Millions) |
| North Country and Capital Regions | 2,465 | 12,327 | \$733 | \$1,916 |
| Southern Tier Region | 275 | 1,375 | \$52 | \$204 |
| Western NY & Finger Lakes Regions | 77 | 383 | \$23 | \$67 |
| Mid-Hudson Region | 9,801 | 49,006 | \$2,887 | \$6,625 |
| NYC Region | 60,007 | 300,037 | \$21,562 | \$36,940 |
| Long Island Region | 8,051 | 40,257 | \$2,290 | \$5,623 |
| Central NY & Mohawk Valley Regions | 68 | 341 | \$13 | \$56 |
| Total NYS* | 81,351 | 406,755 | \$27,632 | \$51,846 |
| Out-of-State | 64,077 | 320,383 | \$20,594 | \$57,455 |
| Total National Impact | 145,427 | 727,137 | \$48,226 | \$109,301 |

MTA and New York

Lowest per capita Carbon Footprint

700,000 cars off CBD-NYC Every Weekday
~17 million metric tons of Transit Avoided Carbon



Congestion/ Environment/ Energy /Time/Quality of Life

MTA's Carbon Foot Print -

Contributing to a Sustainable, Resilient and Livable New York



~17 million metric tons of Transit
Avoided Carbon
~2 million metric tons of Transit
Impacted Carbon

**Ten Pounds of GHG avoided
for choosing a ride on the
MTA network in NY**

Emissions Produced by Transit

Emissions from Transit

Tailpipe emissions from
transit vehicles

Electricity use for traction

Maintenance yards, offices and
other stationary sources

Debit

Emissions Displaced by Transit

Avoided Car Trips

Mode shift from private autos

Land-Use Multiplier

Compact land-use-> shorter trips, more walk/bike trips

Trip chaining

Lower car ownership

Congestion Relief

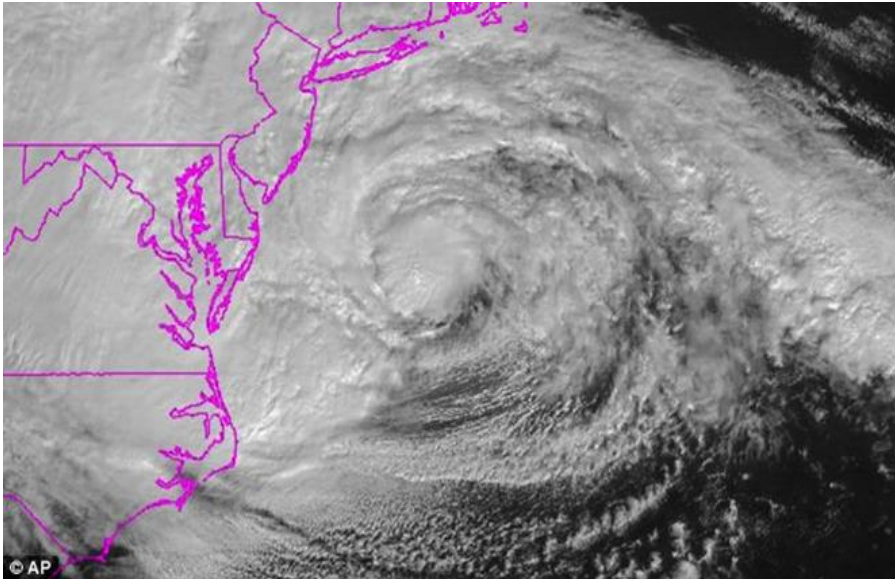
Improved fuel efficiency from reduced congestion

Credit

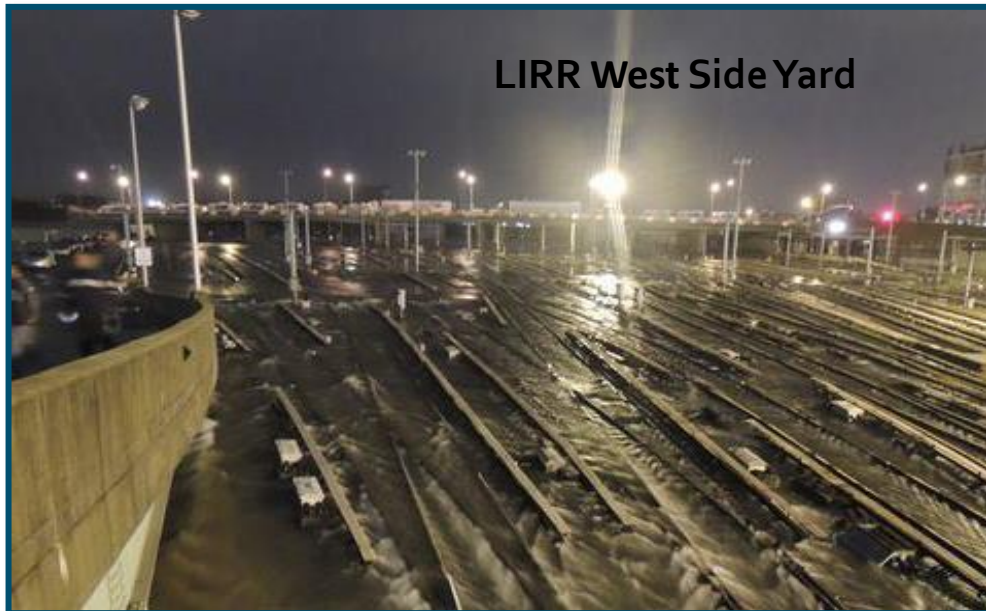
Greenhouse Gas Impacts of Transit

Hurricane Damage Across the MTA System

Oct 29, 2012- Superstorm Sandy



Metro-North Hudson Line



LIRR West Side Yard



Metro-North Spuyten Duyvil Station

Hurricane Damage Across the MTA System



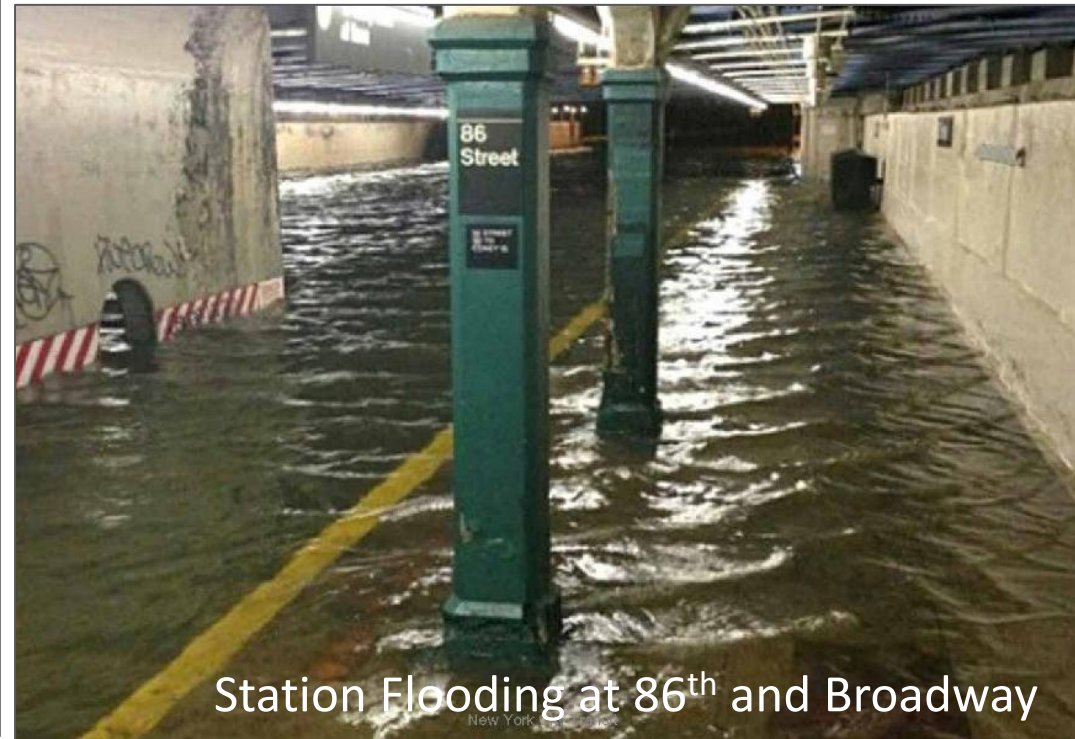
Hurricane Damage Across the MTA System

NYCT

Track Level at South Ferry



Station Flooding at 86th and Broadway



Hurricane Damage Across the MTA System

B&T Queens Midtown Tunnel



subway tunnel flooding



Coastal lines/subways



Hurricane Damage Across the MTA System



*South Ferry Station
Lower Manhattan*



MTA Climate Adaptation Task Force

NYC + NE USA Alliance since 2015

MTA CLIMATE ADAPTATION TASK FORCE

Update on agency-wide climate resiliency projects.

2019
Resiliency
Report



RESILIENCY & PREPAREDNESS

Post SANDY Lessons Learned

| Steps | Opportunities to Integrate Climate Vulnerability and Risk |
|--|--|
| Establish Vision, Goals & Performance Measures | <ul style="list-style-type: none"> Consider resilience to climate change in each element of policy framework for statewide and regional long range plans, transportation improvement programs, risk-based transportation asset management plans, and mode specific plans. Establish regional and statewide performance measures related to climate change resilience, and sustainability. |
| Assess Tradeoffs Between Modes and Programs | <ul style="list-style-type: none"> Include climate risk as one key element of an agency's broader risk management framework. Include climate-related risks in agency risk register. Test implications of various funding allocation decisions at the level of program areas and modes. How do investments in adaptation strategies vs. safety vs. pavement/bridge maintenance vs. mobility affect a state's or region's ability to meet short-term and long-term performance targets? |
| Formulate and Evaluate Policies, Strategies, and Investments | <ul style="list-style-type: none"> Propose specific adaptation strategies based on assessment of regional, subarea, and asset level vulnerability and risk. Consider cost and feasibility of options. Some adaptations may be relatively expensive (perhaps requiring additional sources of revenue or outside financial support). |
| Apply Practical Design, Prioritize & Implement | <ul style="list-style-type: none"> Make changes to assumptions about climate stressors, particularly for asset classes that have longer useful life and are in high-risk areas. Conduct "bottom up" prioritization of adaptation investments to complement "top down" program-level tradeoff analysis. Propose adaptation strategies at appropriate time frames given understanding of pace of climate change (including timing of risks) and key milestones. |
| Monitor Performance Results & Outcomes | <ul style="list-style-type: none"> Monitor changing climate conditions and keep abreast of latest climate projections and models to inform design and prioritization decisions. Amass database of weather events that cause damage or disruption to the transportation system. Archive operational data and damage reports, including costs and duration of closure. Conduct "plan vs. actual" analysis to measure effectiveness of adaptation investments in reducing or mitigating damage and disruption. |

Establish
Vision/Goal/Measures

Assess
Risks/Trade offs

Formulate & Evaluate
Policy/Strategy/Investment

Apply
Design/Implementation

Monitor
Performance/Outcome

Climate Adaptation & Resiliency

The nation's largest city has a message for the architects and engineers planning the New York of tomorrow:

Fortify new buildings against the ravages of climate change or risk rebuilding as global warming worsens



Cities Leading Urban Sustainability

enhanced standards that will make our built environment more resilient to extreme weather and climate change while promoting the health, safety, and prosperity of all New Yorkers.

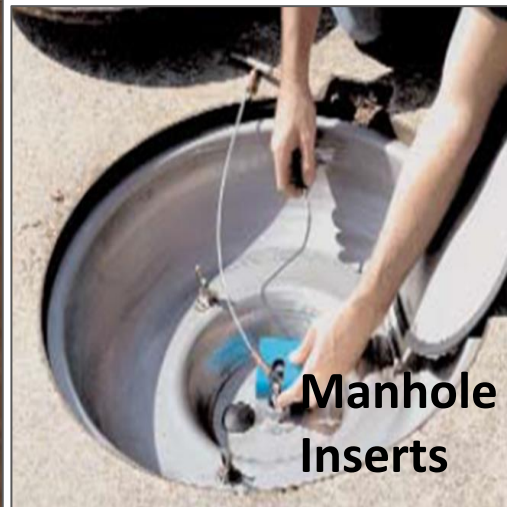
RESILIENCY & PREPAREDNESS

Post SANDY Lessons Learned

| Agency | Design Flood Elevation |
|--------|------------------------|
| NYCT | Category 2 + 3' |
| MNR | ABFE + 4' |
| LIRR | ABFE +4' |
| B&T | 500 year flood |

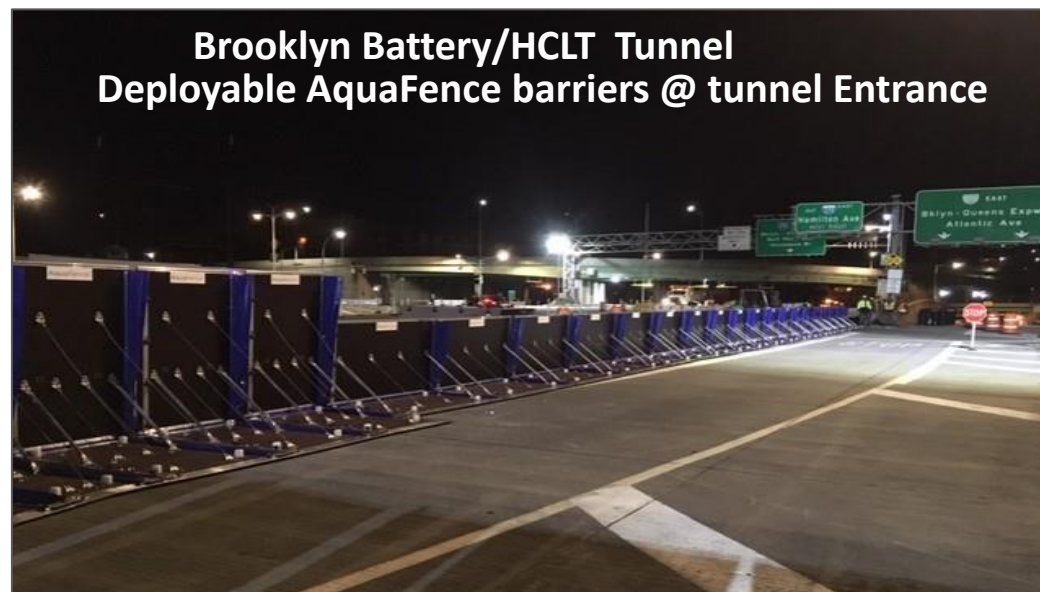
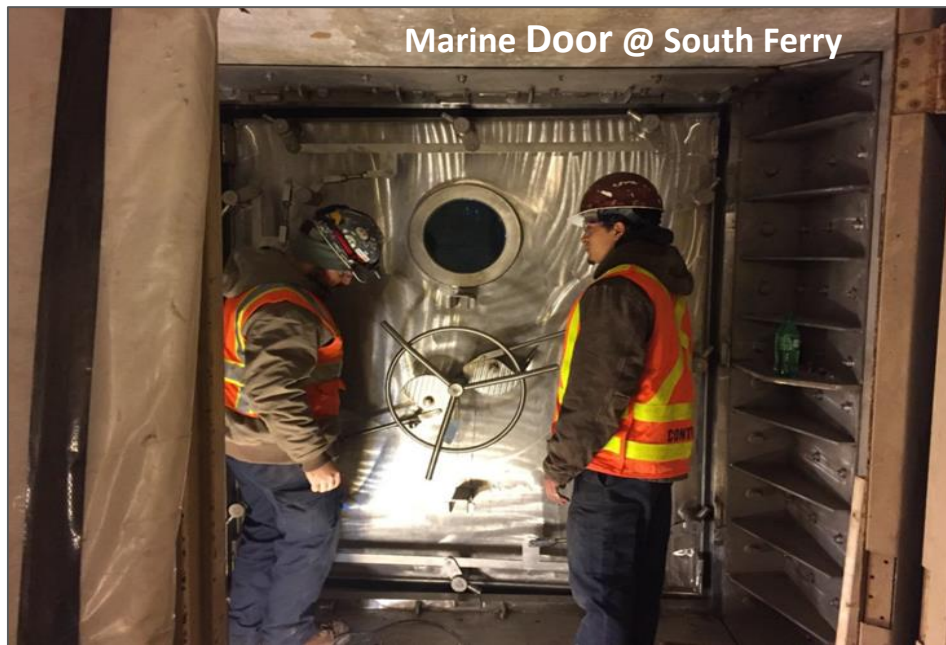
RESILIENCY & PREPAREDNESS

Rapid Mitigation Measures



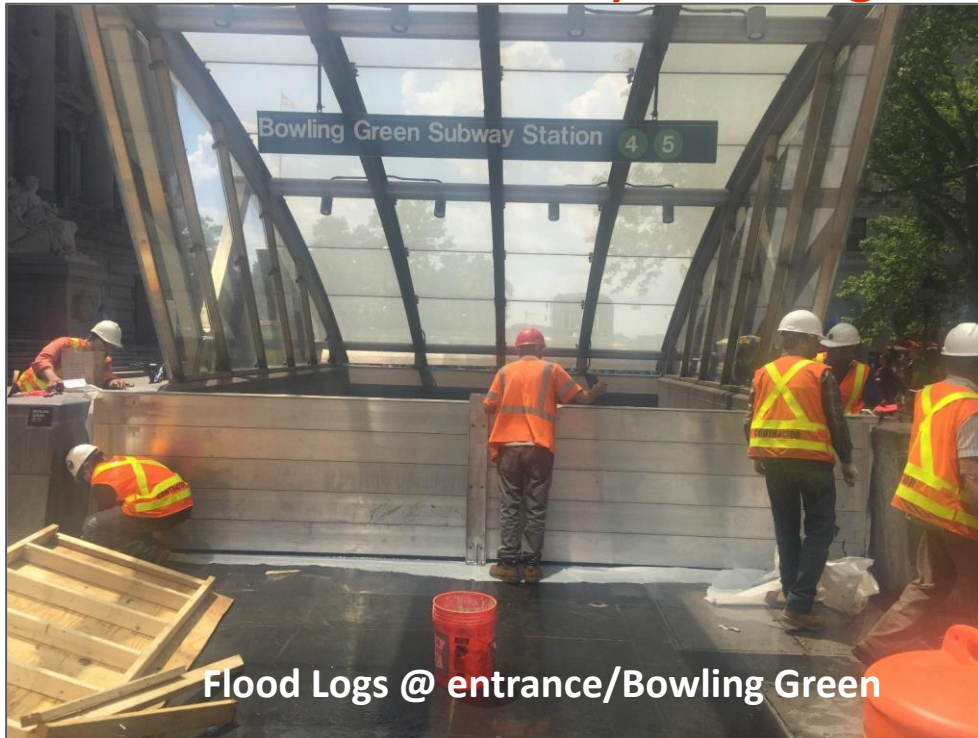
RESILIENCY & PREPAREDNESS

Rapid Mitigation Measures



RESILIENCY & PREPAREDNESS

Rapid Mitigation Measures



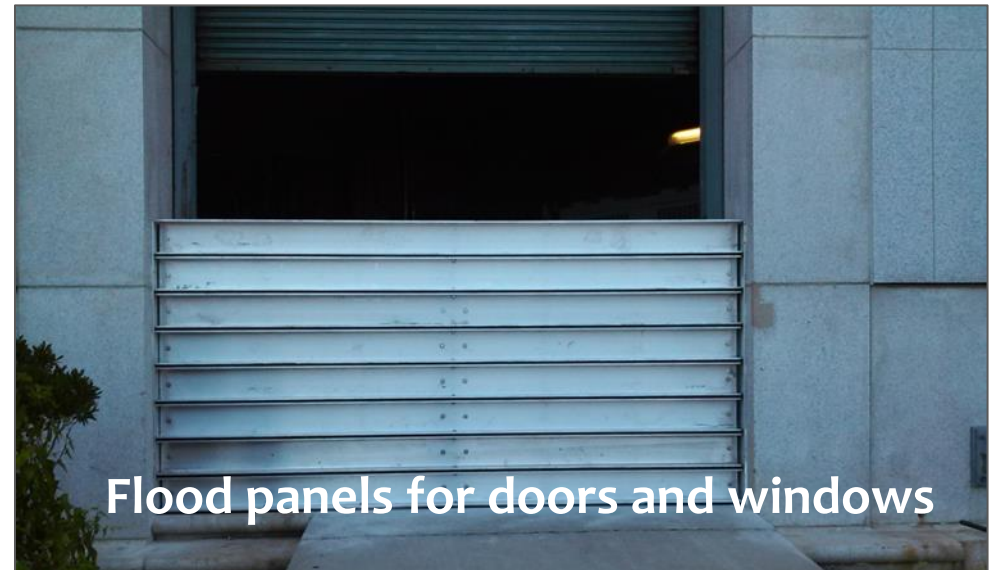
Flood Logs @ entrance/Bowling Green



Inflatable Marine Door @ Whitehall St



Entrance Mitigation at South Ferry / Lower Manhattan



Flood panels for doors and windows

RESILIENCY & PREPAREDNESS

Long Term Measures



Sea wall along coastal lines

Coney Island Yard



RESILIENCY & PREPAREDNESS

Long Term Measures

LIRR

Elevated Substations

Croton Harmon Substation



Long Beach



Oceanside



Oil City



RESILIENCY & PREPAREDNESS

Long Term Measures



B&T *Sea Wall at Gov. Is Ventilation Bldg*

*Restored abutment at
Cross Bay Bridge*



MTA Climate Policy & Prioritization

- Internal MTA-wide **Climate Adaptation Task Force** & Forums
- Improved **enterprise asset management** which includes location data and vulnerability and criticality metrics
- Coordinated geospatial analyses and the use of **geographic information system (GIS)** and mapping technologies
- Access to **early detection warning systems** including weather sensors and tide gages
- Incorporation of future climate projections into **engineering design standards** (temperature, precipitation, sea-level rise)

MTA Cat Bond

the first capital market cat bond focusing directly on storm surge risk



Capital market risk transfer enabled FMTAC to obtain fully secured property reinsurance protection against storm surge without requiring MTA or FMTAC to become a catastrophe bond issuer - FMTAC entered into a reinsurance agreement with MetroCat Re Ltd.

On June 5, 2013 MTA and FMTAC (First Mutual Transportation Assurance Company) staff received authorization from the Board to proceed with structuring and marketing of a capital markets-based reinsurance transaction providing storm surge coverage

Goals:

- Access to additional reinsurance capacity for catastrophic perils
- Developing a stable, long term alternative reinsurance
- Creating competition with traditional reinsurance, thereby providing leverage
- Demonstrating reasonable efforts to obtain property coverage comparable to prior years' coverage levels

United Nations C4C

MTA's Participation in the Global Climate Agenda & COP21

May 2015

MTA becomes a Signatory Participant at UN's Caring for Climate Program.
MTA's C4C Commitment Goals were:

- 20% Energy Reduction at all MTA Facilities
- Develop MTA wide Climate Adaptation Guidelines
- Continue to Develop and Implement Sustainable Strategies in Capital Projects

November 2015

MTA is Featured by UNFCCC at COP21 in Paris for Post Sandy Strategies.

December 2016

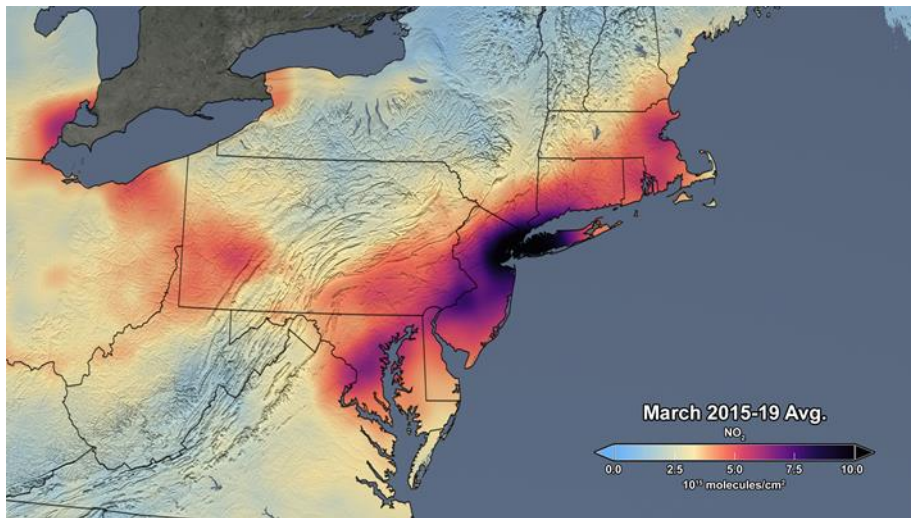
MTA Meets C4C Goal #1

GHG and the Global Climate Agenda

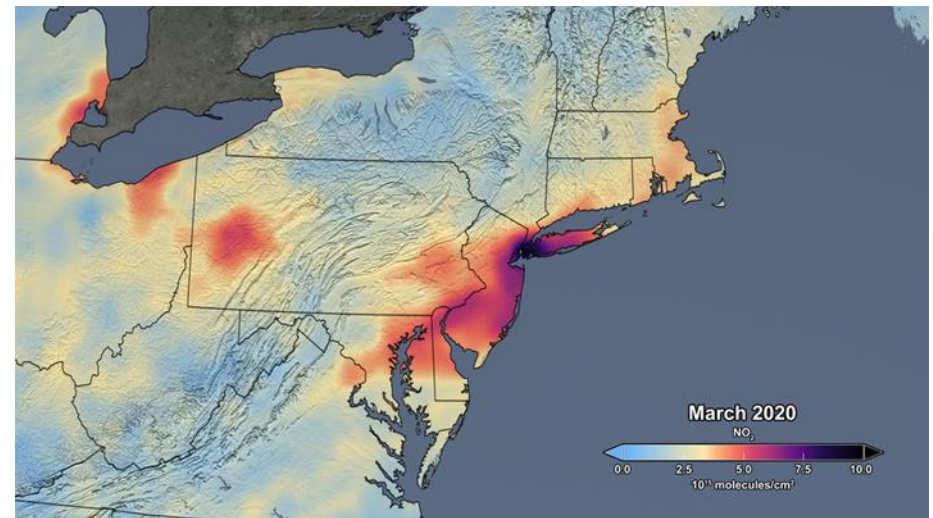
➤ Changes in NO₂ levels from NASA satellites

One air pollutant, nitrogen dioxide (NO₂), is primarily emitted from burning fossil fuels (diesel, gasoline, coal).

- Source: <https://svs.gsfc.nasa.gov/4810>



**Tropospheric NO₂ Column,
March 2015-2019 Average,
Northeast USA, With
Labels**



**Tropospheric NO₂ Column,
March 2020 Average,
Northeast USA, With
Labels**

□ Air Quality Index (AQI) During Covid-19

**Air Quality
Index (AQI):
NO2, CO,
PM2.5**

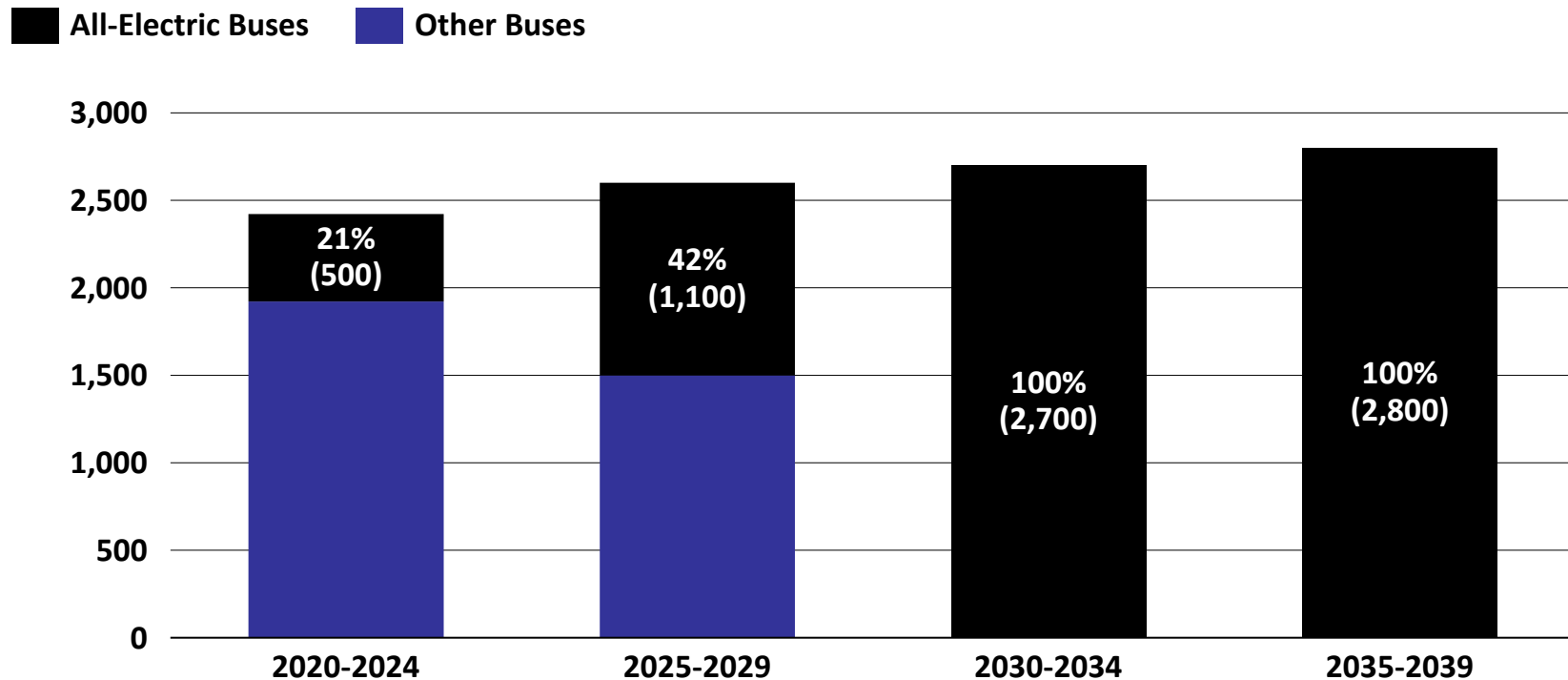
| | NO2 AQI | CO AQI |
|-------------------------------|---------|--------|
| Feb-2019 | 48.6 | 8.6 |
| Mar-2019 | 47.5 | 8.2 |
| Change (%) | -2.2% | -4.4% |
| Feb-2020 | 33.2 | 7.6 |
| Mar-2020 | 28.1 | 4.6 |
| Change (%) | -16% | -39% |
| Feb: change from 2019 to 2020 | -31.6% | -12.3% |
| Mar: change from 2019 to 2020 | -41.0% | -44.3% |

- Geographical area: New York-Newark-Jersey City, NY-NJ-PA
- Source: EPA.gov

Achieving 100% electric by 2040 requires only electric buses starting in 2029

- Commitment to transition to 100% zero-emissions fleet by 2040
- 2015-2019 Capital Program included 60 all-electric buses
- 2020-2024 Capital Program includes 500 all-electric buses

2020-2039 Projected AEB Capital Plan*



**2020-2024 Capital Program currently on pause; future capital program projections are estimates and are not part of approved Capital Programs*

MTA Setting Target for SBTi by 2021

Emissions Pathway for Paris Climate Agreement Alignment

MTA sets three separate targets, using 2015 as our baseline, on a 15-year goal:

Weighted average reduction in emissions per passenger mile across all **revenue-generating** transportation modes

Reduction in absolute emissions from **non-revenue** activities

Reduction in absolute emissions from **supply chain**, supported by Carbon Disclosure Project (CDP)



ClimateAdaptation Forum

THANK YOU

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