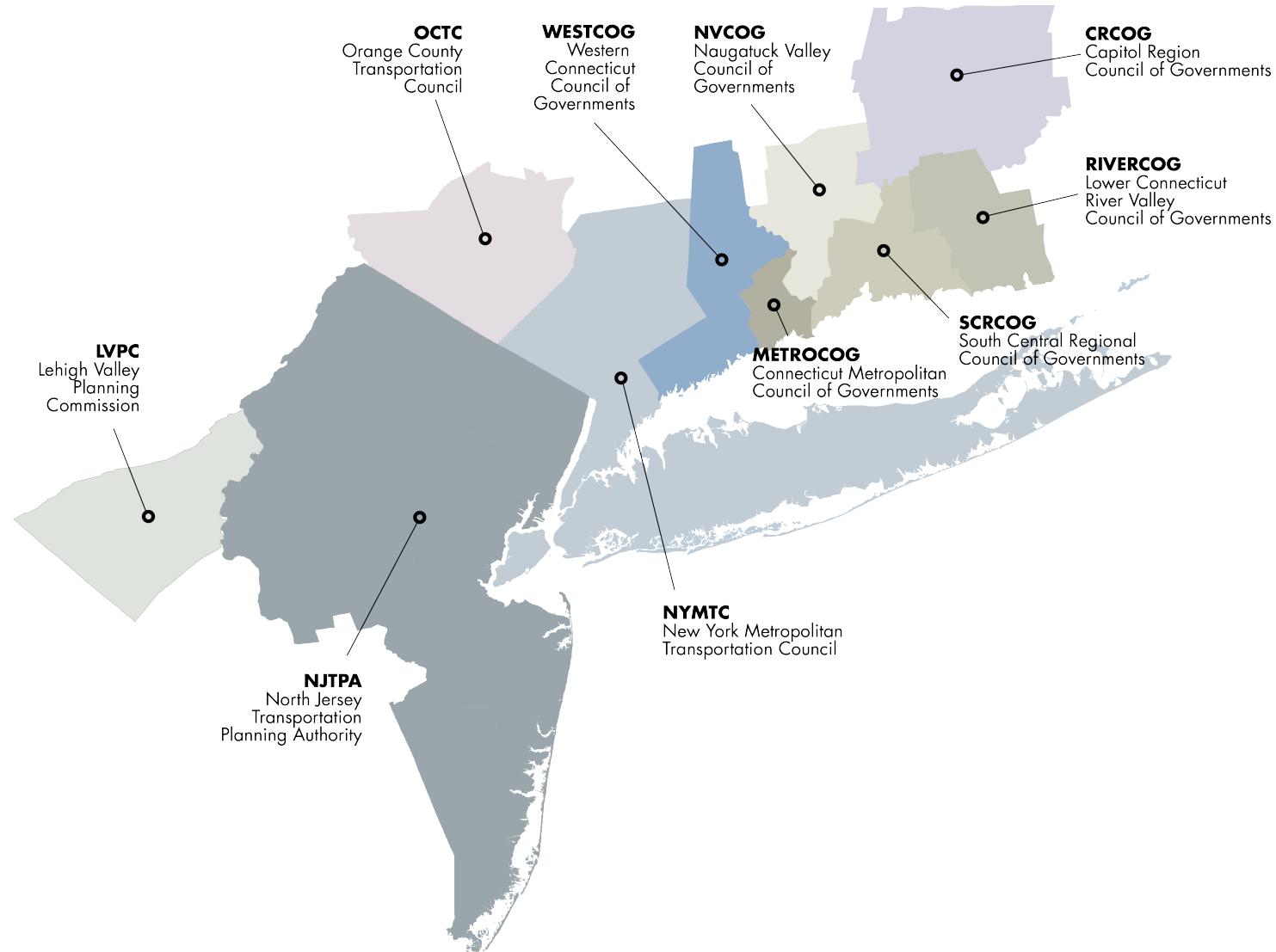


Clean Freight Corridors Planning Study

Multi-State Freight Working Group
March 24, 2022

Geographic scope of the study



Study Objective

Assess opportunities for the development of **Clean Freight Corridors** in the NYMTC planning area that are integrated within the larger Multi-State Metropolitan Region.

This study has:

- Inventoried existing alternative fuel infrastructure in the region;
- Reviewed current and emerging alternative fuel technologies;
- Identified gaps between existing and future alternative fuel infrastructure capacities;
- Analyzed goods movement trends and forecasts;
- Identified and defined optimal corridors for recommended designations as clean freight corridors and identified needs for the development of additional clean freight infrastructure in each corridor.

Project Team

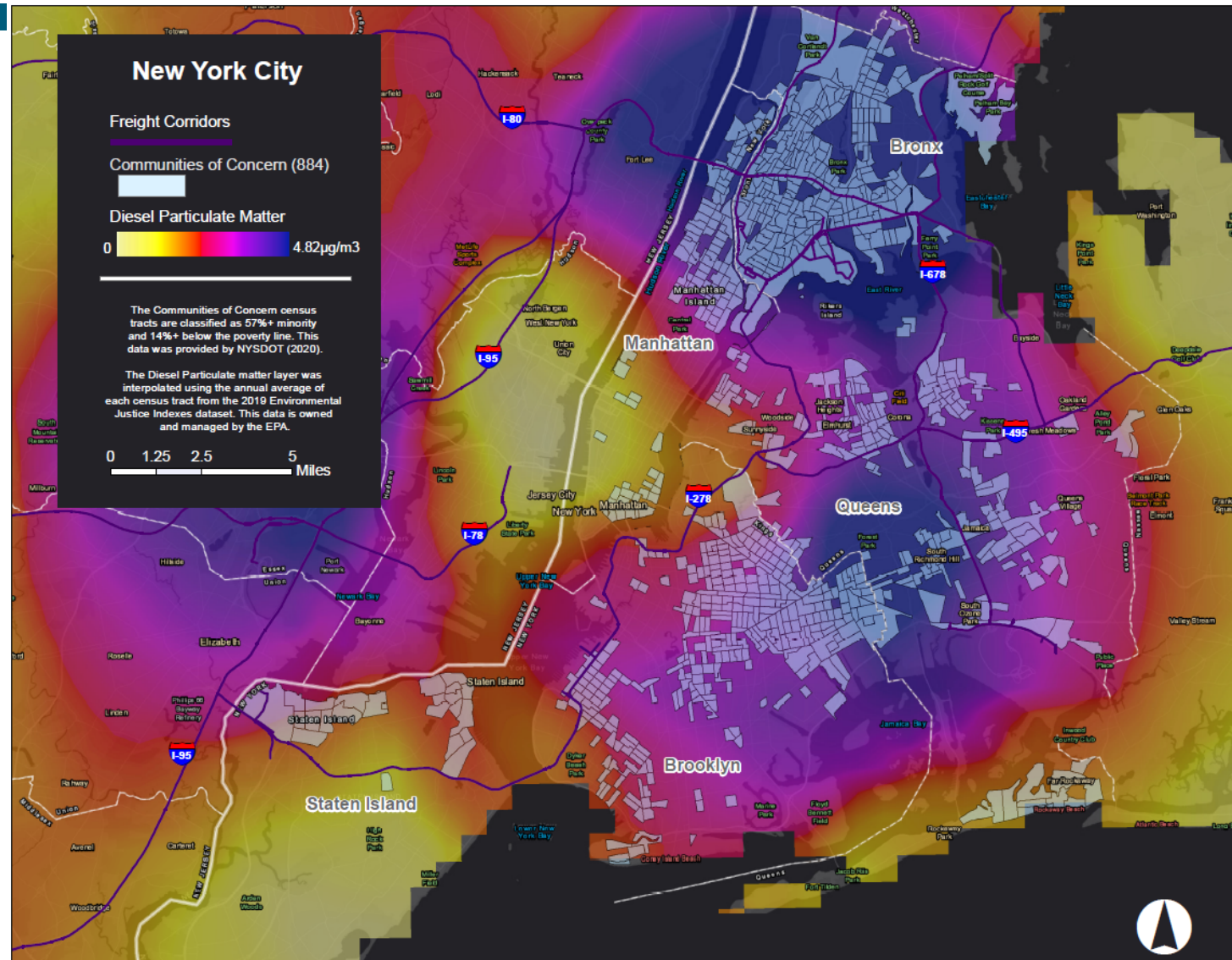
- NYMTC Project Management – Leslie Fordjour, NYMTC Project Manager
- Consultant Team Leaders:



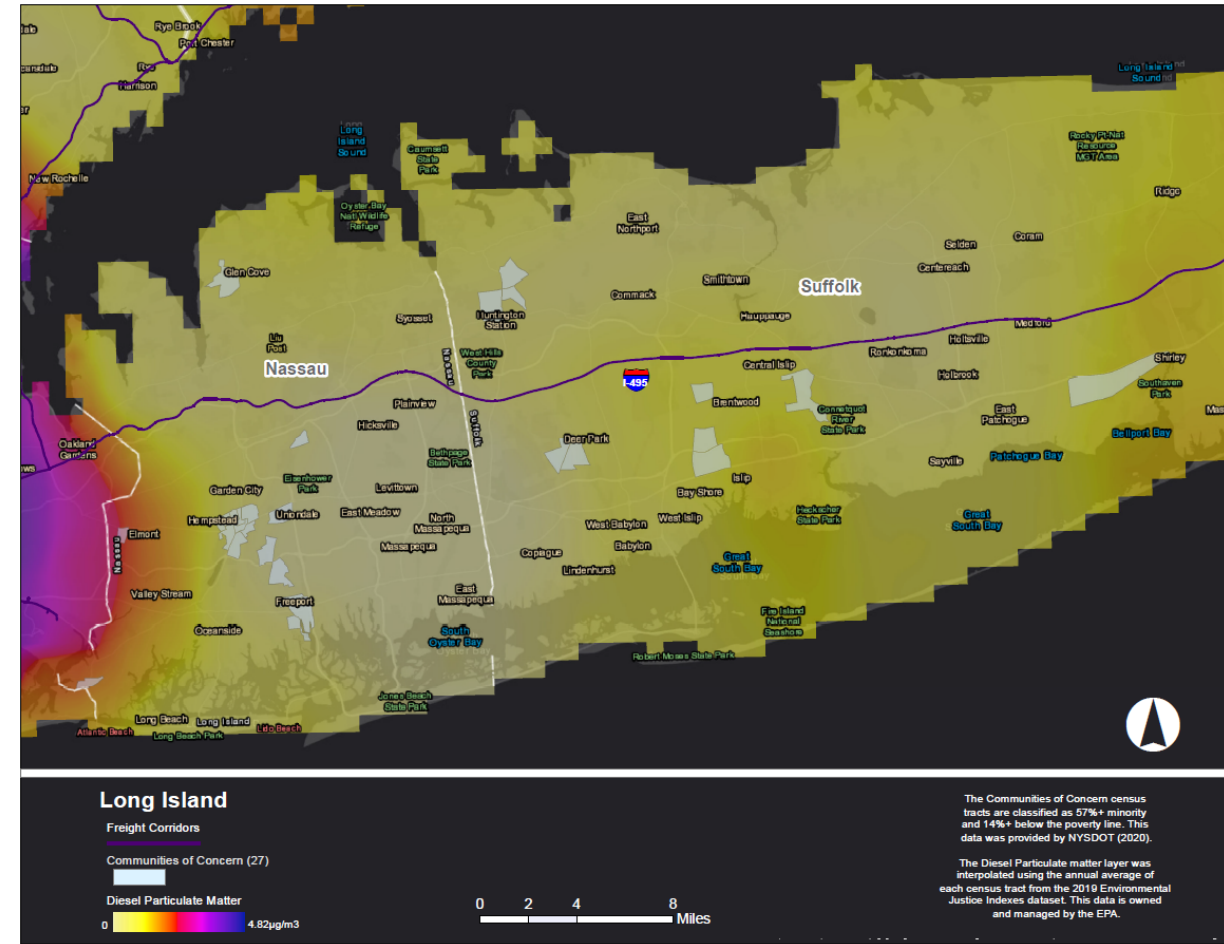
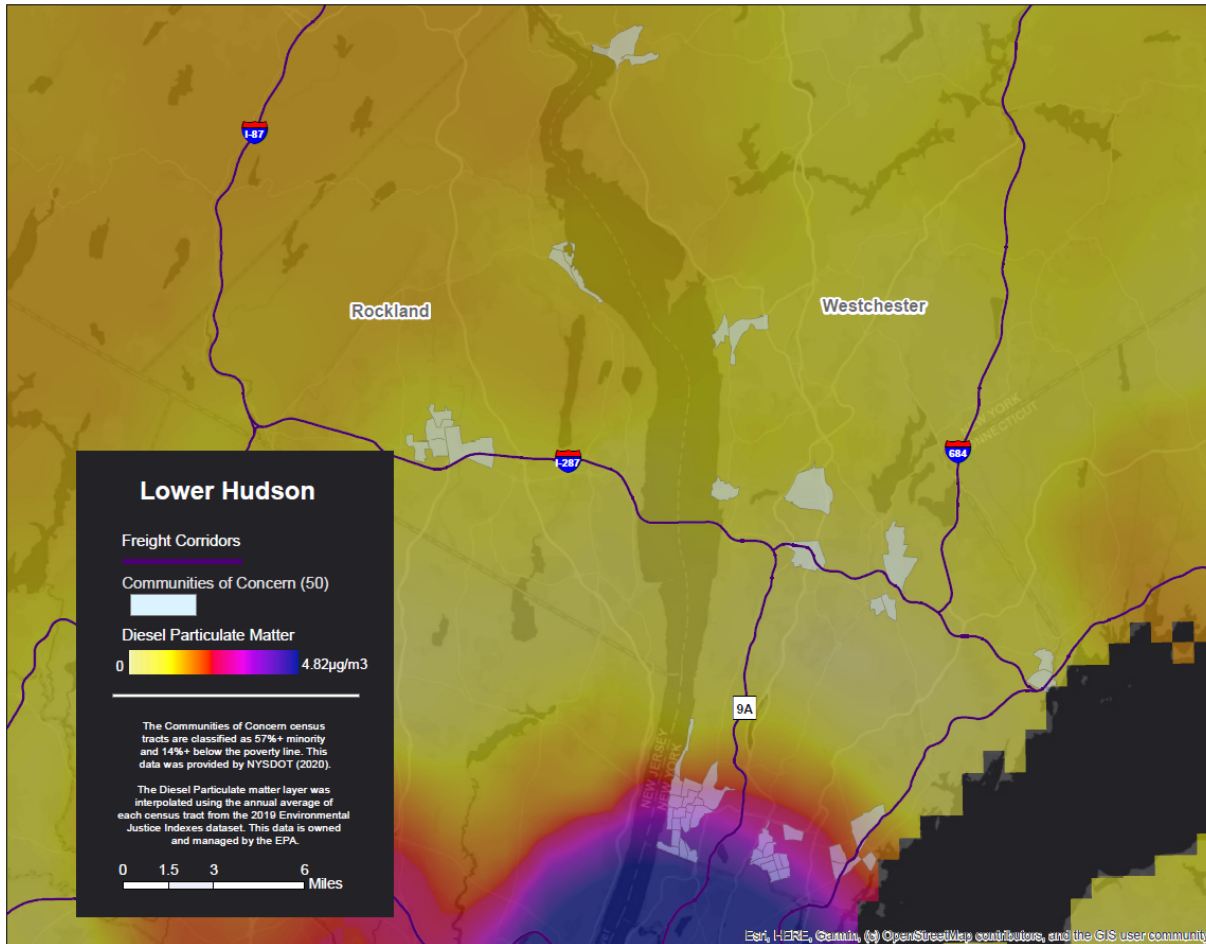
Key Findings

- Trucks constitute a significant source of greenhouse gas and criteria air pollution with a disproportionate impact on low-income communities
- Freight volumes in the region are projected to grow 37% between 2018 and 2045
- Diesel is projected to fall below 50% of new truck sales between 2029-2034, with battery electric, fuel cell electric, and compressed natural gas constituting the majority of truck sales past 2030
- There is significant policy support for diesel alternatives throughout the study region but additional measures are needed to support alternative fuel fleet turnover

Title VI / Environmental Justice



Title VI / Environmental Justice



Recommendations

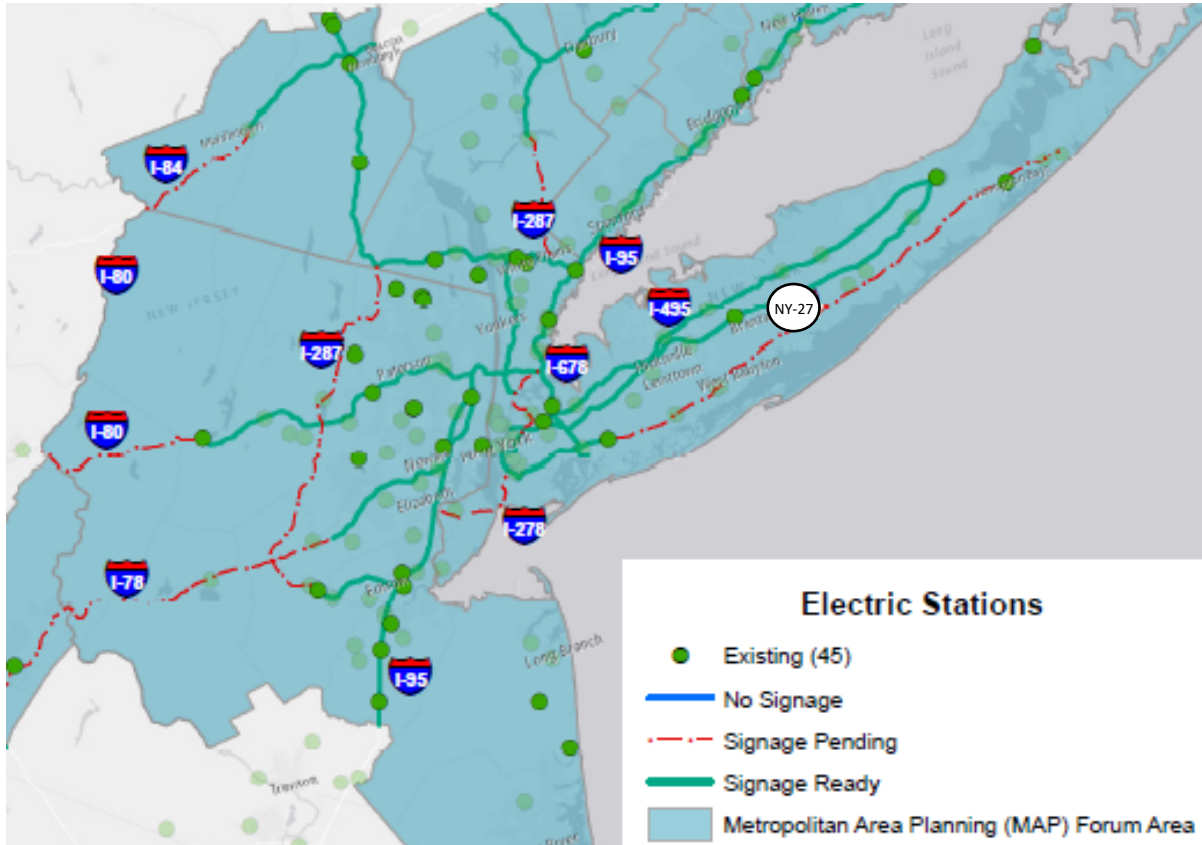
- High “readiness” corridor segments have good alternative fueling infrastructure coverage, high truck volume, and proximity to freight-generating facilities
- High “need” corridor segments have high levels of diesel particulate matter pollution and high projected demand for alternative fuel based on vehicle adoption projections
- Implications:
 - High readiness / high need = Designate as Clean Freight Corridors (priority)
 - Low readiness / high need = Prioritize for additional alternative fuel station development
 - High readiness / low need = Longer-term CFC designation
 - Low readiness / low need = No recommendation

Recommendations

			High Readiness				High Need		
	Highway	Segment	EV	H2	CNG	LPG	EV	H2	CNG
Clean Freight Corridor (High Readiness, High Need)	I-278	Total length	X	X			X	X	X
	I-495	Queens	X	X	X		X	X	X
	I-495	Suffolk	X	X	X	X	X	X	X
	I-678	Total length	X		X		X	X	X
	I-80	New Jersey (east of 287)	X	X		X			
	I-87	Westchester and Bronx	X	X	X		X	X	X
	I-95	New Jersey (north of Exit 10)	X	X	X	X	X	X	X
	I-95	Manhattan and Bronx	X	X	X		X	X	X

Regional Assessment for Clean Freight Corridors

Regional Assessment for Clean Freight Corridors

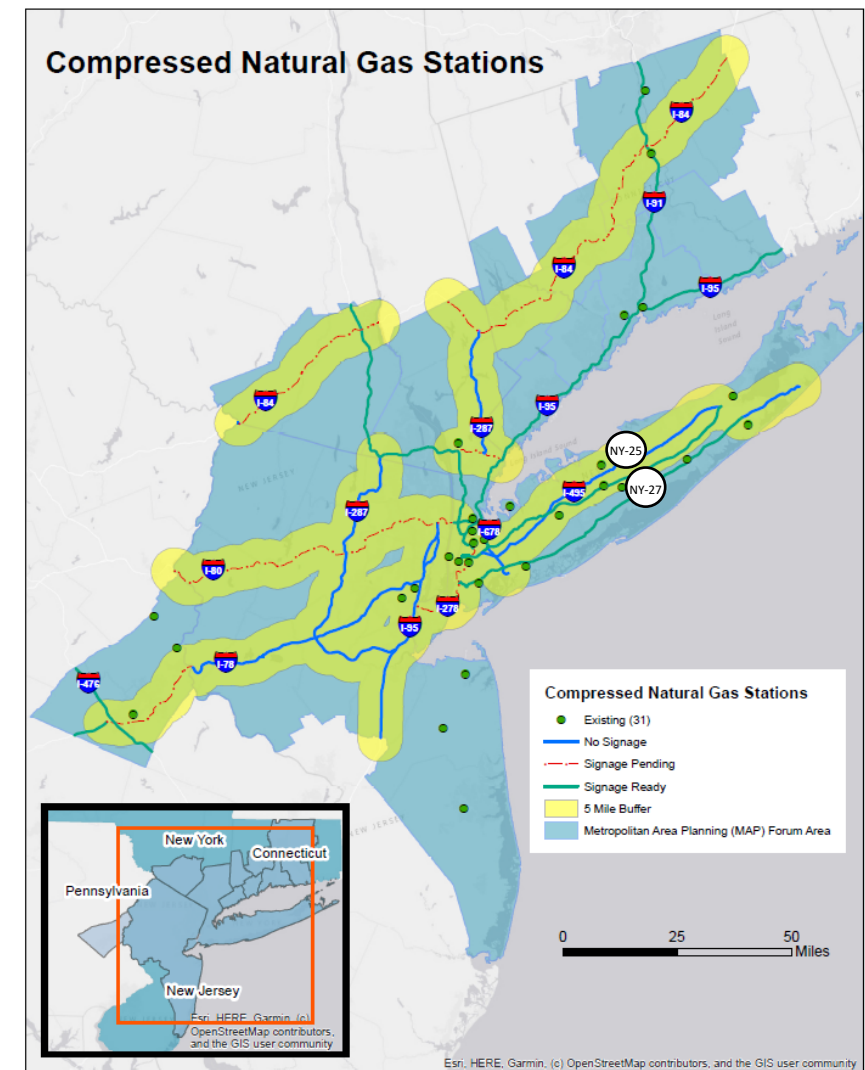
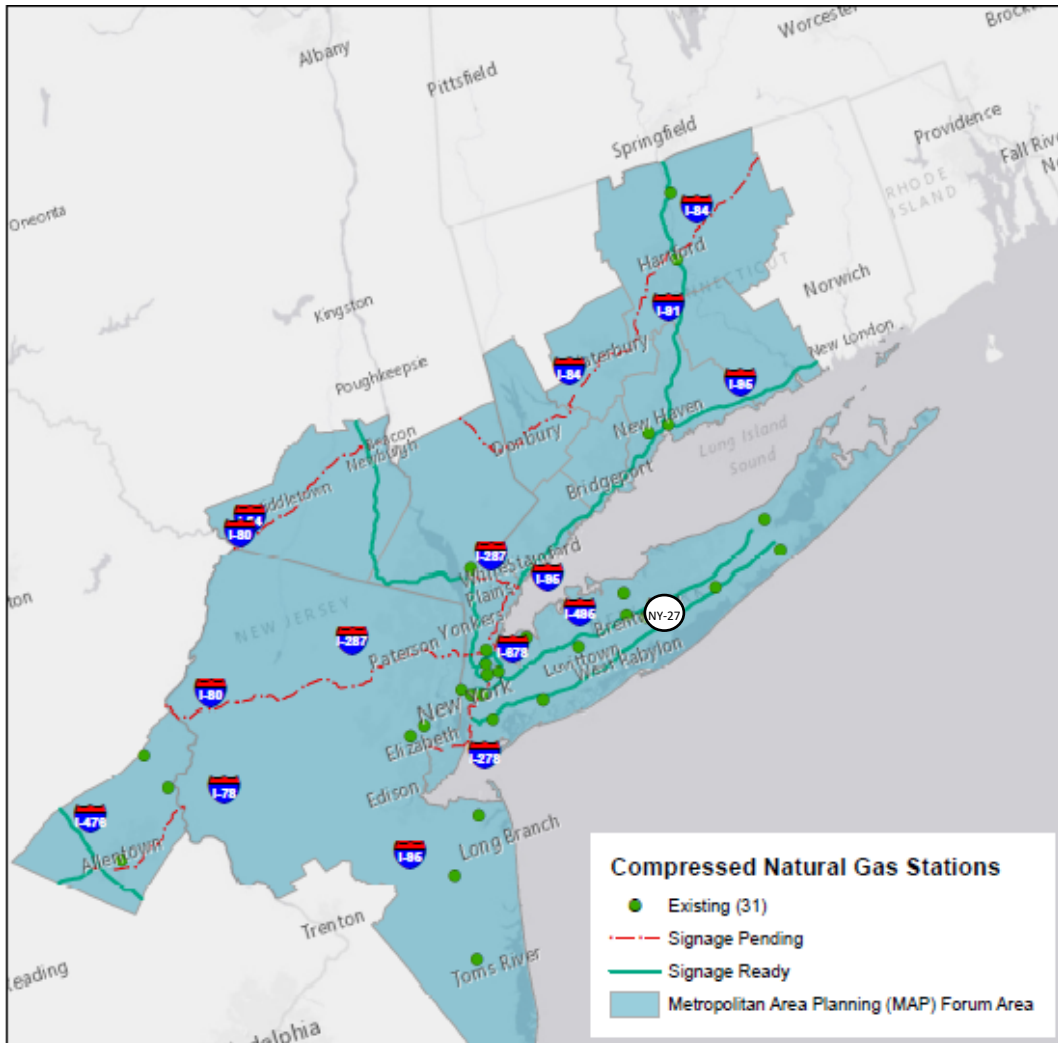


Identified existing alternative fuel infrastructure and FHWA corridor designations

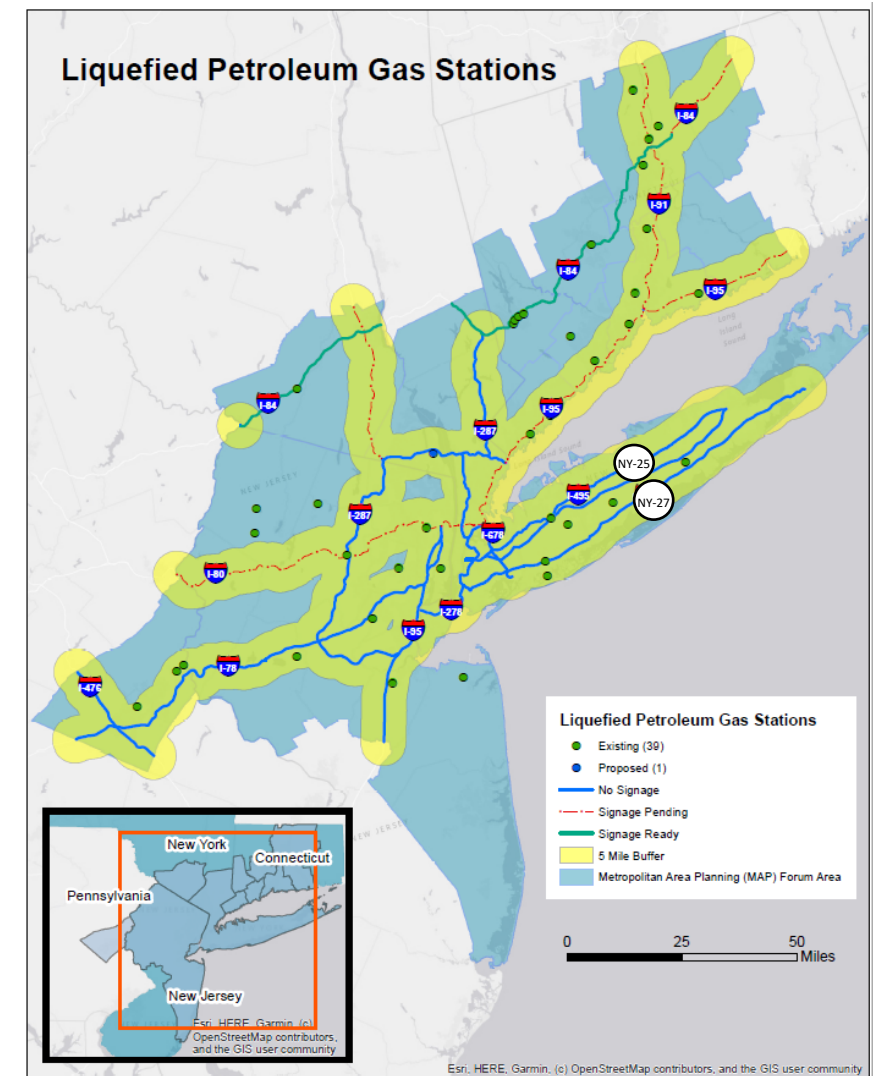
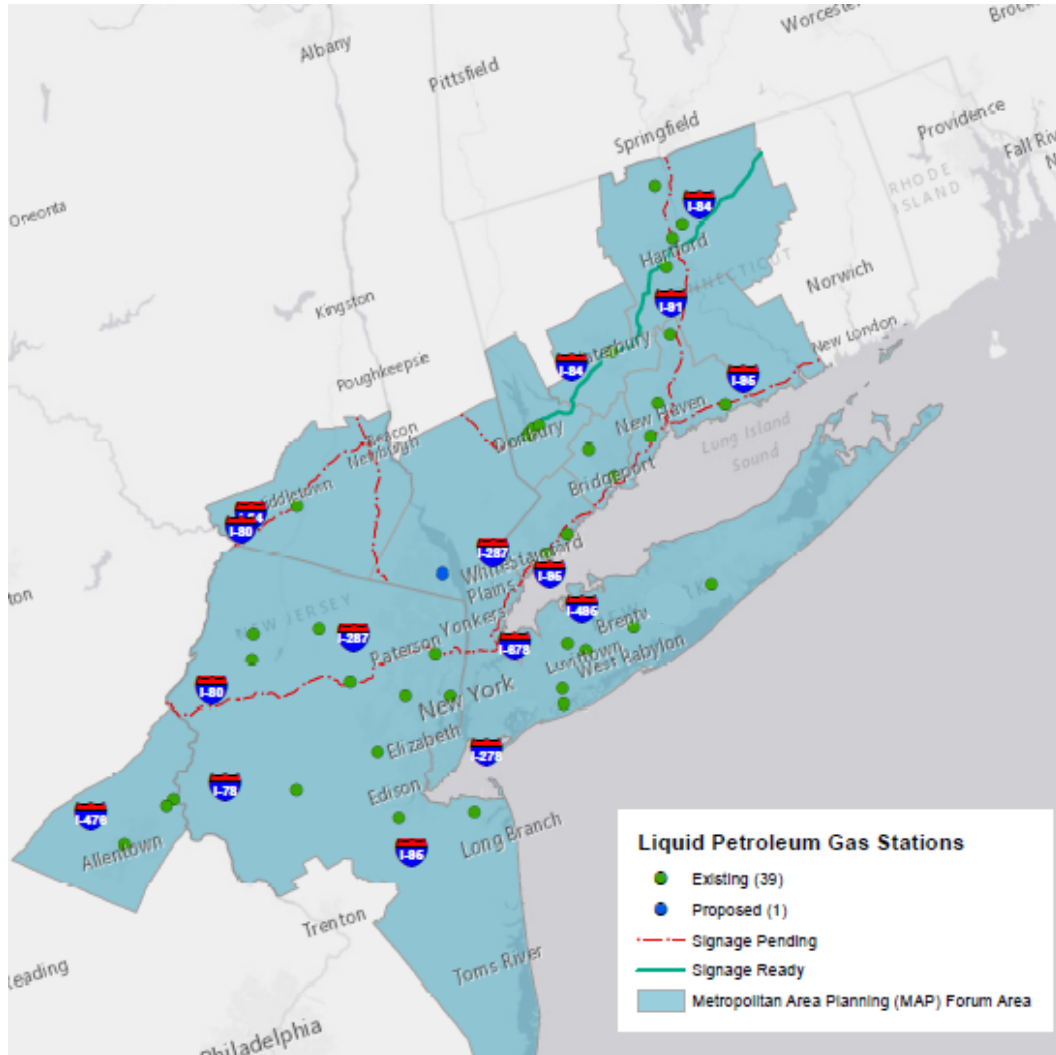
Filtered stations to match medium- and heavy-duty (M/HD) theoretical vehicle compatibility

Produced maps for each fuel type and identified gaps in infrastructure networks

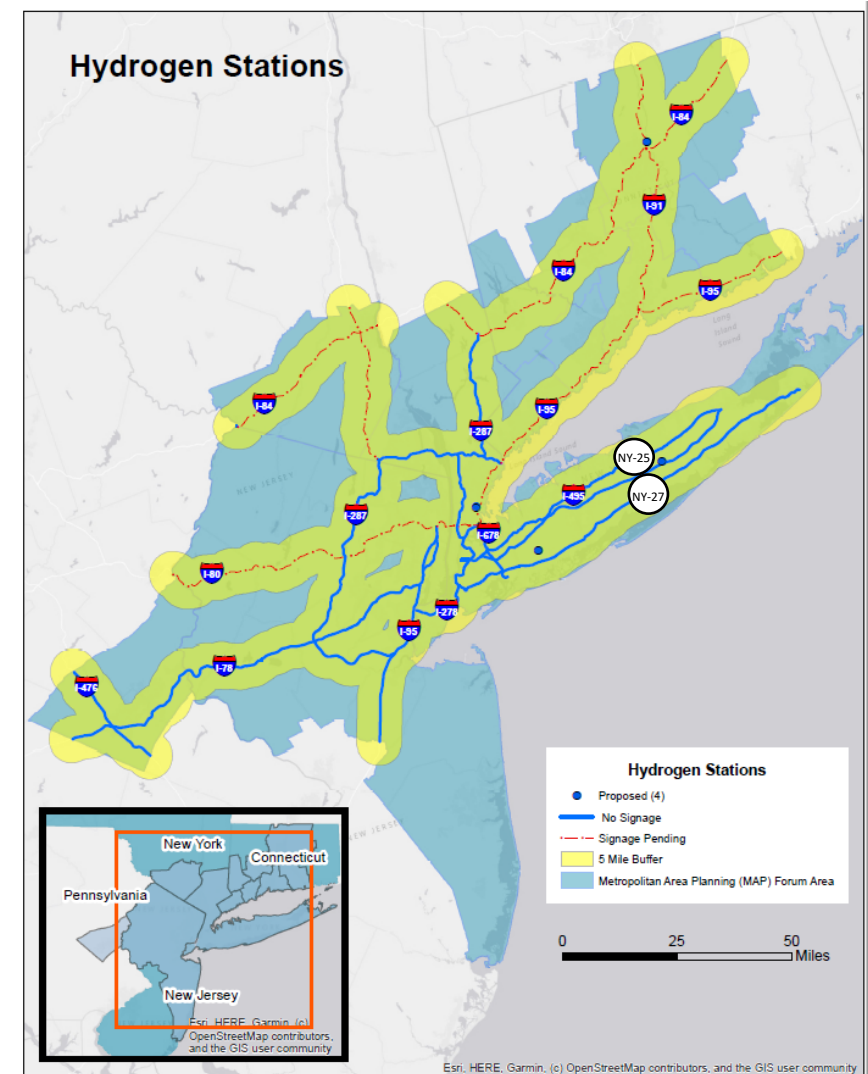
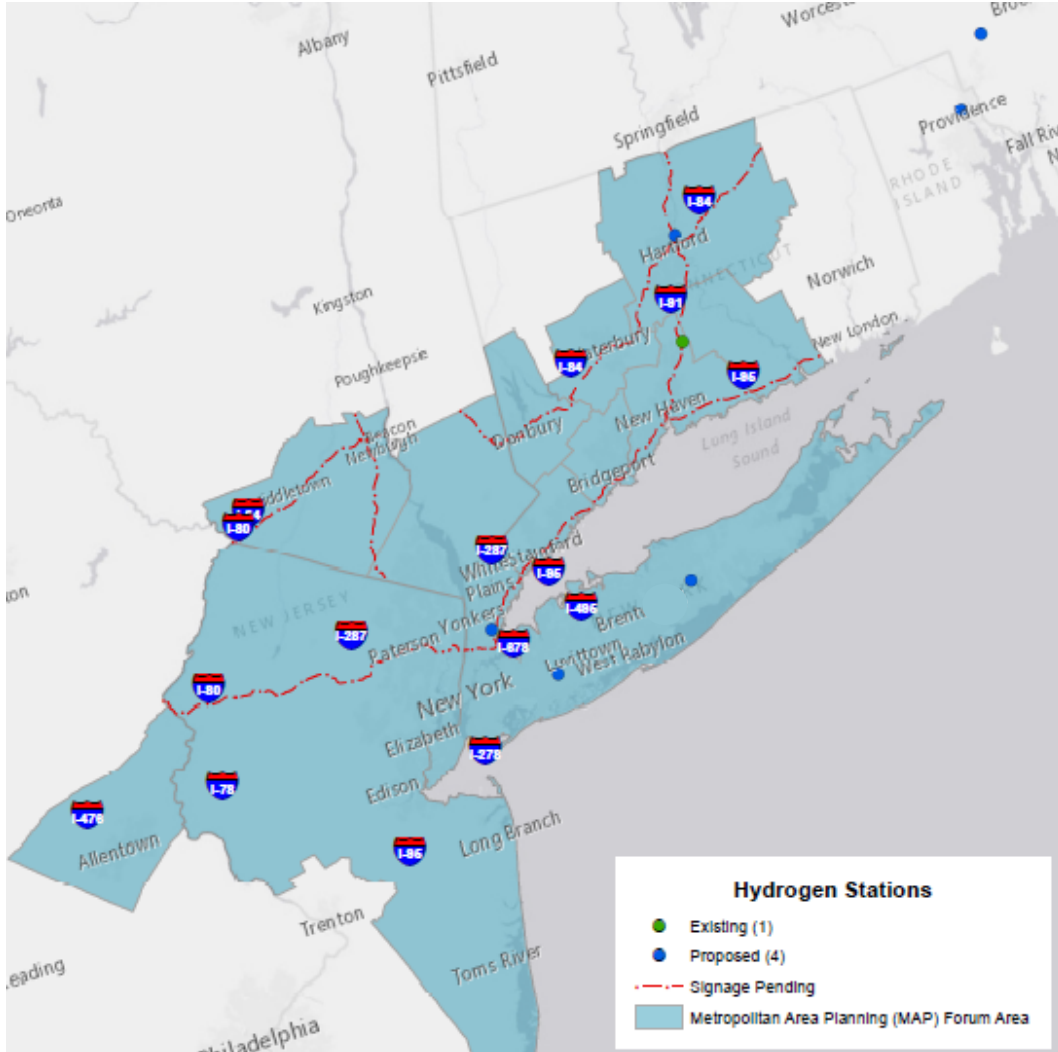
Assessment and Gaps – CNG



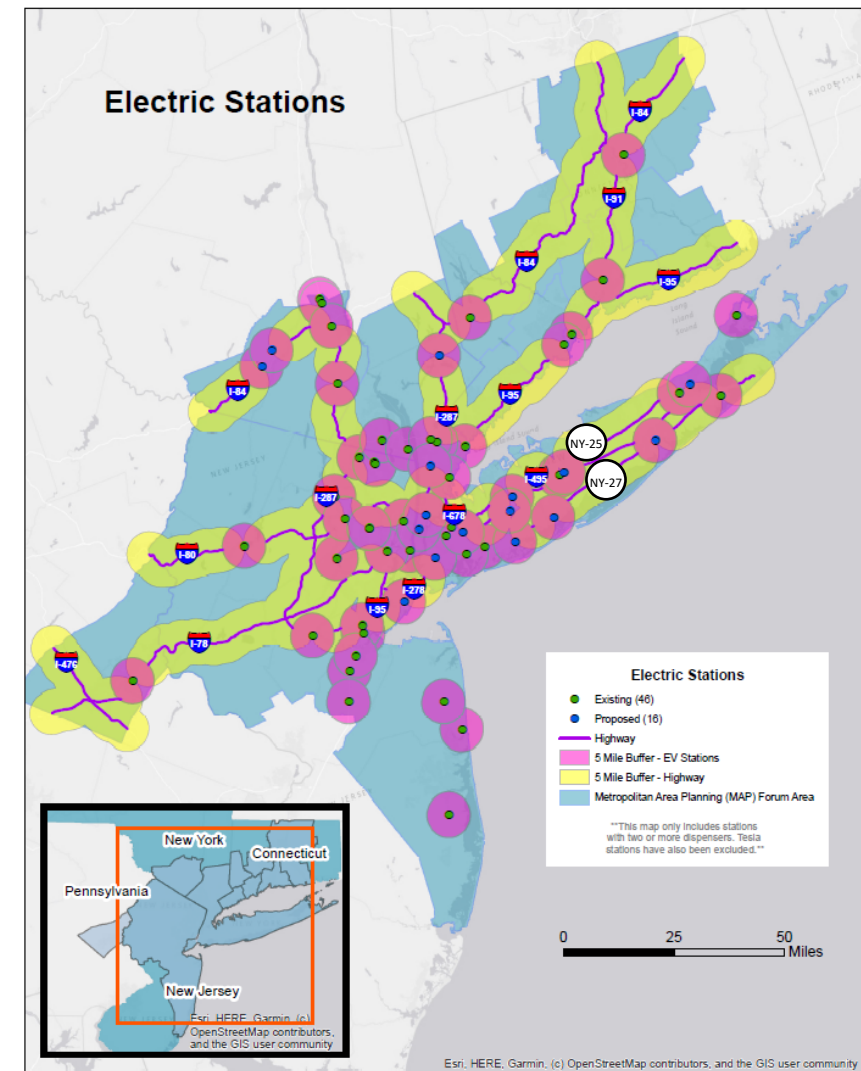
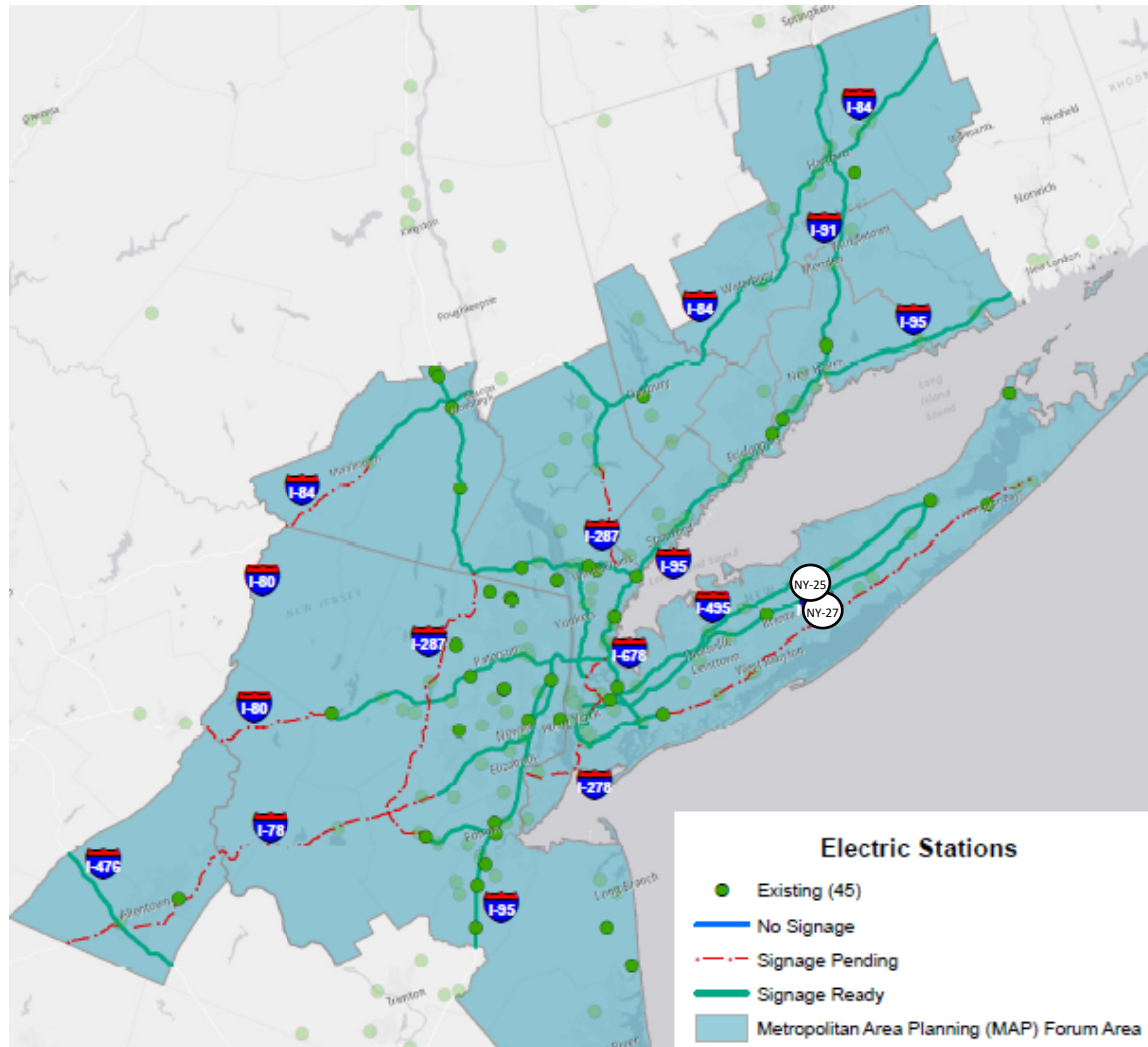
Assessment and Gaps – Propane



Assessment and Gaps – Hydrogen



Assessment and Gaps – Electric



Alternative Fuel Vehicle Technology Scan and Projections

AFV Technology Scan and Projections

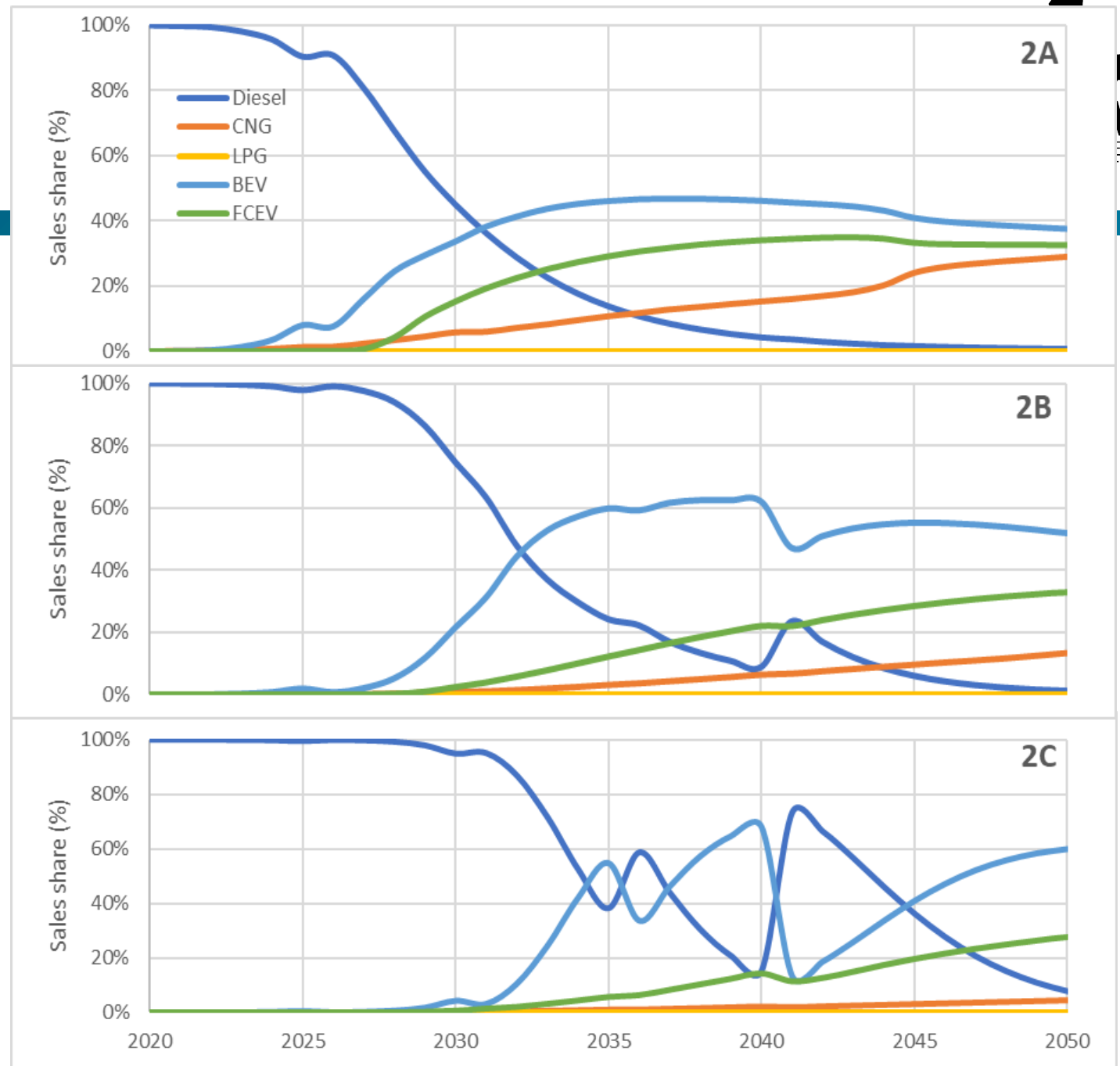
1. Characterize the state of technology for major alternative fuel types and the vehicles that use them
2. Describe the policy and regulatory landscape for AFV technologies in the study area
3. Project AFV adoption patterns among truck fleets through 2050

Policy Outlook

- Significant policy support for diesel alternatives within the study region
- Policy outlook is brightest for zero-emission technologies (BEV and FCEV)
 - Emergence of structures for utility involvement and investment in fleet electrification lays a groundwork to be replicated
- Regulatory hurdles and policy aversion to combustion technology will continue to impede growth in CNG and LPG technology
- Additional regulatory and incentive actions must be taken to achieve policy objectives

Modeling Results: Adoption Rate

- Diesel is projected to drop under 50% of sales between 2029-2034
- BEV ends with the highest sales share in each scenario (38-60%)
 - FCEV ends between 28-33%
 - CNG ends between 4-29%
 - Diesel ends between 0.5-6%
 - LPG ends with negligible sales
- Less aggressive adopter profiles (2B and 2C) result in greater sensitivity to incentives
 - Greater sales share volatility



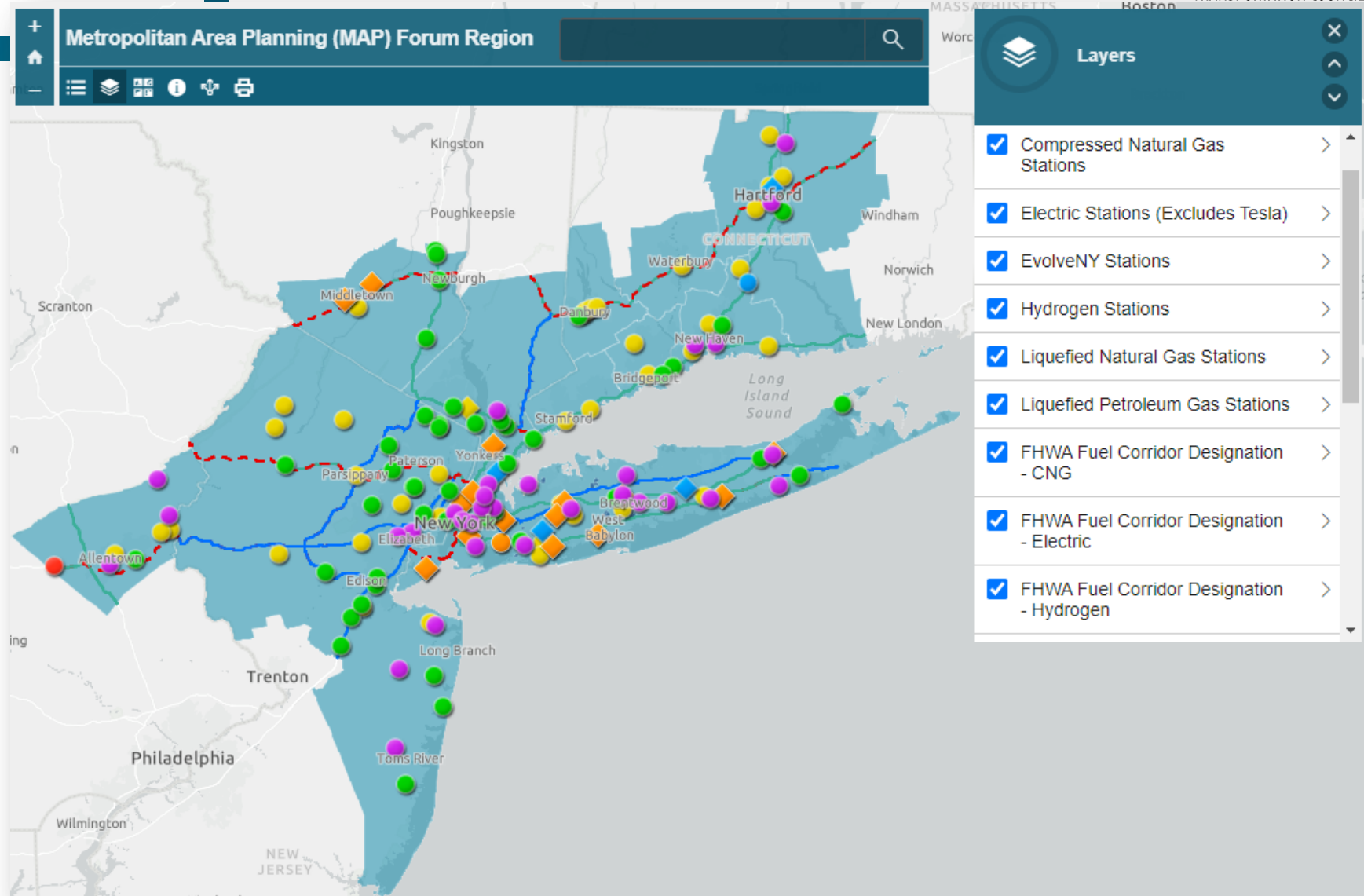
Online GIS Map

Provides easy viewing access

Allows viewers to toggle any map layers on/off

Continuously updated to include new layers as analysis proceeds

Online map



Freight Demand Trends and Forecasts

Regional Freight Commodity Flows

Domestic Mode	Tons (M)	Units (M)	Value (\$B)
Truck	577.4	50.62	\$835.95
Water	55.7	0.00	\$34.08
Rail	21.4	0.76	\$60.53
Air	0.8	0.00	\$92.44
Other	0.0	0.00	\$0.31
Grand Total	655.3	51.39	\$1,023.30

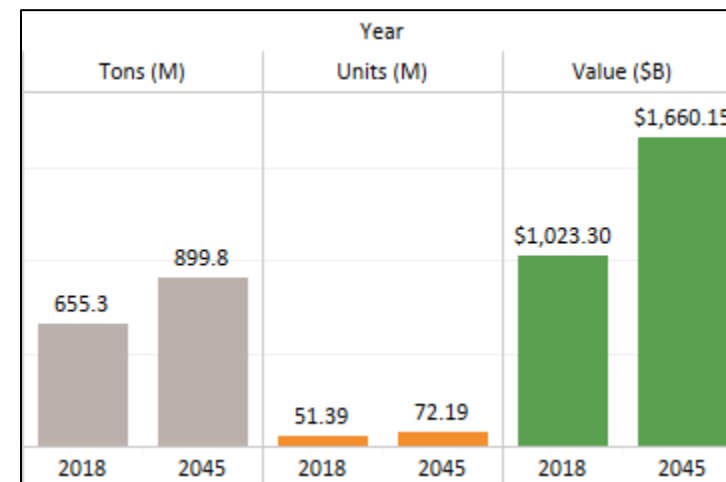
Domestic Mode	Tons (M)	Units (M)	Value (\$B)
Truck	88.1%	98.5%	81.7%
Water	8.5%	0.0%	3.3%
Rail	3.3%	1.5%	5.9%
Air	0.1%	0.0%	9.0%
Other	0.0%	0.0%	0.0%

	0%	50%	100%	0%	50%	100%	0%	50%	100%
	% of Total Tons (M)			% of Total Units (M)			% of Total Value (\$B)		

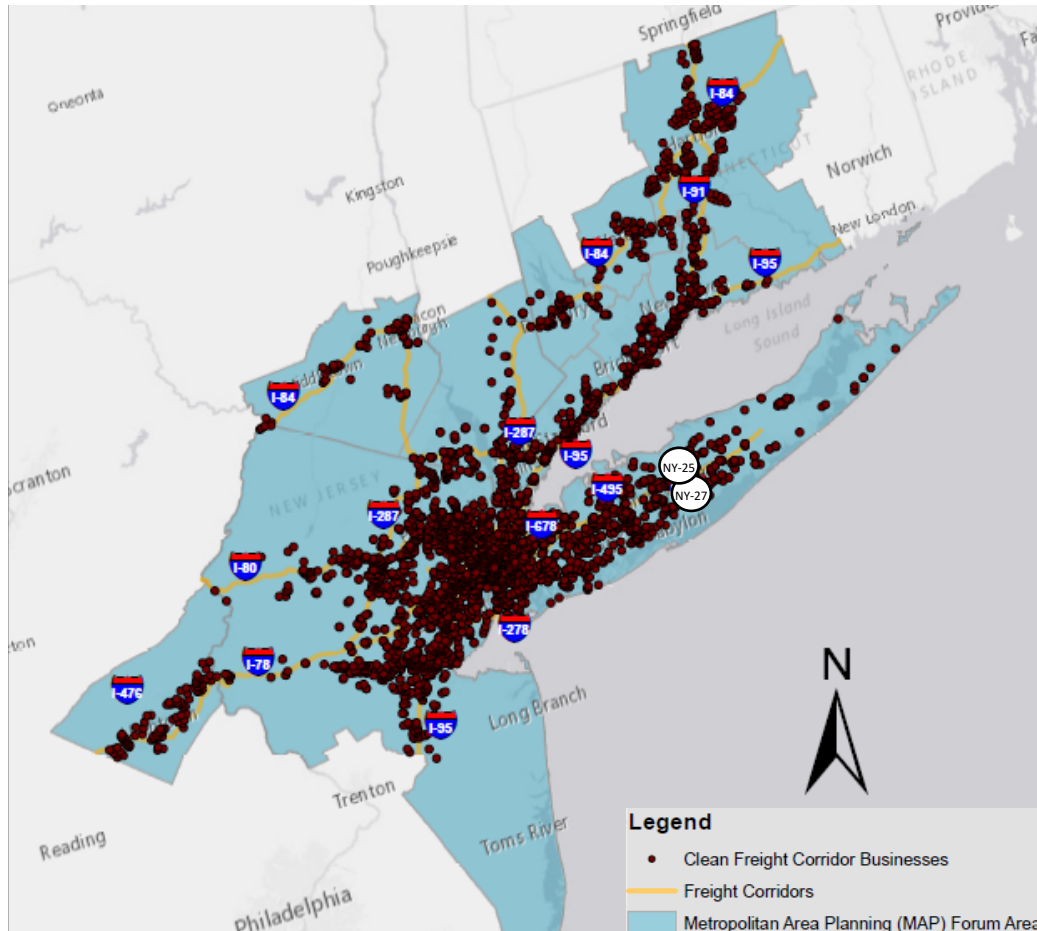
Source: IHS Markit Transearch, analysis performed by WSP for NYMTC Plan 2050 (forthcoming).

88% of freight tons in MAP Forum Region move by truck (2018)

Total freight volume (in tons) expected to increase 37% through 2045



Corridor-Level Freight Demand Generators



Data/Information Sources:

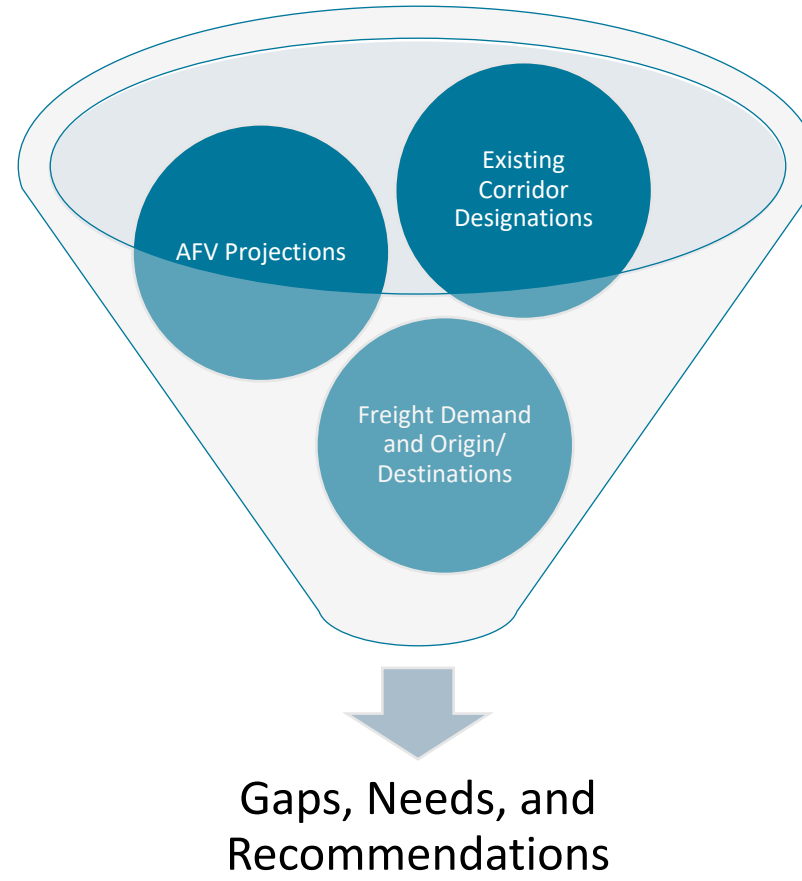
- Business establishment data (vendor-sourced)
- Census business pattern data
- Recent plans and studies
- Interviews with NYMTC members (summer and fall, 2020)

Analysis approach:

- Businesses within 5 miles of key freight corridors
- Freight-generating industry sectors (NAICS 11-49)
- Location employment 100+

Clean Freight Corridor Recommendations

“Putting it All Together”



Draft Corridor Designation Method

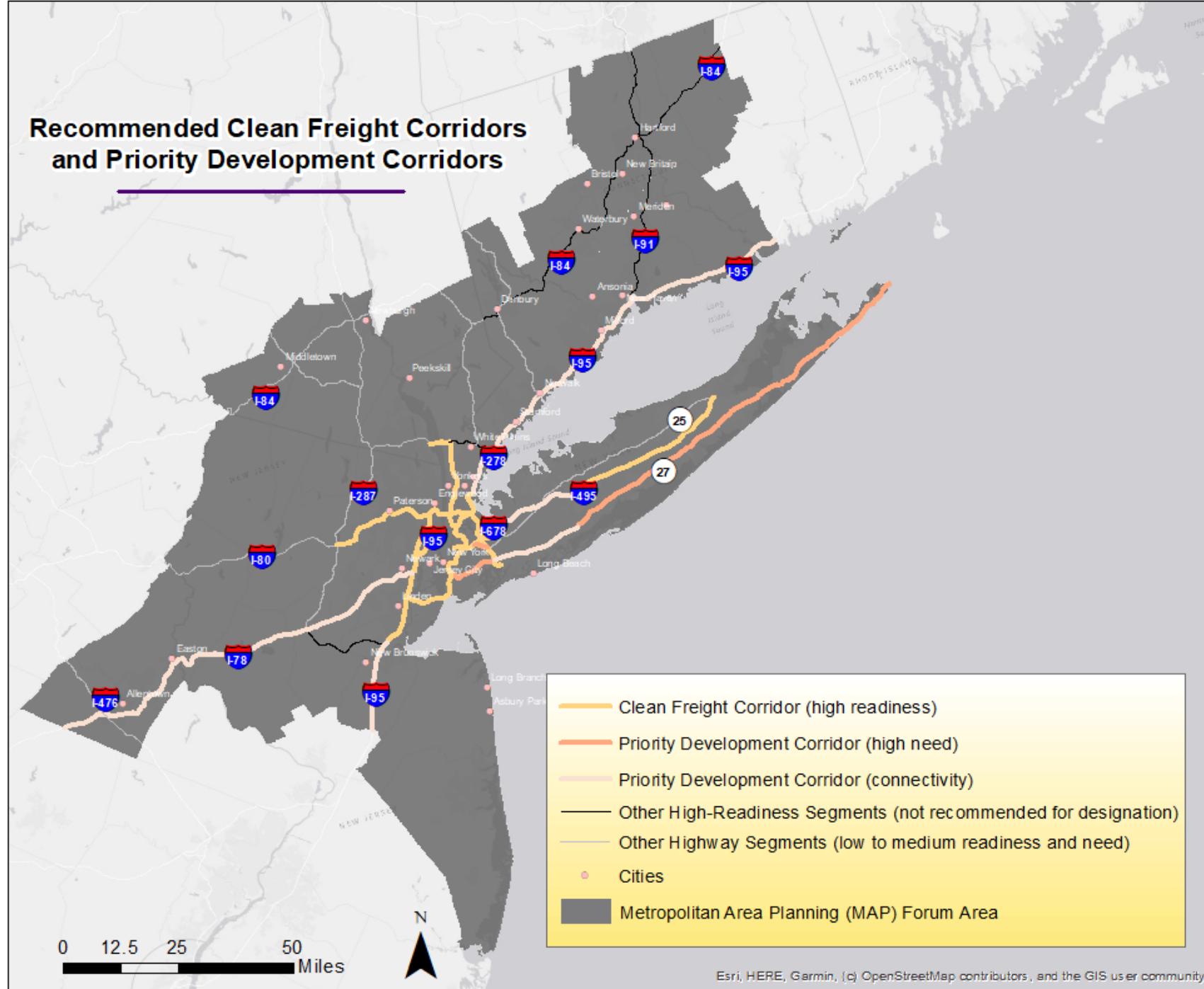
- Readiness levels by fuel type
 - Weighted composite score based on TAC input
 - Fuel station coverage: 44%
 - Freight Demand Clusters: 29%
 - Existing Truck Volume: 27%
 - High, medium, or low readiness (relative)
 - “High” readiness segments = designated clean corridors
- Need levels by fuel type
 - Projected demand: 50%
 - Air quality: 50%
 - Segments with a **low readiness** and **high need** could be designated as priority development corridors

Optimal Mix of New Clean Freight Corridors

- Recommended Clean Freight Corridors
 - High **Readiness** for at least three fuel types
 - Fuel station coverage (by fuel type)
 - Proximity to freight demand clusters
 - High existing truck volume
- Recommended Priority Development Corridors
 - Low readiness but high **Need** for EV, H2, and CNG
 - Projected demand (by fuel type)
 - High levels of diesel particulate matter
 - **OR** fills a key gap between other designated segments
 - **OR** connects to a designated clean fuel development corridor in a neighboring jurisdiction

			High Readiness				High Need		
	Highway	Segment	EV	H2	CNG	LPG	EV	H2	CNG
Clean Freight Corridor (High Readiness, High Need)	I-278	Total length	X	X			X	X	X
	I-495	Queens	X	X	X		X	X	X
	I-495	Suffolk	X	X	X	X	X	X	X
	I-678	Total length	X		X		X	X	X
	I-80	New Jersey (east of 287)	X	X		X			
	I-87	Westchester and Bronx	X	X	X		X	X	X
	I-95	New Jersey (north of Exit 10)	X	X	X	X	X	X	X
	I-95	Manhattan and Bronx	X	X	X		X	X	X
Priority Development Corridor (High Need, Low Readiness)	NY 25	Queens			X		X	X	X
	NY 27	Kings and Queens			X		X	X	X
	NY 27	Suffolk					X	X	X
Priority Development Corridor (Connectivity)	I-95	New Jersey (south of Exit 10)	X			X			
	I-95	Westchester		X					
	I-95	Fairfield County				X			
	I-95	New Haven County							
	I-495	Nassau			X	X			
	I-78	Pennsylvania				X			
	I-78	New Jersey (east of 287)							
	I-78	New Jersey (west of 297)							
	NY 27	Nassau		X					

Recommended Clean Freight Corridors and Priority Development Corridors



Implementation Considerations

- Considerations for Corridor Designation
 - Finalize list based on factors outside project scope
 - Further discussion with agencies in adjacent jurisdictions and other stakeholders
 - Further consideration of EJ communities
 - Examine role of different fuel types
- Develop a signage and communication plan
- Considerations for Infrastructure Development
 - Policy considerations
 - Federal (funding, regulatory barriers)
 - State/Regional (Multi-State MOU and Action Plan, leverage existing state incentives)
 - Local (zoning and permitting)

Implementation Considerations

- Considerations for Infrastructure Development (cont.)
 - Role of each fuel type
 - Fuel station siting (spacing, size, redundancy, fuel capacity)
 - Truck-compatible development (turning radii, fuel station dimensions)
 - Engaging local communities
 - Financing (public and private funding sources and mechanisms)

**Electric Island Heavy Duty Vehicle Charging Station,
Portland, Oregon**



Source: Daimler Trucks North America

Thank you!

If you have any questions, comments, or additional feedback, please reach out to Leslie Fordjour, NYMTC Leslie.Fordjour@dot.ny.gov