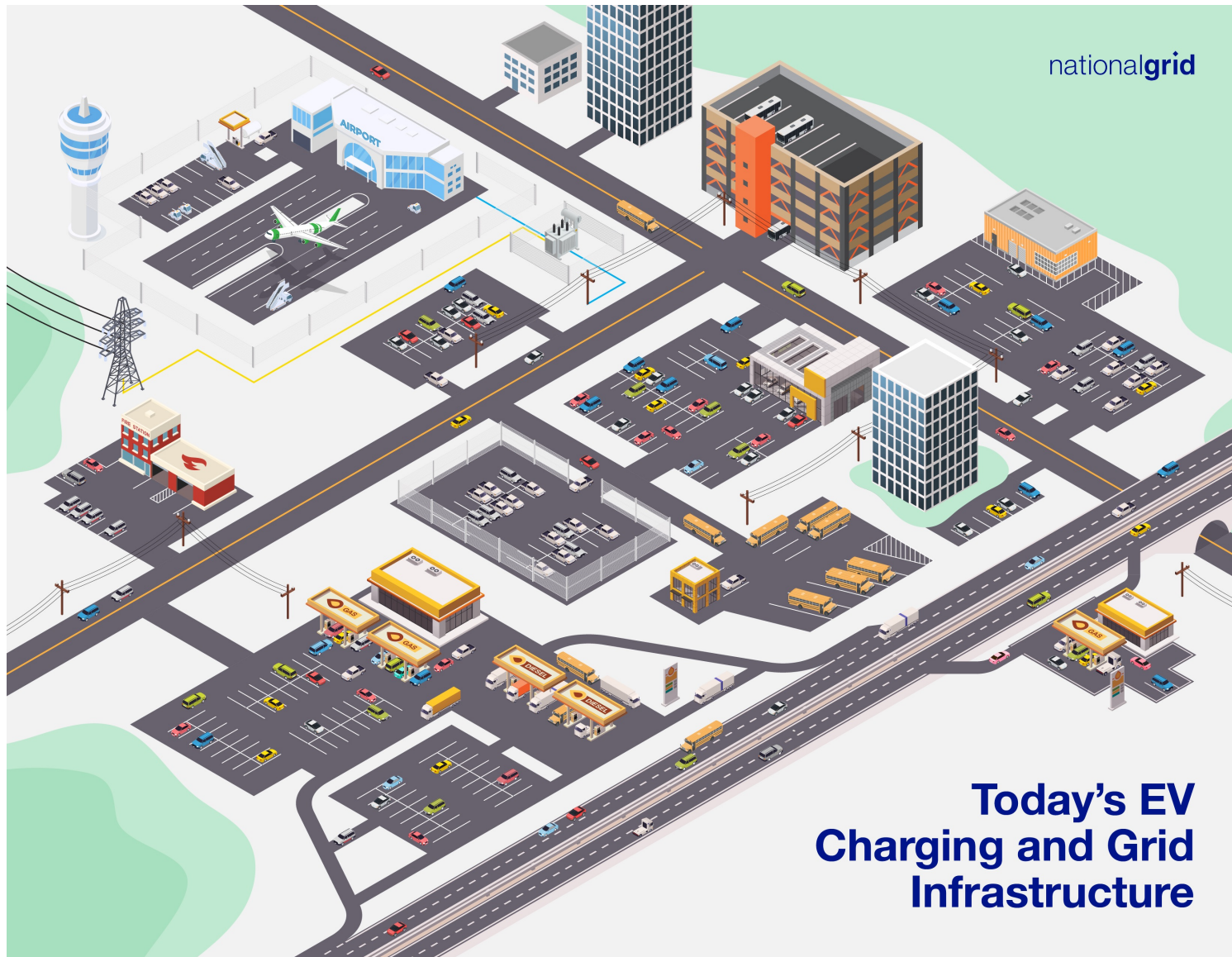


NASEO: Heavy-Duty Electrification and Utility Collaboration

Pedro Jardim
National Grid

nationalgrid



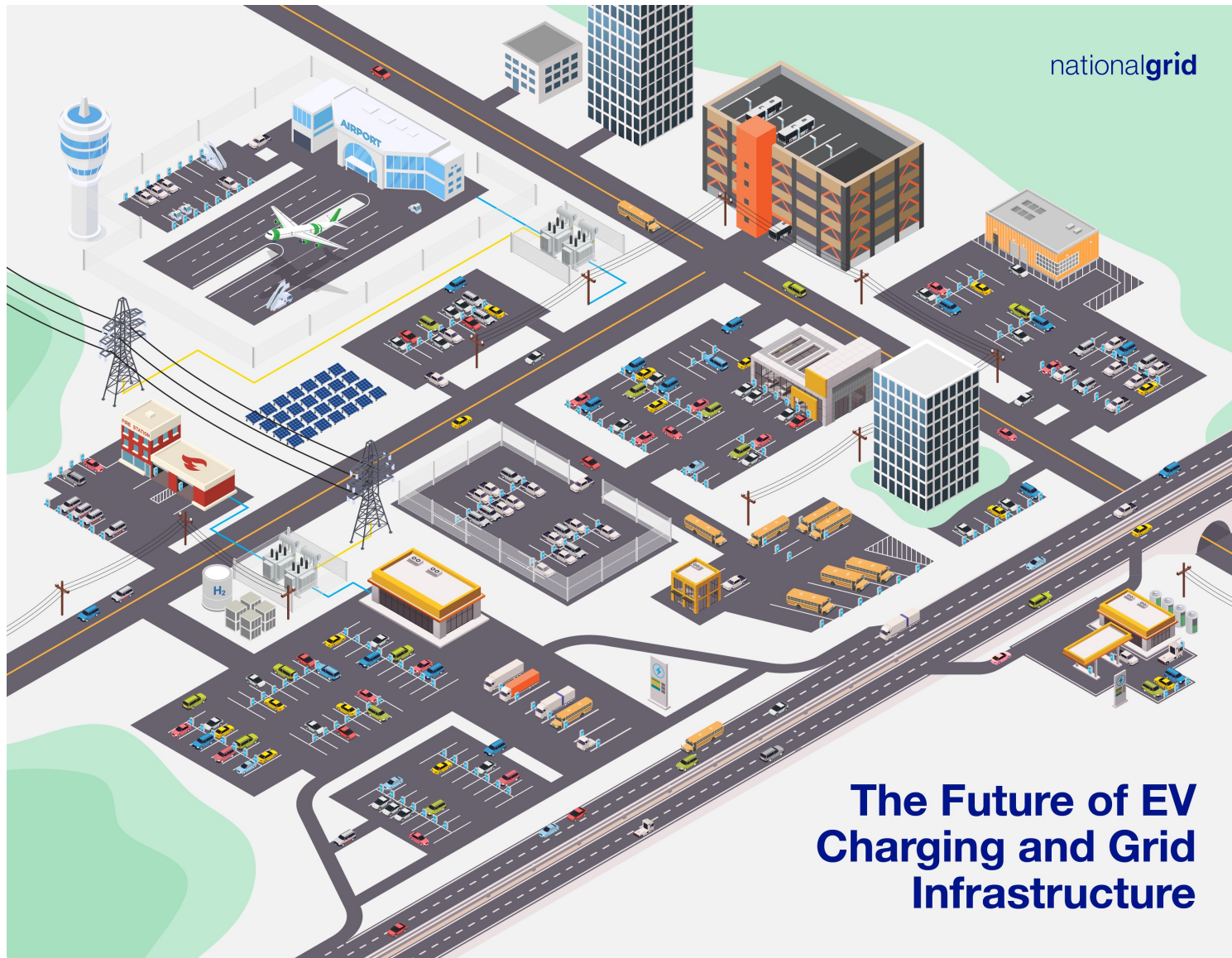


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For the first time, utilities are involved in conversations around the future of transportation

We're moving from the present (limited charging, heavy reliance on fossil fuels)...

Today's EV Charging and Grid Infrastructure

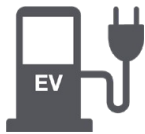


...and preparing our service territory for greater access to EV charging

Utilities are creating “Future of” or “Mobility” teams to interface with stakeholders in this field

There is a critical need to align infrastructure timelines with electrification roadmaps

~6-12 Months
to Construct



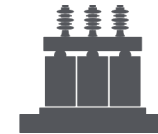
Onsite Upgrades

~1-4 Years to
Construct



Distribution Upgrades

~4-8 Years to
Construct



Transmission Interconnection
and Upgrades

National Grid is seeking to de-risk investment and avoid EV adoption outpacing utility infrastructure.

We as an industry must meet the moment to ensure the electric grid is an enabler—not a bottleneck—to developing a seamless highway and fleet charging network.

Working with Customers and Regulators to Ensure Utilities are not the Bottleneck

Proactive Planning and Forecasting

National Grid is a leader in utilities in how to best identify, forecast, and build solutions for long-term solutions before a customer's load request. Our studies and forecasting efforts have focused on two main verticals:

- Depot and fleet area studies
- Highway and travel plaza load studies

Customer Programs

National Grid and other utilities have worked through our Joint Utilities Group with NY State in the development and implementation of a variety of programs to increase penetration of light duty as well as medium- and heavy-duty vehicles

- Fleet advisory services
- MHD Make-Ready Pilot Program
- Demand Charge Rebate Program

First stop: Highway Charging

Highway fast-charging is critical to delivering a great experience for EV drivers

The grid can accommodate fast-charging – though it will introduce new demands

Federal and state policy have accelerated vehicle electrification

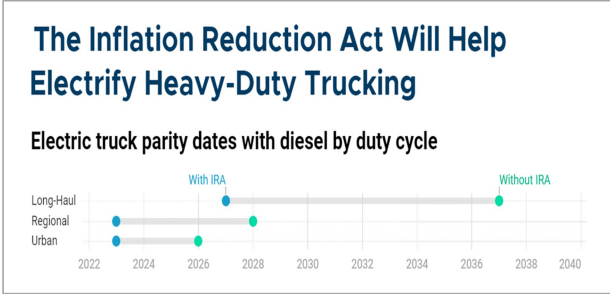


Electric Truck Stops Will Need as Much Power as a Small Town

Tesla rolls out its Semi next month, adding pressure on the trucking industry to go green. But grid upgrades must start now if the new era is to last.



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Fast-charging is critical to making the EV transition accessible to everyone

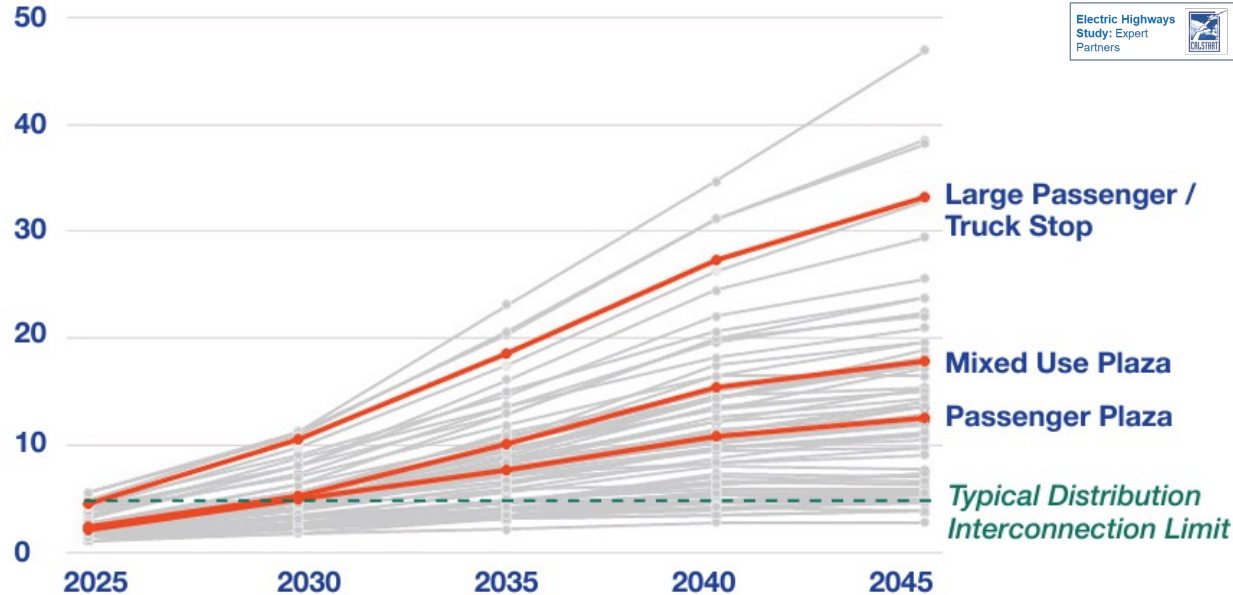
Started our work with Electric Highway Study

Large Industrial Plant
(40+ Megawatts)

A Small Town
(20 Megawatts)

A Stadium
(5 Megawatts)

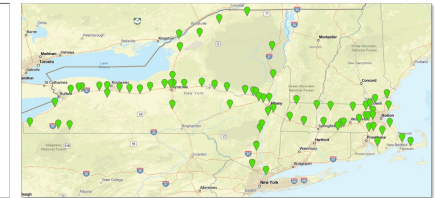
Projected charging capacity for 71 Northeastern highway sites
Megawatts of power to meet annual peak demand, over time



Note: Analysis seeks to match ZEV goals for New York + Massachusetts, makes simplifying assumption that all ZEVs are electric. See study for discussion of assumptions, including role of hydrogen fueling and impact on capacity. Comparisons are approximations.

We analyzed traffic data to forecast future fast-charging capacity at over 70 highway sites in NY & MA.

- Light-duty (passenger) vehicles and medium- and heavy-duty (commercial) vehicles
- Assumptions match state mandates for electric vehicle adoption
- Results will help utilities, regulators, site operators, and state agencies coordinate and drive cost savings



Electric Highways Study Site



This study complements state DOT plans, provides a 25-year roadmap for highway electrification

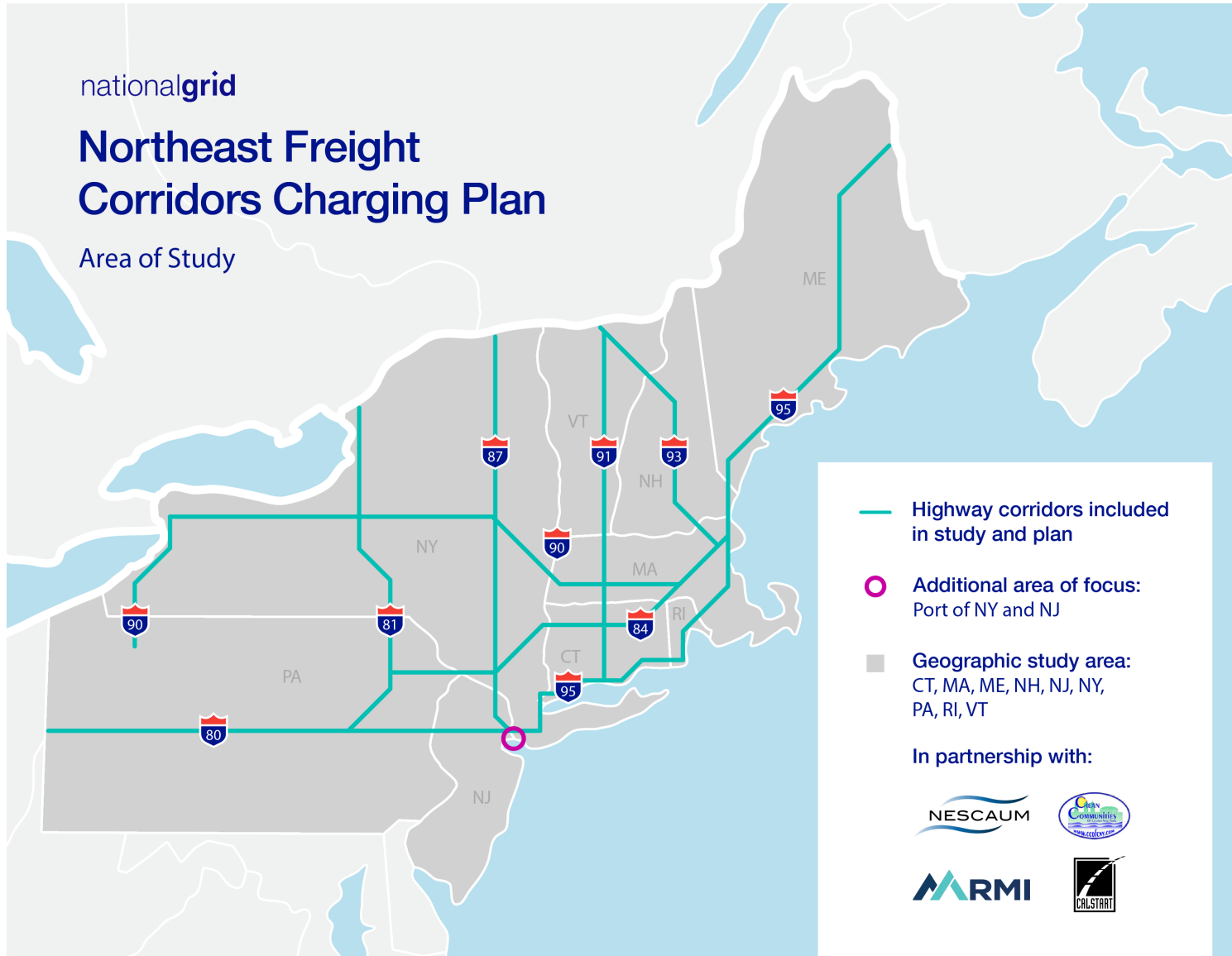
We shared these results widely with our regulators and other departments of NS.

Based on these results, we added 6 projects for proactive investment in our rate case

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Northeast Freight Corridors Charging Plan

Area of Study



The Northeast Freight Corridors Charging Plan is a \$1.2M, 2-year long study and Regional MHDV Charging Plan funded by the Department of Energy Vehicle Technologies Office.

This study will cover nearly **3,000 miles of freight corridors in the Northeast** through studying 100+ sites along those corridors, as well as the electrification needs of the Port of New York and New Jersey.

Collaboration and coordination – Advisory Committees

Advisory committees play a key role in ensuring our project is equitable and representative of different viewpoints of key stakeholders in freight electrification

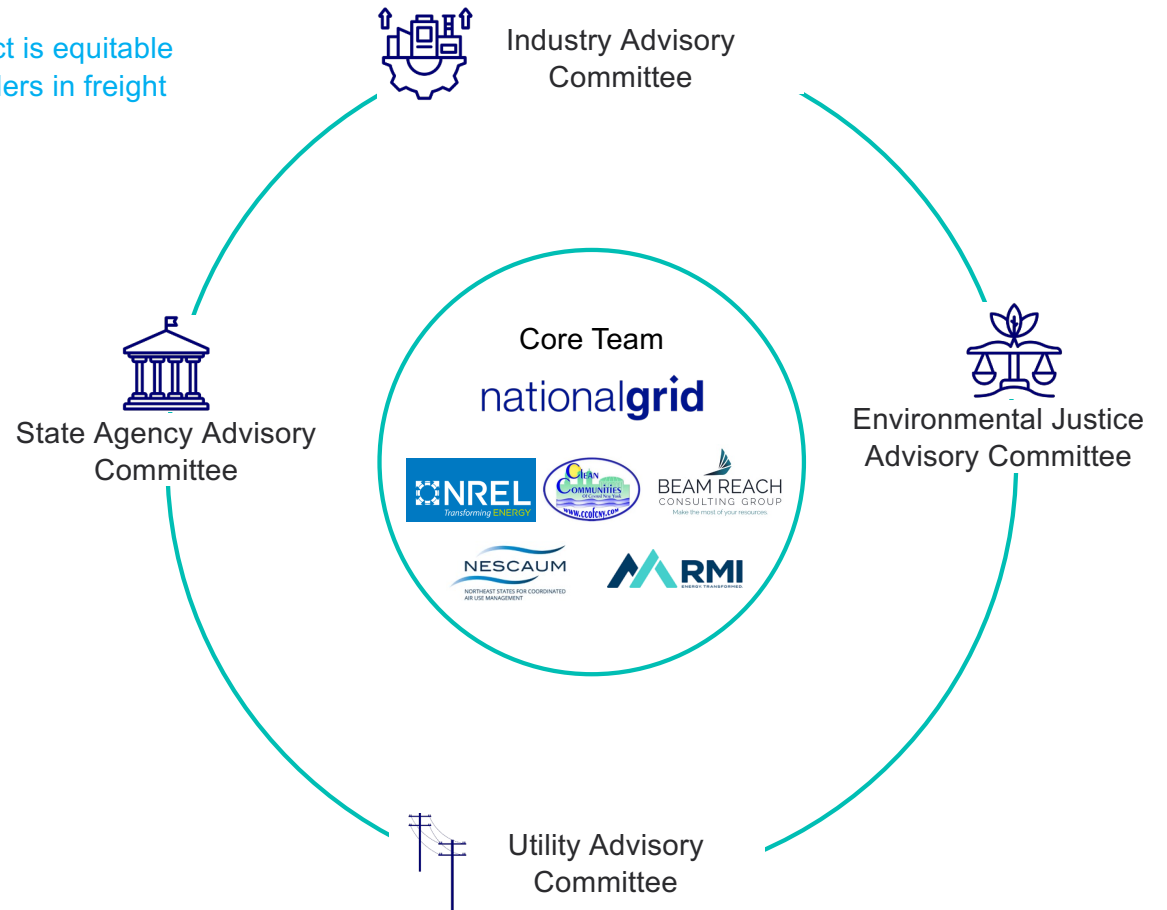
Advisory Committee members include:

Utility: Avangrid, Eversource, Green Mountain Power, PSEG, First Energy, PPL, Versant, Con Edison, NYPA, RI Energy.

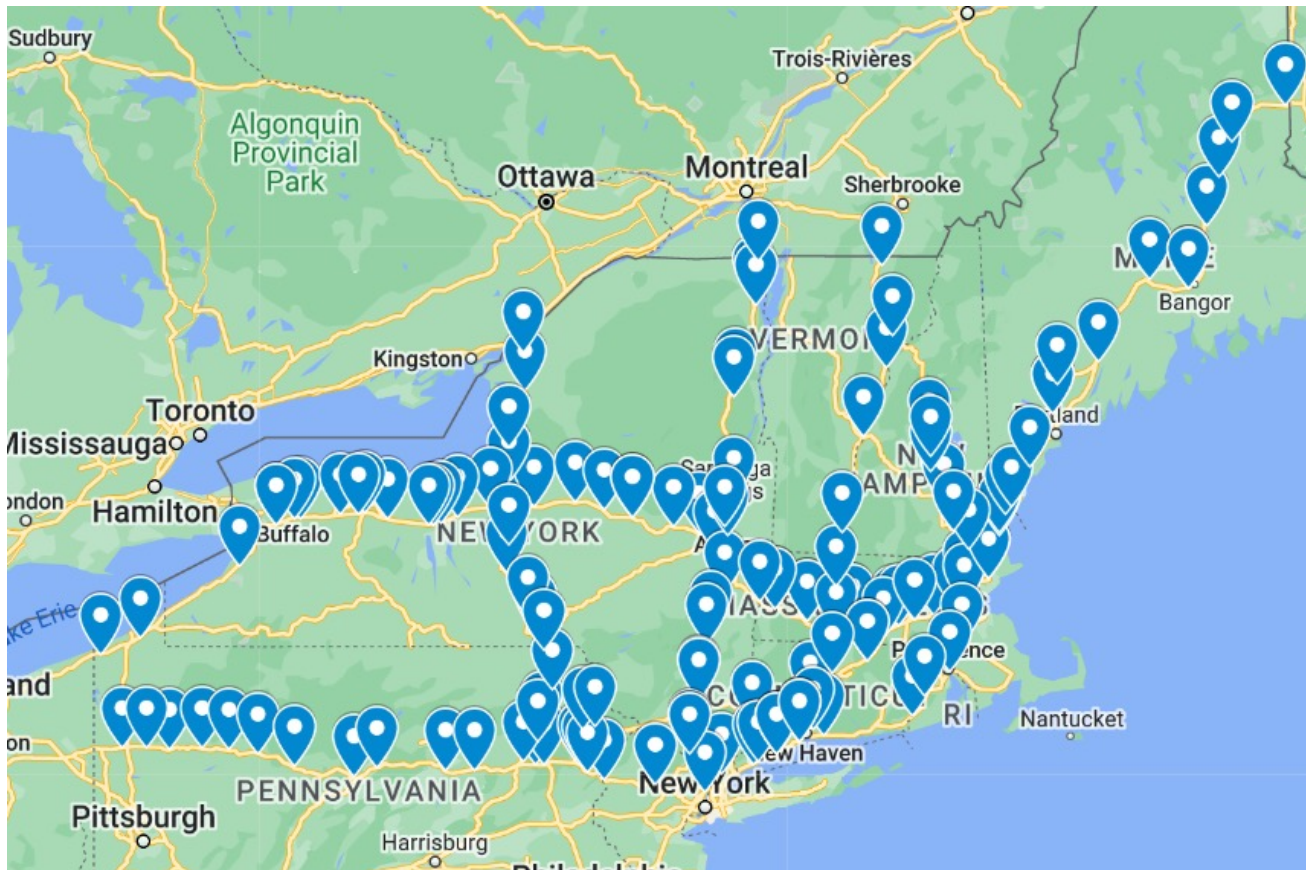
State: Representatives from multiple agencies in PA, NJ, NY, CT, RI, MA, VT, NH, ME

Environmental Justice: Clean Communities of Central New York; Central New York Regional Planning and Development Authority
Vermont Clean Cities;
Greater New Haven/CT Clean Cities; New Jersey Clean Cities; Eastern PA Advanced Clean Transportation Agency

Industry: Cummins, DHL, Nikola, XOS, Applegreen, ChargePoint, General Motors, Pilot Flying J, Zeem, BP Pulse, Daimler, Ikea, Voltera



Sites selected for study




We are developing **load profiles for 120+ sites**











This informs a **regional plan for MHDV charging with 30-40 prioritized sites**, including desktop engineering for grid upgrades.

Customer programs

- EV programs in New York kickstarted in 2020. The state-wide program is a collaboration between the PSC and the Joint Utilities organization of NY
- The program has been updated many times and funding has increased from an initial \$700M to \$1.24B



 NAVIGATING THE UTILITY	 PLANNING EV / EVSE ADOPTION	 UTILITY INFRA.	 CUSTOMER INFRA.	 EV CHARGER (EVSE)	 VEHICLE COSTS	 OTHER SOFT COSTS	 ONGOING OPERATIONS
Single Point of Contact for Fleets (SPOC)	Fleet Assessment Services	Infrastructure Make-Ready Programs		EVSE Rebates	State and Federal Rebates available	Fleet Operator Responsible	Fleet Operator Responsible, Utility Advises, Reduces Fuel Cost, Enables Resiliency
<ul style="list-style-type: none"> • Leslie Vishwanath, Lead Project Manager 	<ul style="list-style-type: none"> • All fleets eligible for site feasibility assessments & rate analysis 	<ul style="list-style-type: none"> • Light-Duty: Funding Available • Medium- and Heavy- Duty: Funding up to 90% for L2 & DCFC Charging 	<ul style="list-style-type: none"> • Light-Duty: Funding Available • Medium- and Heavy- Duty: Funding up to 50% for L2 & DCFC Charging 	<ul style="list-style-type: none"> • State and Federal Rebates available (NYSERDA, DEC, EPA, etc. when available) 	<ul style="list-style-type: none"> • State and Federal Rebates available 	<ul style="list-style-type: none"> • Fleet Operator Responsible 	<ul style="list-style-type: none"> • V2G • Demand Charge Rebate • Coming soon: Commercial Managed Charging Program

Updated Program: Medium- and Heavy-Duty Make-Ready Pilot (MHD Pilot)

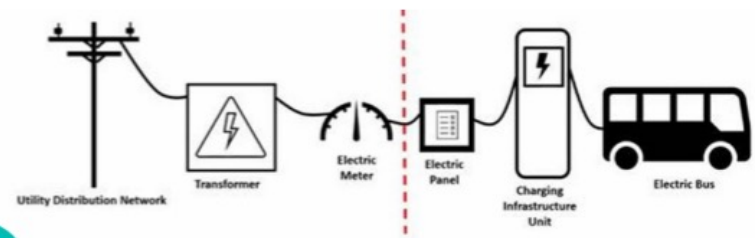
MHDV Infrastructure: NG now has ~\$19M Program to support fleets of all types:

- Expanded in Nov. 2023: *~4x funding through 2025*
- Covers up to **90% of utility-side infrastructure costs**
- Now also** covers up to **50% of customer-side costs for DAC projects or accessible projects** (*customer-side caps are up to \$220 / kW for DCFC \$3,500 / port for L2*)

MHDV Pilot Infrastructure Support:
(Subject to eligibility at left)

Supported up to **90%**

Supported up to **50%**



Eligibility:

EPA CSB or NYSBIP projects are now eligible for NGRID support

- Vehicle Incentive program recipients:**
Participants must participate in federal or state vehicle incentive programs¹, with a DAC prioritization:
 - Projects in a DAC: Eligible for 90% grid- and 50% customer-side incentives (*customer-side caps are up to \$220 / kW for DCFC; up to \$3,500 / port for L2*)
 - Non-DAC Projects: Eligible for 90% grid-side incentives only
- Publicly Accessible Projects:**
Participants no longer need to participate in the above vehicle programs to receive infrastructure funding; eligible for 90% grid- and 50% customer-side incentives (*customer-side caps are up to \$220 / kW for DCFC; up to \$3,500 / port for L2*)

Disadvantaged Community (DAC) Map:



Note: Yellow striped areas are DAC, Blue outline is National Grid electric territory

Our Collaboration With Regulators has led to the Proactive Planning Order

- On August 15, New York PSC issued the Proactive Planning Order
- The proceeding invites utilities in the state to work collaborative with the PSC to solve for future grid needs ahead of typical project timelines.

Key Dates

- August 15 - Proceeding issued
- November 13 – Urgent Projects filing
- December 13 - Planning Framework filing

