NACAA: Planning the Future of Medium- and Heavy-Duty Infrastructure

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National Grid

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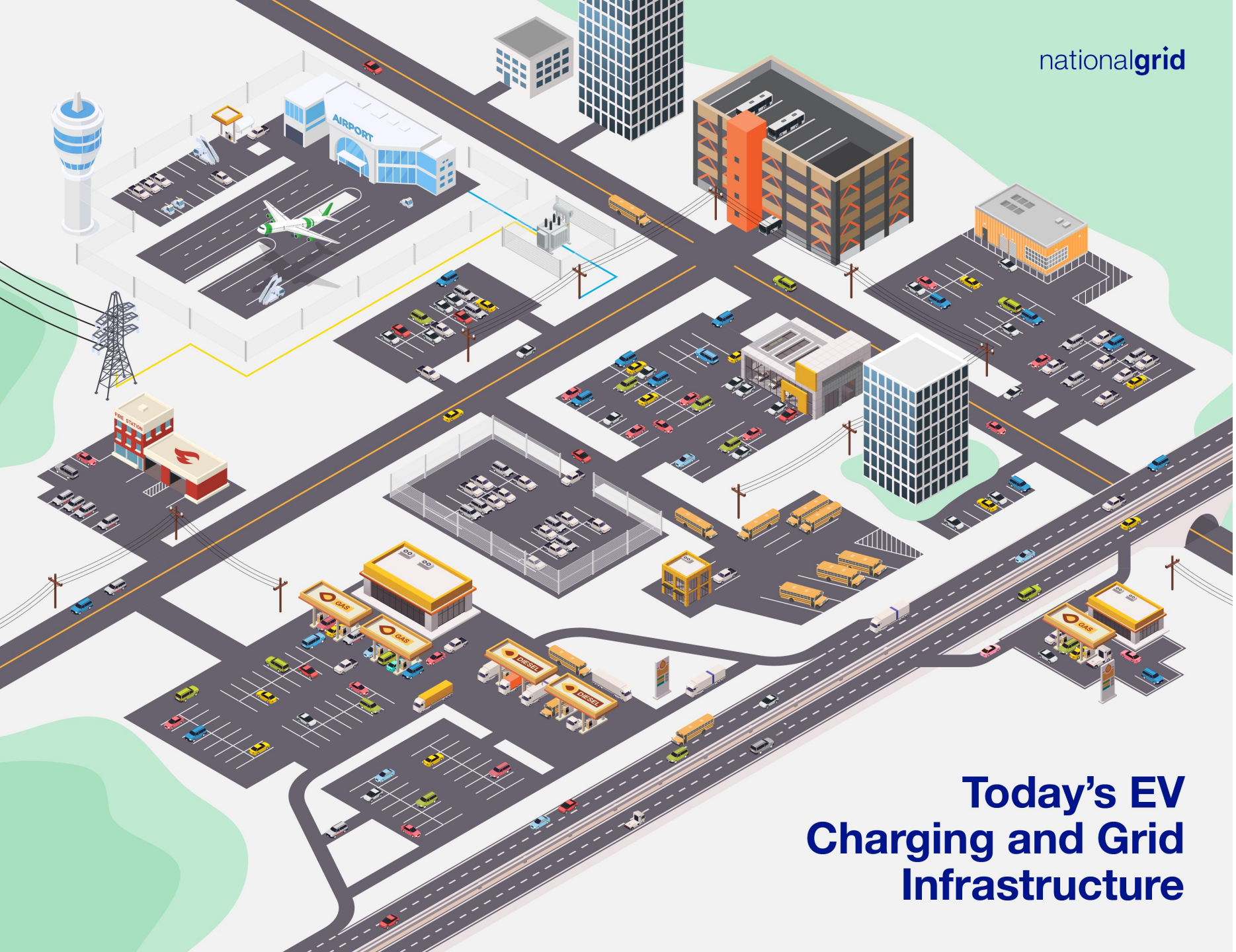
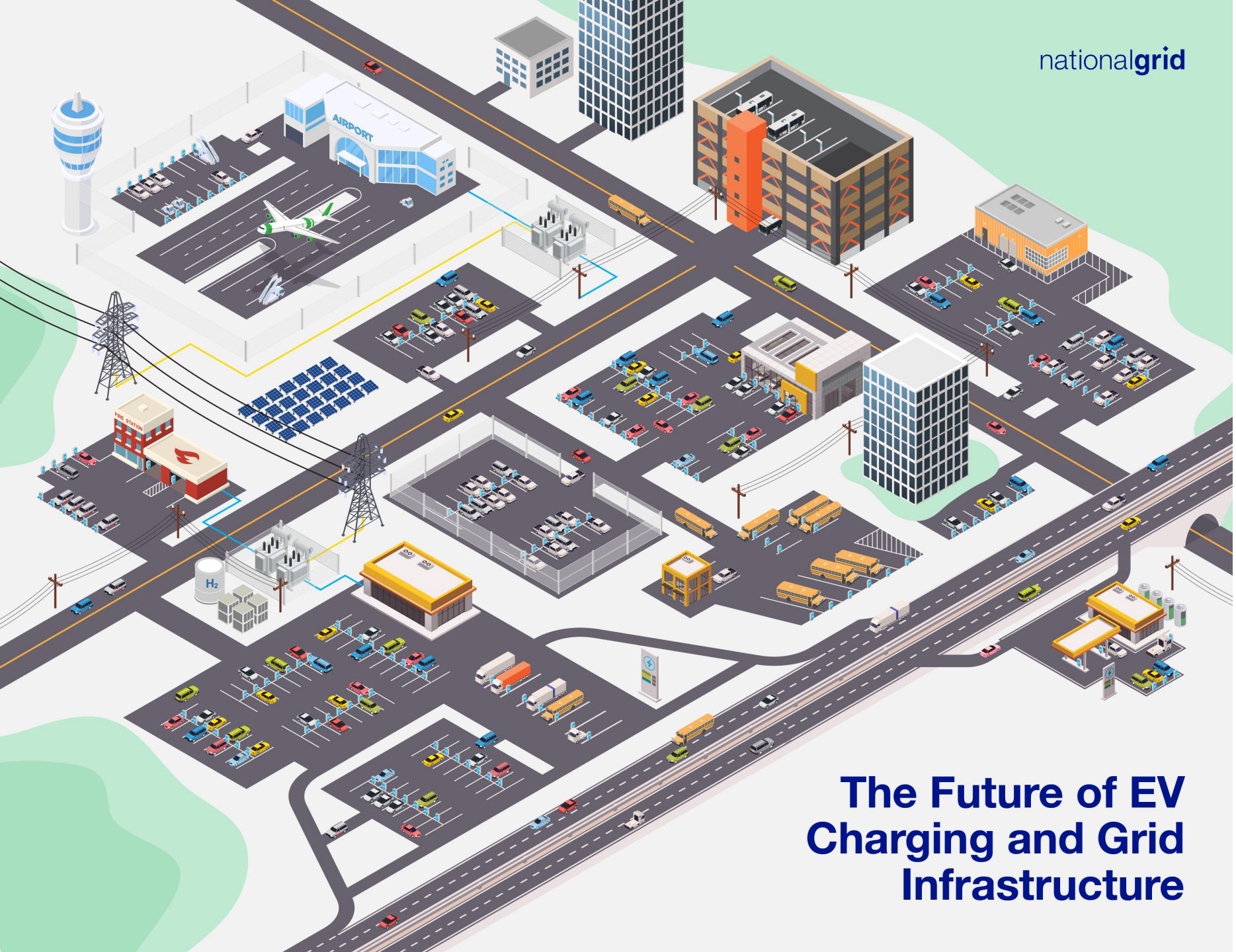


Today's EV Charging and Grid Infrastructure

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)…



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

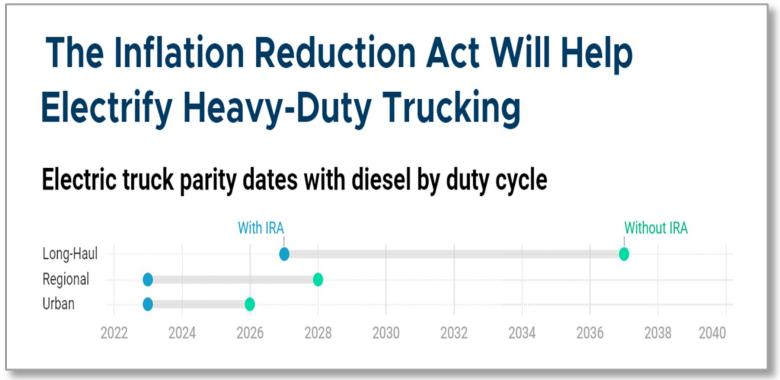
Utilities are creating “Future of” or “Mobility” teams to interface with stakeholders in this field

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

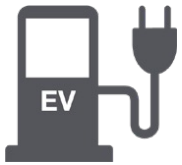
Federal and state policy have accelerated vehicle electrification



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

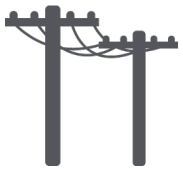
There is a critical need to align infrastructure timelines with electrification roadmaps

~6-12 Months to Construct



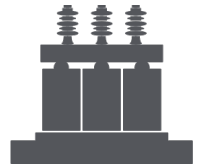
Onsite Upgrades

~1-4 Years to Construct



Distribution Upgrades

~4-8 Years to Construct



Transmission Interconnection and Upgrades

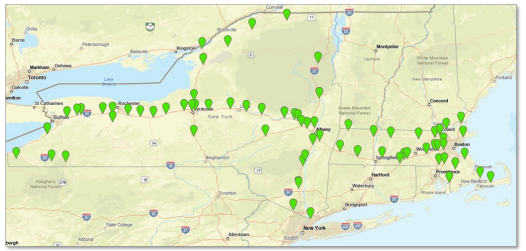
National Grid is seeking to de-risk investment and avoid EV adoption outpacing utility infrastructure.

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.

Started our work with Electric Highway Study

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

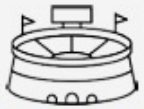


Electric Highways Study: Expert Partners

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

Large Industrial Plant (40+ Megawatts)

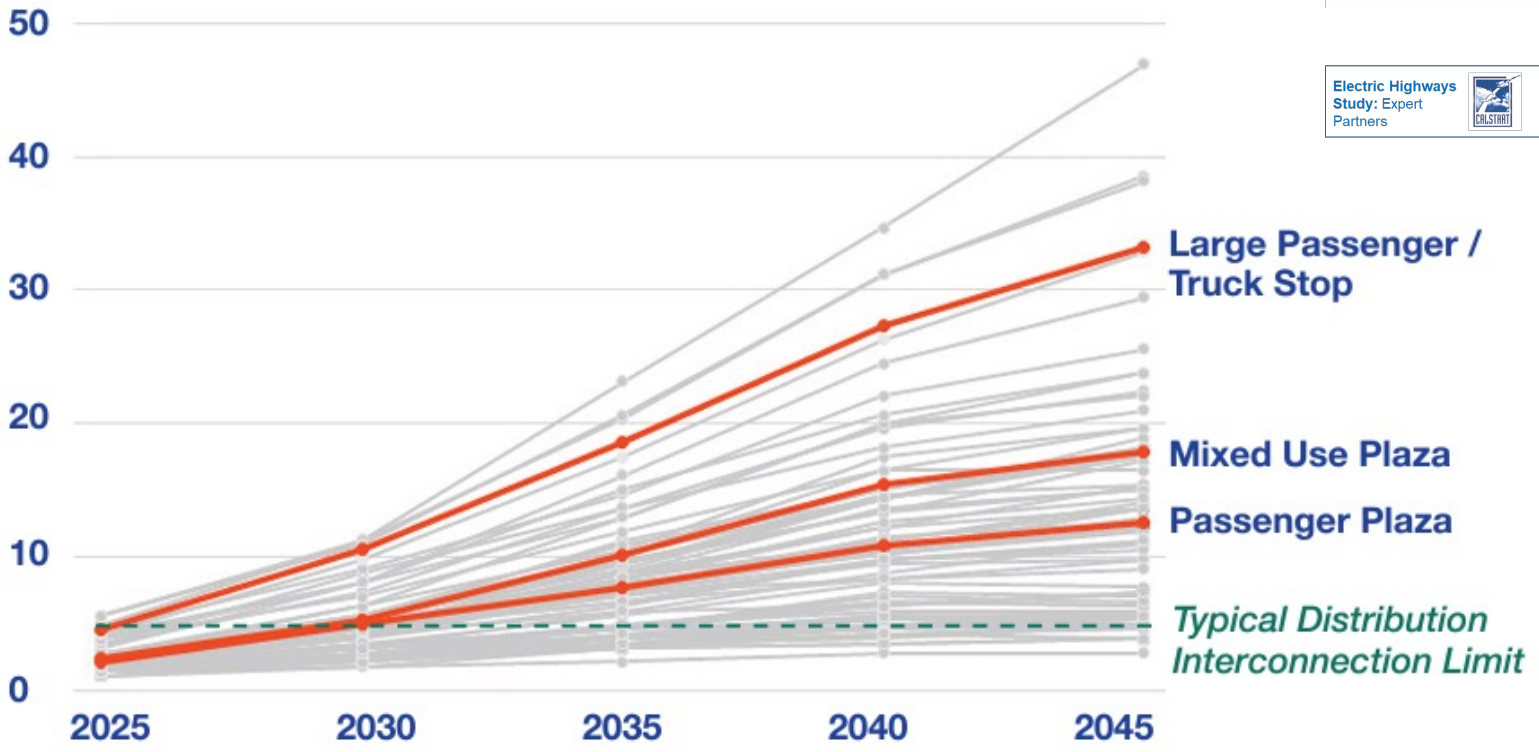
A Small Town (20 Megawatts)



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.

From our own **2022 Electric Highways Study**, we know that fast-charging needs at highway sites will be significant

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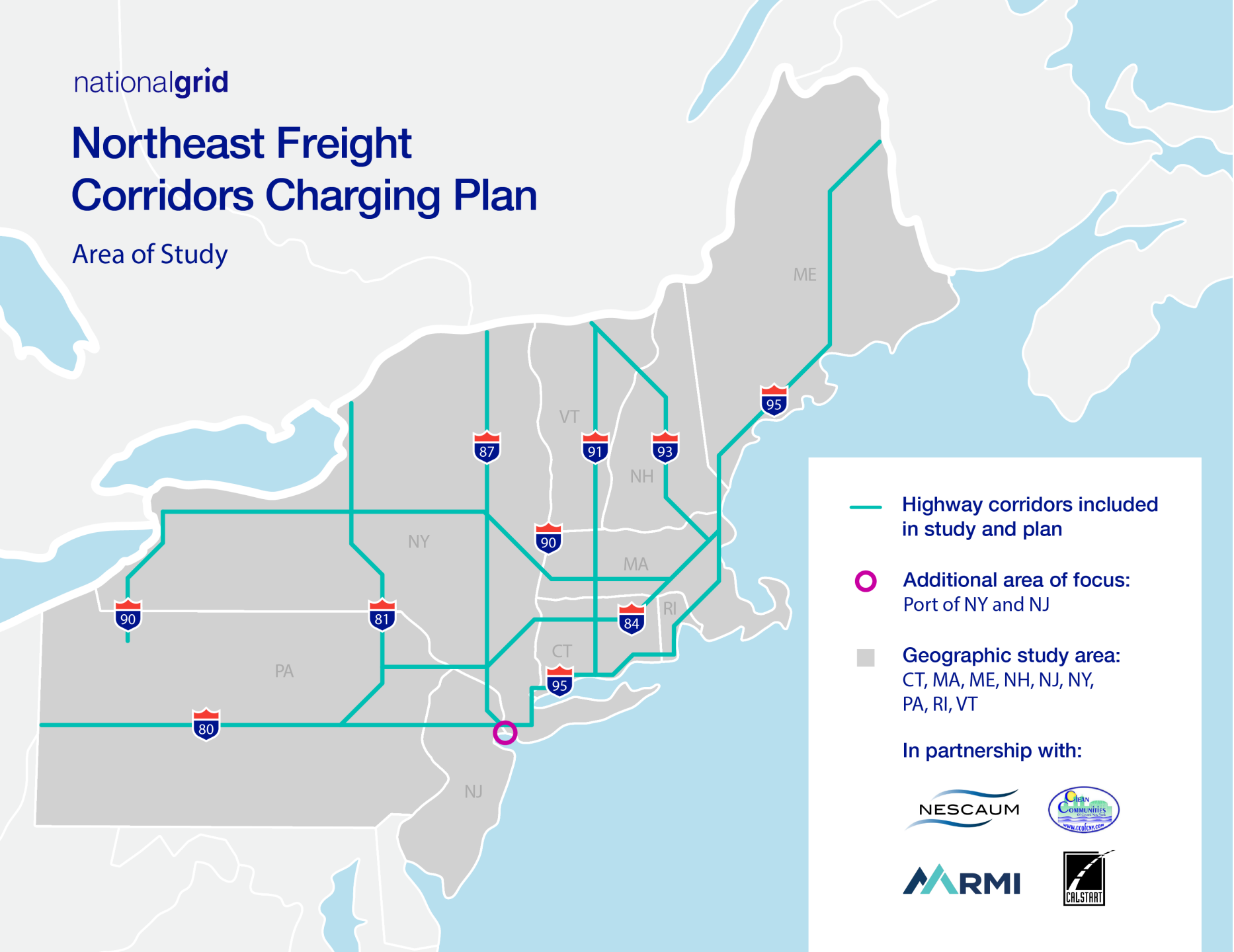
Northeast Freight Corridors Charging Plan

Area of Study



Highway corridors included in study and plan

Additional area of focus: Port of NY and NJ

Geographic study area: CT, MA, ME, NH, NJ, NY, PA, RI, VT

In partnership with:

NESCAUM

Clean Communities of Central New York

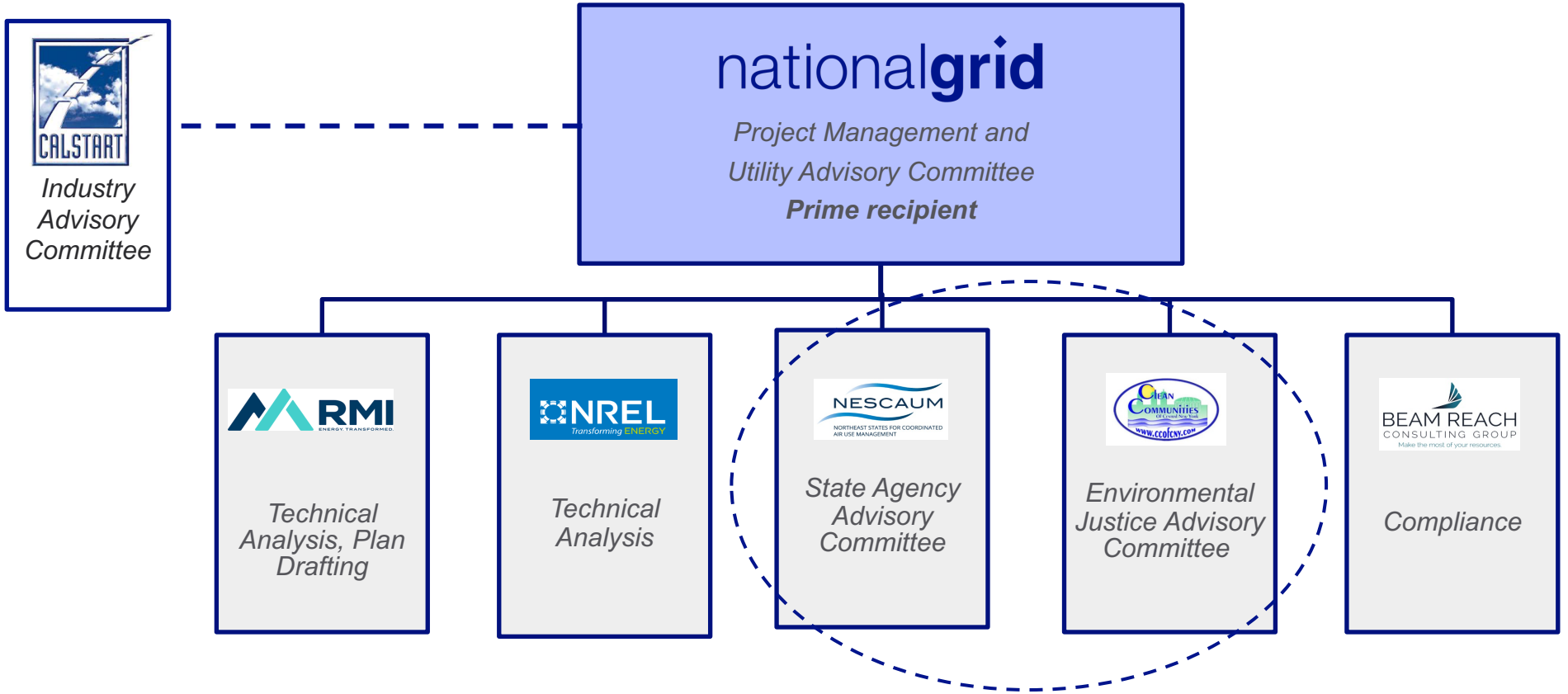
RMI

CALSTART

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 – Project team structure



National Grid leads a standing monthly meeting with the project team. In addition, National Grid has monthly one-on-ones with each organization and hosts weekly “office hours”.

Each organization that leads an Advisory Committee organizes meetings as necessary to meet project objectives and milestones.

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

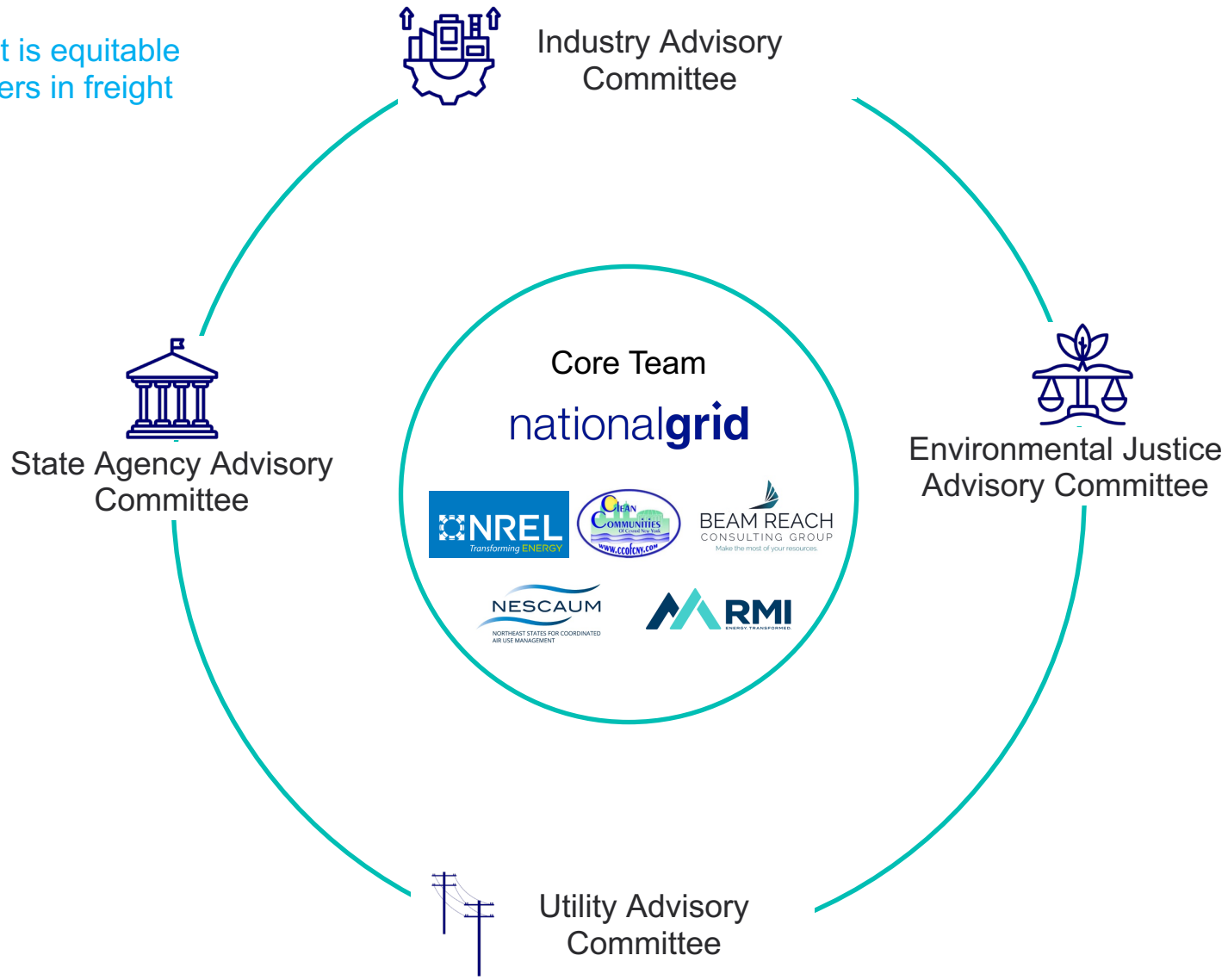
<u>Advisory Committee members include:</u>

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

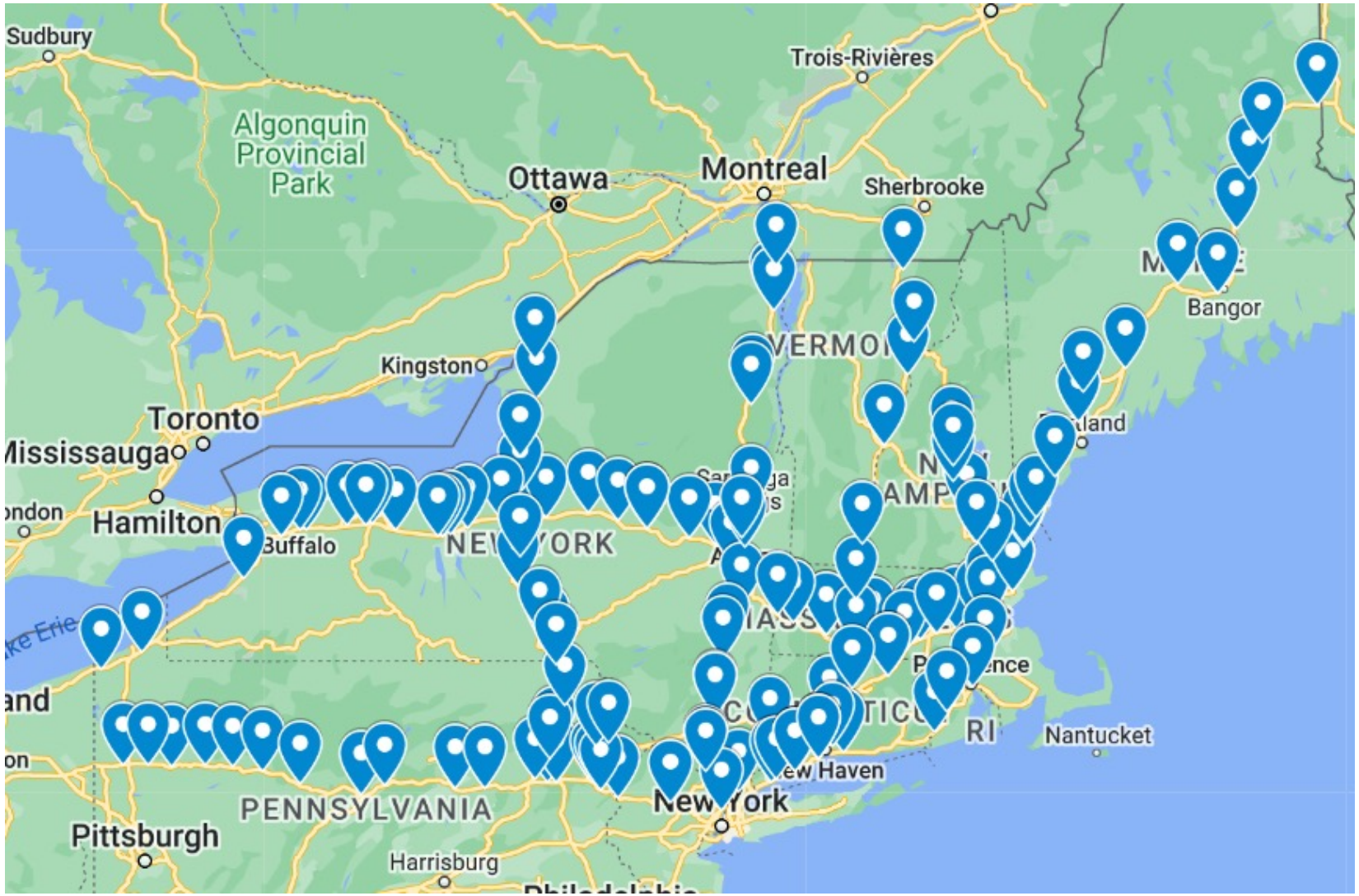
State: Representatives from multiple agencies in PA, NJ, NY, CT, RI, MA, VT, NH, ME

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**

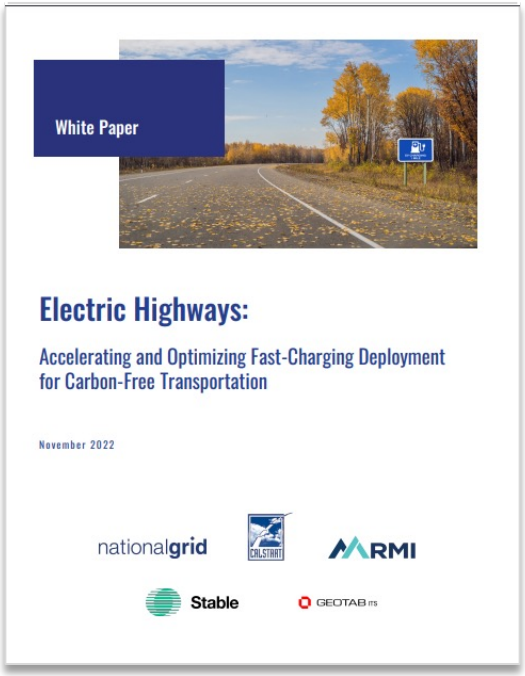
This informs a **regional plan for MHDV charging with 30-40 prioritized sites**, including desktop engineering for grid upgrades

Process and outputs

Corridor Charging Needs	
Process	**Output**
Utility and State Agencies work together to select Sites	Forecast MHDV EV Charging needs for 120+ Sites
Stakeholder Advisory Committees provide input on assumptions used in charging forecasts	***Forecasts reviewed by Stakeholder Advisory Committees and iterated on by RMI***
Sites prioritized based on 4 metrics: 1. Estimated Load 2. Proximity to Infrastructure 3. State Priorities (defined by State Agency Advisory Committee) 4. EJ Impact (Defined by EJ Advisory Committee)	**30-40 Prioritized Sites for Regional Plan**
Utilities perform desktop analysis for prioritized sites – basic conceptual engineering and cost estimates	**Regional coverage for MHDV Charging Sties including estimated load, solutions to serve load, cost estimate of solutions**

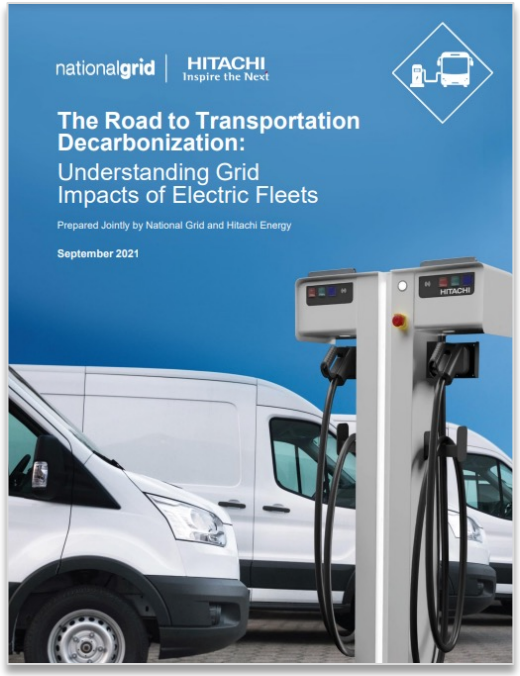
Continuing work around MHDV charging and planning

Electric Highways Study

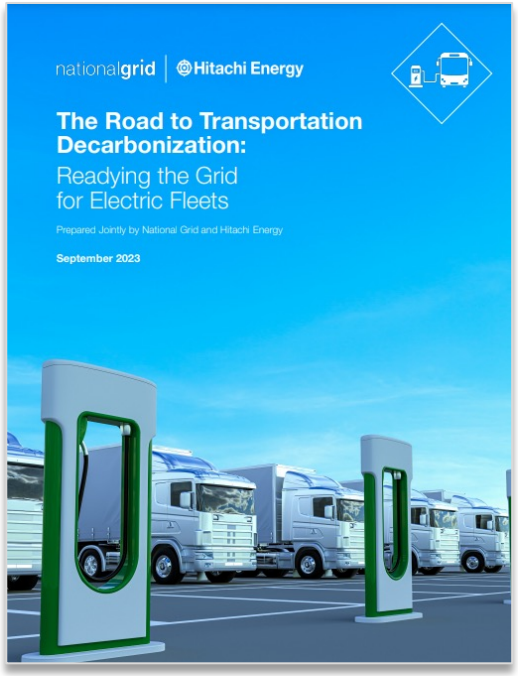


Fast-charging loads at 71 sites across NY / MA

Case Studies of Fleet Electrification Impacts



Load impacts from 51 fleets in one MSA



Grid upgrades needed on one power line to serve 400+ electric trucks

Continuing Work

We are continuing to evolve our capability to identify location-specific EV load growth which traditional forecasts were not designed to capture, using sources such as:

- Depot Databases
- Vehicle Telematics
- Propensity Modeling