



NPCC Reliability Forum

March 27, 2025, 9:00 a.m. – 12:00 p.m. EDT **Webex Meeting**

Registration Link: [Webex Link](#)

1.0 Reliability Forum Topics

- 1.1 Welcome and Safety Message: Gerry Dunbar, NPCC Director Reliability Standards and Criteria (9:00 am - 9:05 am)
- 1.2 Antitrust Compliance Guidelines, Public Notice, and Meeting Protocols: Ruida Shu, NPCC Manager of Reliability Standards (9:05 am – 9:10 am)
- 1.3 NPCC Reliability Forum Outreach Efforts – Gerry Dunbar, NPCC Director Reliability Standards and Criteria (9:10 am – 9:15 am)
- 1.4 Working with electric utilities to support heavy-duty electric vehicles – Aravind Kailas, Advanced Technology Policy Director, Volvo Group North America (9:15 am – 9:55 am)
- 1.5 Driving an Efficient Clean Transportation Transition – Britt Reichborn-Kjennerud, Director of E-Mobility, Con Edison (9:55 am – 10:35 am)

Break (10:35 am – 10:40 am)

- 1.6 Building the Grid to Need: Best Practices for Proactively Developing Grids to Support EVs – Cole Jermyn, Attorney, Energy Transition, Environmental Defense Fund (10:40 am – 11:20 am)
- 1.7 Driving Change: Grid Planning Implications & Opportunities from EV Load Growth – Ben Shapiro, Principal, Transportation, Rocky Mountain Institute (RMI) (11:20 am – 12:00 pm)
- 1.8 Closing – Gerry Dunbar



Northeast Power Coordinating Council, Inc. (NPCC)

Antitrust Compliance Guidelines

It is NPCC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. The antitrust laws make it important that meeting participants avoid discussion of topics that could result in charges of anti-competitive behavior, including: restraint of trade and conspiracies to monopolize, unfair or deceptive business acts or practices, price discrimination, division of markets, allocation of production, imposition of boycotts, exclusive dealing arrangements, and any other activity that unreasonably restrains competition.

It is the responsibility of every NPCC participant and employee who may in any way affect NPCC's compliance with the antitrust laws to carry out this commitment.

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- Industry-related topics considered sensitive or market intelligence in nature that are outside of their committee's scope or assignment, or the published agenda for the meeting;
- Their company's prices for products or services, or prices charged by their competitors;
- Costs, discounts, terms of sale, profit margins or anything else that might affect prices;
- The resale prices their customers should charge for products they sell them;
- Allocating markets, customers, territories or products with their competitors;
- Limiting production;
- Whether or not to deal with any company; and
- Any competitively sensitive information concerning their company or a competitor.

Any decisions or actions by NPCC as a result of such meetings will only be taken in the interest of promoting and maintaining the reliability and adequacy of the bulk power system.

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Reliability Forum Disclaimer Statement

1. General

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Public Announcement

RSC and Reliability Forum Meetings, Webex, and Conference calls:

Participants are reminded that this meeting, Webex, and conference call are public. The access number was posted on the NPCC website and widely distributed. Speakers on the call should keep in mind that the listening audience may include members of the press and representatives of various governmental authorities, in addition to the expected participation by industry stakeholders.



Meeting Logistics

Participants will be muted upon entry, and you are encouraged to use the “Chat” feature of the Webex if you wish to ask a question. The questions will be answered by the presenter at the end of each presentation. NPCC Reliability Forum will be recorded, the meeting material will be posted on the Reliability Forum section of the NPCC website.

Thank you for your cooperation.

NPCC Reliability Forum

NPCC 2025 Outreach Activities

Gerry Dunbar
Director Reliability Standards and Criteria

March 27, 2025





NPCC Long Term Strategy

To assure effective and efficient reduction of risks to the reliability and security of the grid

2025 Outreach Activities

- **Reliability Forums - March, May, Aug., Oct.**
 - Various Reliability Topics
 - Electric Vehicles, OSW, Large Loads, Transmission Interconnection
- **State and Provincial Outreach Topics**
 - NERC and NPCC Seasonal Reliability Assessments
 - FERC Order 901 (Reliability Standards for Inverter Based Resources)
 - Winterization, Data Centers
- **Regional Webinars/Workshops**
 - Physical and Cyber Security
 - Extreme Weather Preparedness
- **Risk Identification**
 - Energy Assessment



NPCC Long Term Strategy

To assure effective and efficient reduction of risks to the reliability and security of the grid

- NPCC Seasonal Reliability Assessments
- IBR Standard and Registration Projects
- Northeast Gas/Electric System Study
- NPCC More Stringent Reliability Criteria

WORKING WITH ELECTRIC UTILITIES TO SUPPORT HEAVY-DUTY ELECTRIC VEHICLES

NPCC Meeting

Aravind Kailas, Ph.D.

Volvo Group

2025-03-27

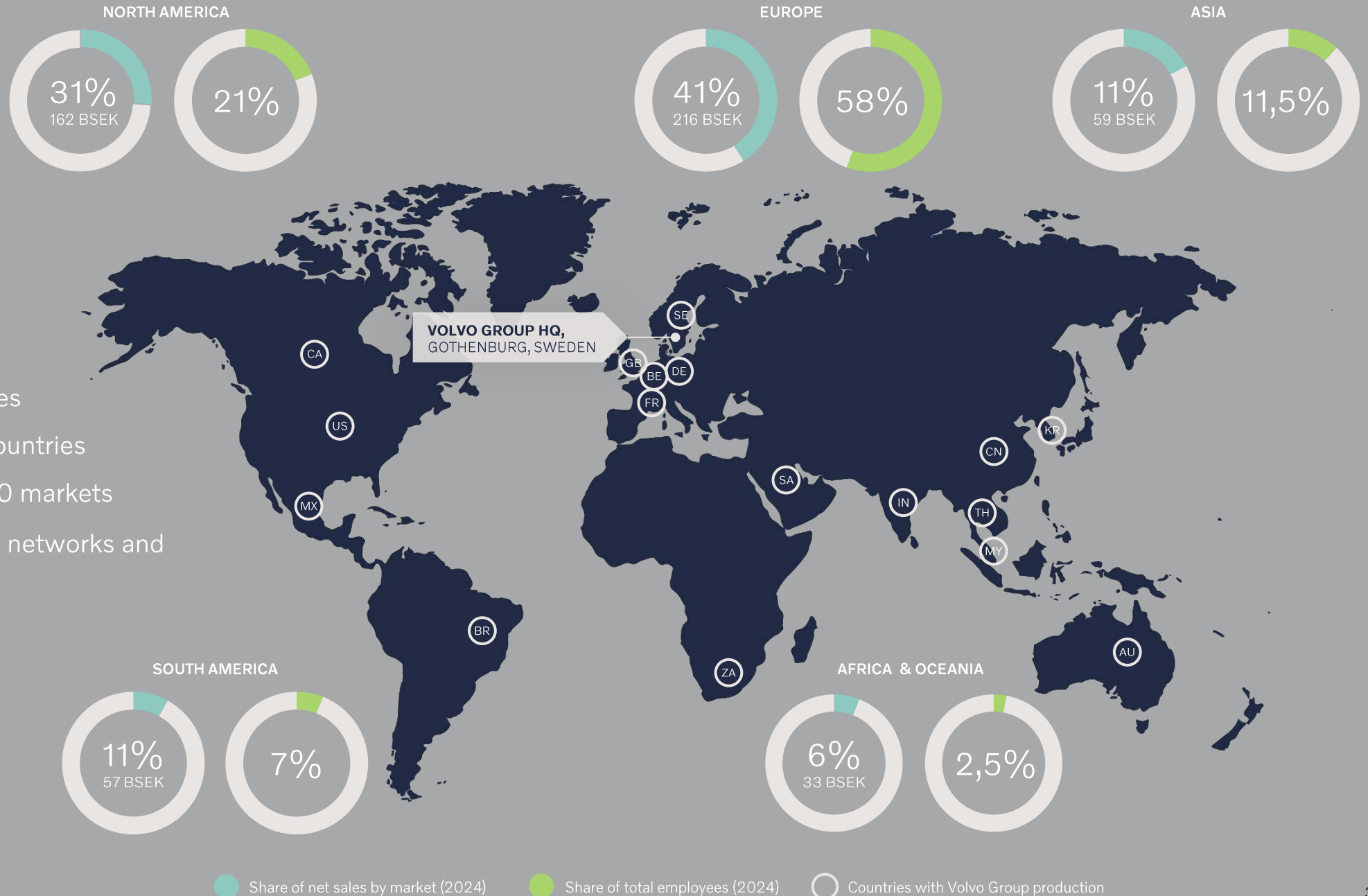
Volvo Group North America

- 16 manufacturing sites
- 9 parts distribution centers
- Global HQ for Mack Trucks



Global presence

- 102,000 employees
- Production in 17 countries
- Sales in almost 180 markets
- Worldwide service networks and dealerships



Our brands

Volvo Group's brand portfolio consists of several distinct brands, targeting a variety of customers and segments.

V O L V O

V O L V O
P E N T A

ROKBAK



PREVOST

NOVABUS

MACK



milence

FLEXIS



cespira

cellcentric

Our unique position in electric mobility

Market leader in Class 8 battery-electric trucks in Europe and North America



V O L V O

8

electric models in
series production



Product Configurations



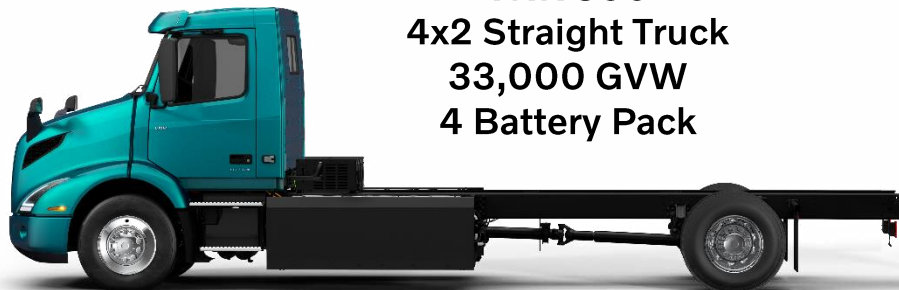
VNR 300
4x2 Tractor
66,000 GCW
4 Battery Pack



VNR 300
6x2 Tractor
82,000 GCW
4 & 6 Battery Pack



VNR 300
6x4 Tractor
82,000 GCW
4 & 6 Battery Pack



VNR 300
4x2 Straight Truck
33,000 GVW
4 Battery Pack



VNR 300
6x4 Straight Truck
54,000 GVW
4 Battery Pack

VNR Electric in Numbers

566

VNR Electric Trucks
Delivered

71

Unique Customers

19

States and
Provinces

7.8 million

Customer Miles
Driven



2024

62

Volvo Trucks
Certified EV
Dealers

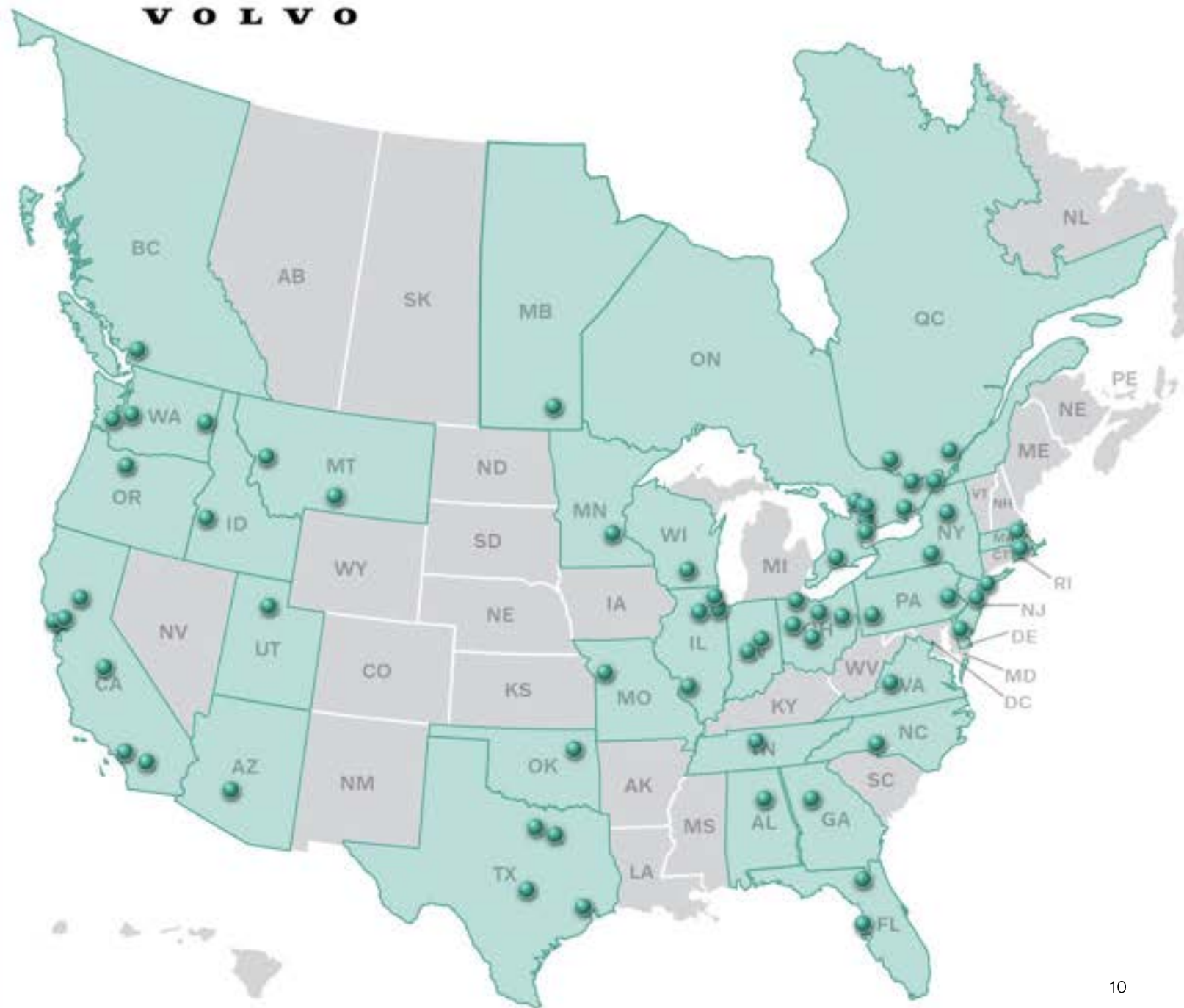
31

States/
Provinces

40

Dealer
Certifications
in Progress

*Some locations yet to be announced publicly



Mack MD Electric

Horsepower:
260 Peak HP

Torque:
1,850 lbs.-ft. Peak

Battery Capacity:
150kWh (2 batteries)
240kWh (3 batteries)

Max Payload:
19,400 lbs

AC & DC Charging



A white Mack LR Electric garbage truck is parked on a paved residential street. The truck features a large white body with a rear-loading mechanism and a prominent 'MAEK' logo on the front grille. The background shows suburban houses with tiled roofs and green lawns under a clear blue sky.

Mack LR Electric

Horsepower:
536 Peak HP

Torque:
4,051 lbs.-ft. Peak

Battery Capacity:
376kWh (4 batteries)

Max Payload:
25,000 lbs

A white Mack MD Electric Utility Aerial Lift truck is shown in a large industrial building. The truck has a long white boom with a basket at the end, and the word "TEREX" is visible on the side of the boom. The front of the truck features the "MACK" logo on the grille. The truck is parked on a polished floor, and the background shows the interior of a large warehouse or factory with high ceilings and structural beams.

Mack MD Electric Utility Aerial Lift

Up to 200 miles on a
single charge

Working height of 60 feet
Max side reach of 48 feet

Battery Capacity:
240kW Battery packs
28.8 kWh SmartPTO by Viatec

Material handling
capacity of 2,000 lbs.

Level 2 or DC Fast charging
option (80kW)

Certified EV Dealer Network

66

Mack Trucks Certified
EV Dealers

33

States/Provinces

26

Dealer Certifications
In Progress



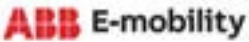
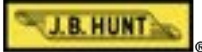


PACT

Powering America's Commercial Transportation

The voice for commercial vehicle infrastructure



Why PACT?

Demand for electric M/HD technologies will grow as more infrastructure becomes available.

Growing demand requires collaboration. PACT brings together vehicle makers, fleet operators, charging companies, utilities and commissioners, and policymakers to work together and find solutions.



Our Vision

A robust market for all types of commercial vehicles, providing M/HD electric fleets with access to reliable power when it's needed, where it's needed, and at a reasonable cost.



Breaking Down Barriers, Accelerating the Transition

Barriers

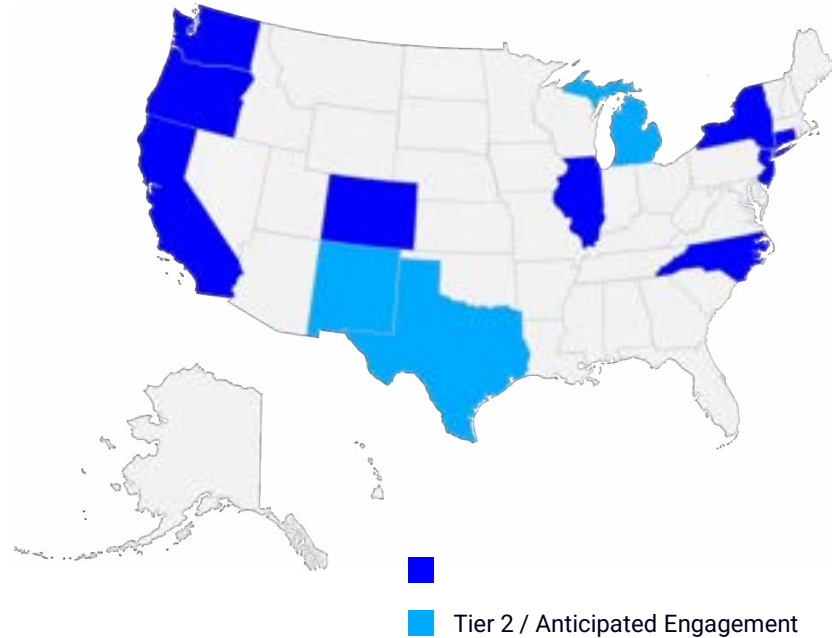
- M/HD fleet electrification imposes significant upfront costs on all project stakeholders
- Complex application processes and permitting regulations often delay project timelines
- Outside the trucking sector, limited knowledge of unique M/HD charging needs

Solutions

- Dedicated federal & state funding streams for M/HD infrastructure
- Expedited and streamlined permitting & approval processes and proactive grid build outs
- Deep and consistent collaboration between energy, trucking and public sectors

Where are we focused?

Guided by input collected through member surveys and policy deep dive discussions, PACT has been working nationally and at the state-level.



Policy Priorities

- Standing up an enabling market for the growth of electric commercial vehicle adoption
- Readyng the grid for today's advanced vehicle technologies
- Making the energy transition a win-win for all



Guiding Principles

- Advocate for federal, state, and local policies and programs that increase and accelerate the deployment of M/HD commercial vehicle infrastructure.
- Advocate for effective utility policies to support the build out of M/HD electric vehicle infrastructure.
- Proactively pursue collaboration, outreach, and education with stakeholders.



There's no such thing as an "average" M/HD truck.

- Vehicles are designed and manufactured according to customers' functional specifications
- Distinct duty cycles have different charging requirements
- Unique charging requirements elicit dedicated tariff structures, reasonable rates, and flexible incentive programs

Class Six: 19,501 to 26,000 lbs.



Beverage



Rack



School Bus



Single Axle Van



Stake Body

Class Seven: 26,001 to 33,000 lbs.



City Transit Bus



Furniture



High Profile Semi



Home Fuel



Medium Semi Tractor



Refuse



Tow

Class Eight: 33,001 lbs. and over



Cement Mixer



Dump



Fire Truck



Fuel



Heavy Semi Tractor



Refrigerated Van



Semi Sleeper



Tour Bus

Product (Vehicle) Development

Diesel

- Driven by customers' needs
- Do it all
- Significant leaps vs. Incremental improvements
- Focus on efficiency
- Consultation with customers
- Established ecosystem

Electric

- Driven by incentives and policies
- Purpose built
- Focus on battery capacity, range, weight reduction, charging
- Novel designs, integrating batteries and new electric motors
- Emerging ecosystem

New Technology, New Challenges

Diesel

- Building on existing technologies
- Refueling networks are well-established, easily accessible, and cost-competitive
- High utilization

Electric

- New supply chains
- Unprecedented reliance on third parties
 - Utilities
 - Grants and incentives
 - Permitting

What's a duty cycle and why does it matter?

How and how much a vehicle is used, factoring in speed, payload, driving patterns, distance and downtime

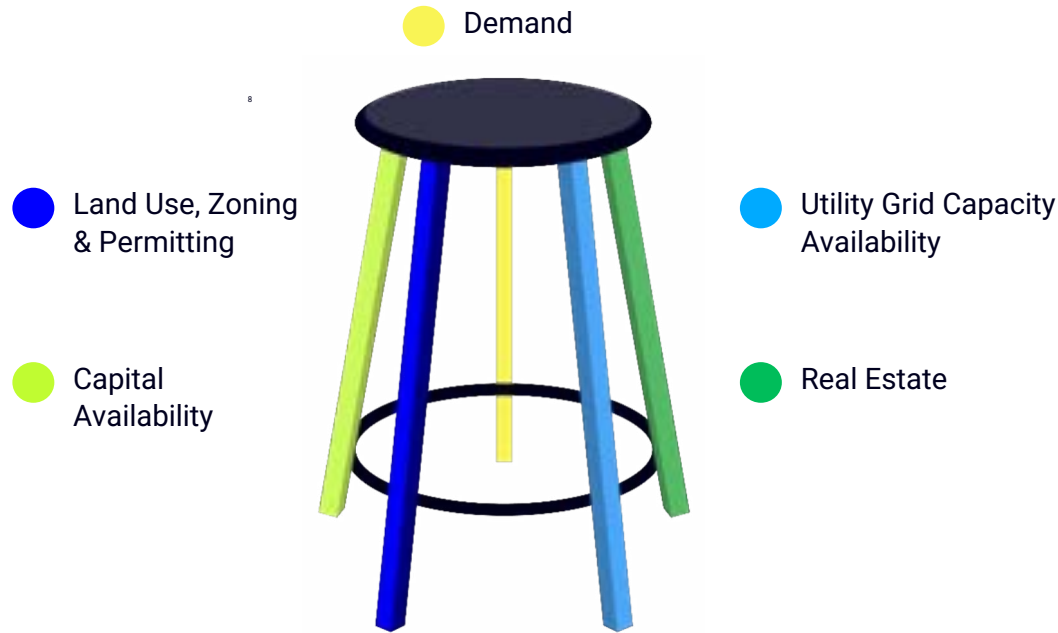
Drayage/Middle Mile

- Haul containers to and from shipping ports and logistics hubs
- Travel short distances, start and stop frequently
- Requires fast charging in real estate and power constrained areas
- Public or shared depots

Long-Haul

- Interstate freight transport
- Travel far distances (100,000+ miles/year) at sustained highway speeds (50–65 mph)
- Requires ultra-fast charging along highways
- Public depots
- Need for Megawatt Charging System (MCS)

Pathways to Market Transformation for MHDVs



Developing charging infrastructure is time intensive, costly, and complex

- Requires careful consideration for location, size, power availability and constructability.
- Clear and reliable energization timelines are critical to support private sector investments.
- Project development and operations hinge on getting power to a site.

Public Charging

- **Users:** Local, regional and long haul freight operators; first/last mile delivery and distribution; small business operators; rented or short-term leased trucks; construction vehicles; corporate or commercial entities
- **Average Size:** 2-5 acres; up to 10+ acres
- **Charger Reqs:** 350kW - 1 MW DC fast chargers
- **Power Reqs:** 10- 100 MW
- **Design Reqs:** Pull-thru lanes, amenities store, crosswalks
- **Benefits:** Move beyond return to base operations, support electrification without upfront costs



Shared or Multi-Fleet

- **Users:** Drayage, short-haul, first/last mile delivery, municipal, rideshare, taxis and rental car companies, shipping and logistics, utility and service vehicles, corporate or commercial
- **Average Size:** 3-5 acres
- **Charger Reqs:** 7-42 x 350kW DC fast chargers
- **Power Reqs:** 5-15 MW
- **Design Reqs:**
- **Benefits:** Higher utilization, charger availability certainty, control and security



Private Charging

- **Users:** Shippers, producers and sellers of goods and services; often have bespoke needs, depend on fast and reliable charging
- **Average Size:** 1.85 acres
- **Charger Reqs:** 65 x 180 kW
- **Power Reqs:** 7-11 MW
- **Design Reqs:** Driver lounges
- **Benefits:** Greater certainty and control over operations



Funding Implications of Delayed Timelines

- Grant funding reduces capex and defrays investment risk in the early years while utilization is still low
- Hundreds of millions of local, state and federal dollars have been awarded to M/HD projects; each grant contract stipulates a strict *liquidation deadline* of when funds must be spent
 - Federal grants up to 5 years on average
 - State grants 2-3 years on average
- Utility energization timelines are often much longer than grant liquidation deadlines
- Energization delays jeopardize grant funding and development feasibility, particularly early on when truck volumes are low

Wider use of bridging solutions needed soon

- Industry needs Bridging Solutions to work, especially in the next few years when grid capacity availability is tight.
- Many are common utility practices that do not require regulatory approvals. Once the regular grid capacity addition is energized, bridging solutions can drop off.
 - Shifting loads from a feeder to another nearby feeder
 - Temporary power to get started
 - Flexible Service Connections
 - Ramped/Phased connections
 - Timed/Scheduled connections
 - Increased use of utility-owned portable transformers/substations, battery storage
- If utilities struggle to meet our timelines, we are willing to pursue “customer-owned” BTM microgrids, using on-site generation & battery storage not connected to the utility grid.

V O L V O

THANK YOU!



Driving an Efficient Clean Transportation Transition

March 27, 2025

Agenda

1. The role of utility programs in driving EV charging buildout and beneficial charging behavior
2. Identifying the need for a more proactive approach to planning
3. Evolving forecasting and planning in era of rapid load growth

Con Edison is supporting EV charging buildout and beneficial integration with the grid through programs and services



EV Infrastructure Incentives

For Widespread Access to EVs

PowerReady

\$613M for light-duty vehicle charging incentives

MHDV Pilot

\$22M Pilot for medium and heavy-duty vehicle charging incentives

Micromobility

\$18M for e-bikes & scooter charging incentives



Managed Charging Incentives

Beneficial Integration of Charging with the Grid

SmartCharge NY

For EV drivers

SmartCharge Commercial

For commercial charging stations

SmartCharge Tech

For installing load management technology



Customer Education and Support

Guiding the E-Mobility Transition

E-Mobility Advisory Services

Providing guidance prior to and during the electrification process. Offer support in understanding grid capacity at site and how to plan for upgrades

[EV Charging cost calculator](#)



Innovation and Research

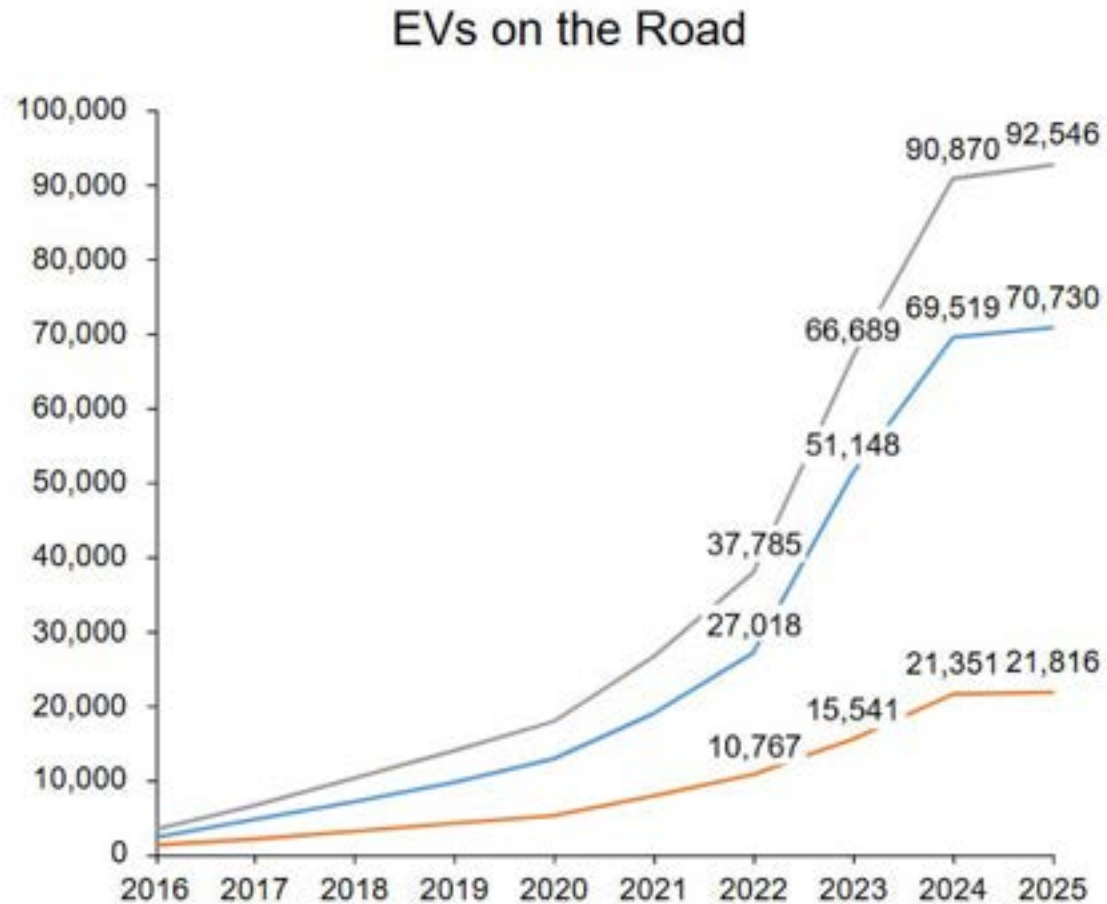
Charting the Path to the Future

Demo Projects

NYC DOT curbside charger demonstration project to install 120 plugs

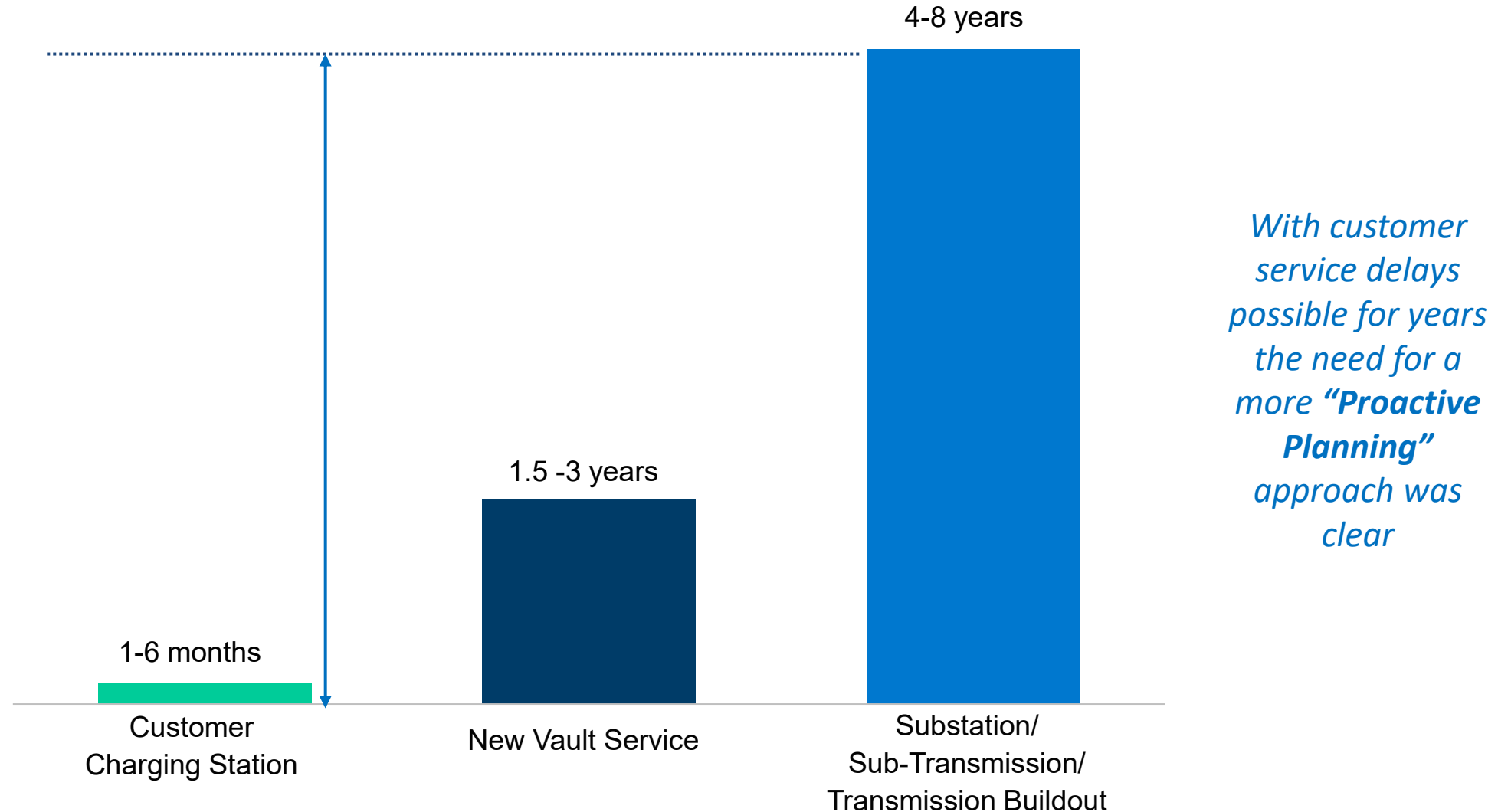
Partnership with First Student school bus operator to deploy cost-effect EV charging solutions for fleets

Electric car adoption in the Con Edison's dense urban service area has taken off, where 1 in 10 cars purchased is electric



EV charging access has expanded sixfold since Con Edison launched its PowerReady EV charging infrastructure incentive program in 2020, with 12,000 EV charging plugs added in Con Edison service area

Early experience has shown that just-in-time planning can result in a timing mismatch between the utility & customer



Proactive planning balances grid readiness with minimizing the risk of over- or early-building

The main uncertainty in EV load planning is time; the largest risk is the grid won't be ready when customers seek to interconnect

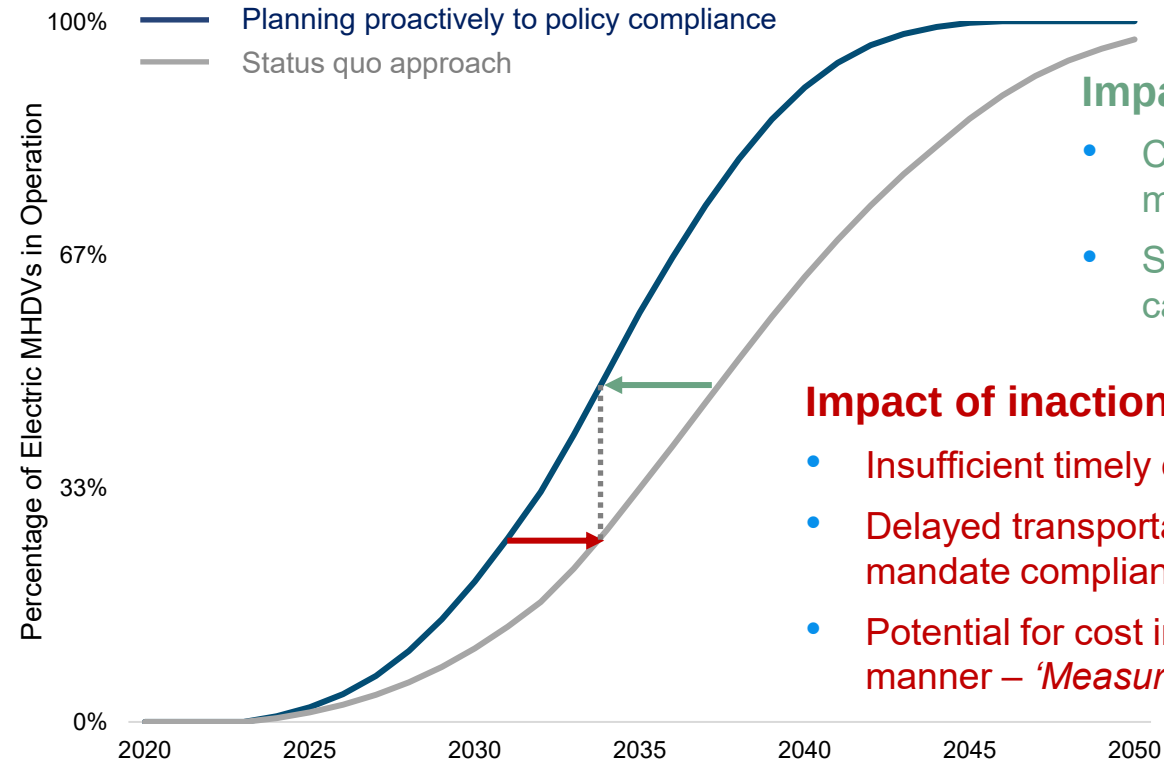
Uncertainty

1. Time

2. Magnitude of Load

3. Location

Illustrative EV Adoption Scenarios



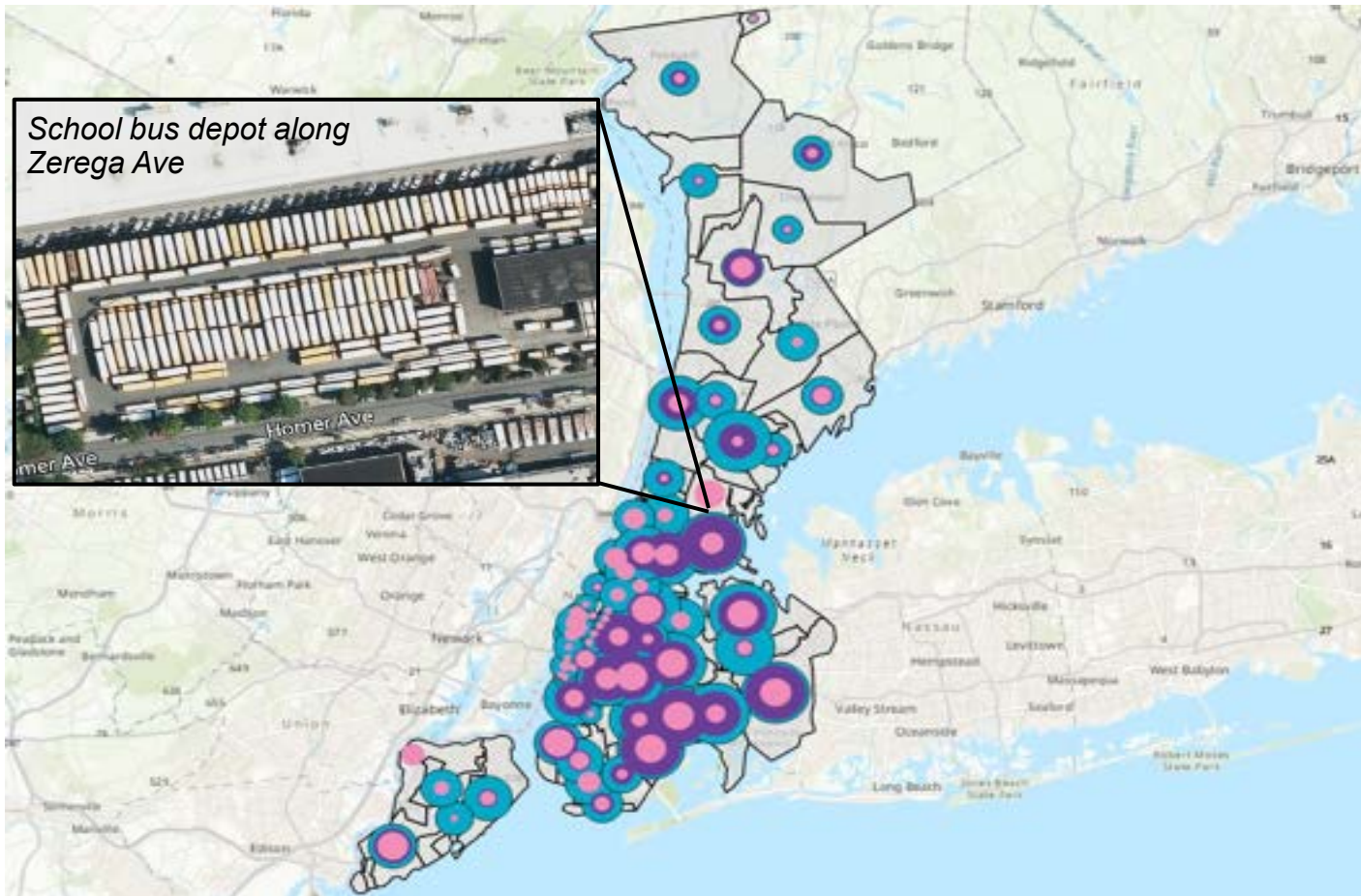
Impact of being too early

- Create margin of capacity for when load materializes in subsequent years
- Shared infrastructure will be useful day 1 and can provide multiple benefits

Impact of inaction or delayed action

- Insufficient timely capacity to meet energy demands
- Delayed transportation electrification progress and mandate compliance
- Potential for cost inefficiency by building in a piecewise manner – ‘Measure twice, cut once’¹

To better understand EV loads, we completed a robust, bottom-up, granular EV load study that identified roughly 80,000 trucks & buses, along with ~2.75M cars & vans



Legend¹

- Number of fleet HDVs
- Number of fleet MDVs
- Number of fleet LDVs
- Con Edison Networks
- 1 – 88 vehicles
- 600 – 1,000 vehicles
- 1,000 – 2,000 vehicles
- > 8,000 vehicles

Our EV load study developed highly granular view of EV charging loads through the 20-year window

Project approach



Total number of vehicles per network per use case
(Static with time)



Electrification rate per use case (2023 – 2055)
(Evolves over time)



Energy consumption and charging demand per vehicle
(Detailed to hourly level)



Incremental EV load and peak demand by network
(Hourly, daily and yearly)

Major Sensitivities

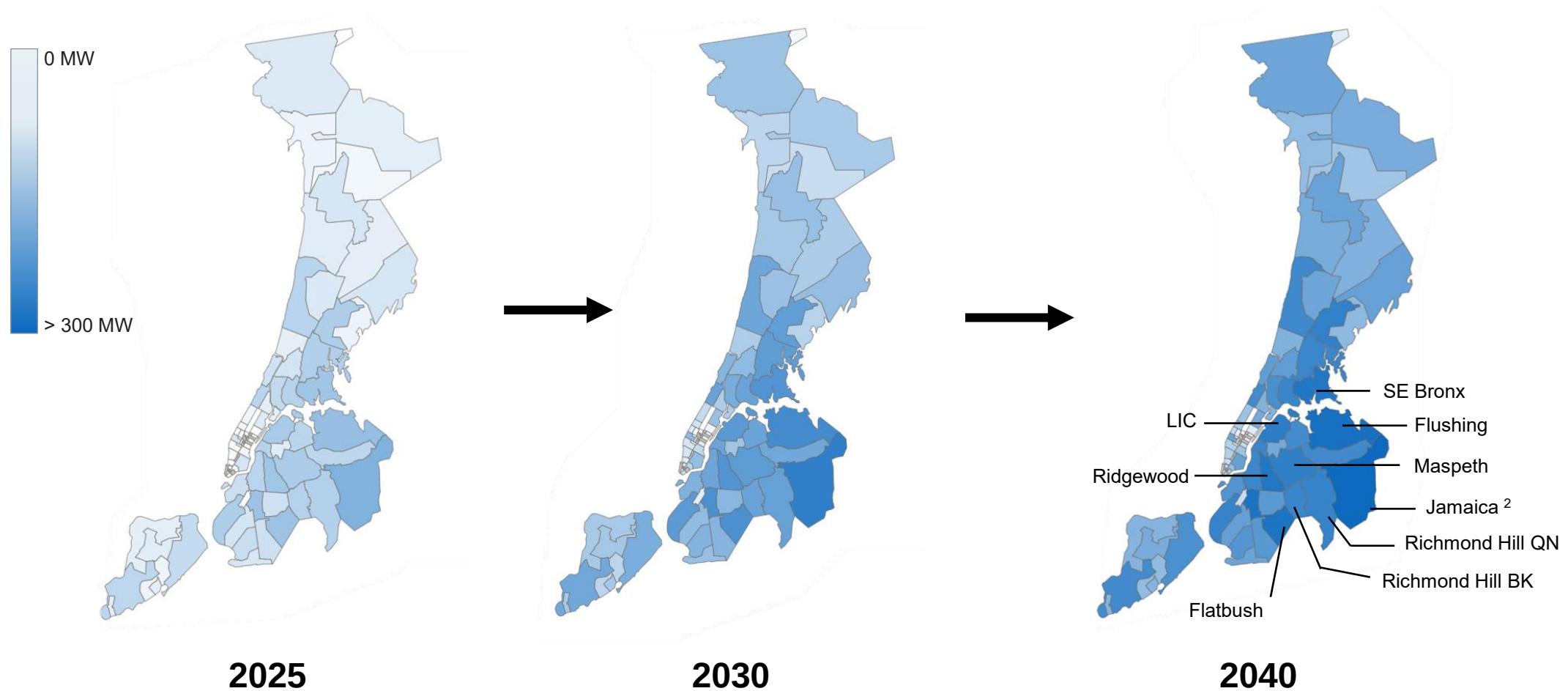
- Managed charging
- Depot vs. non-depot charging
- Seasonal variations

Relevant Data Sets

- Telematics data for localized driving behavior
- Fleet sizes and locations
- Site visit observations
- Local policies and commitments

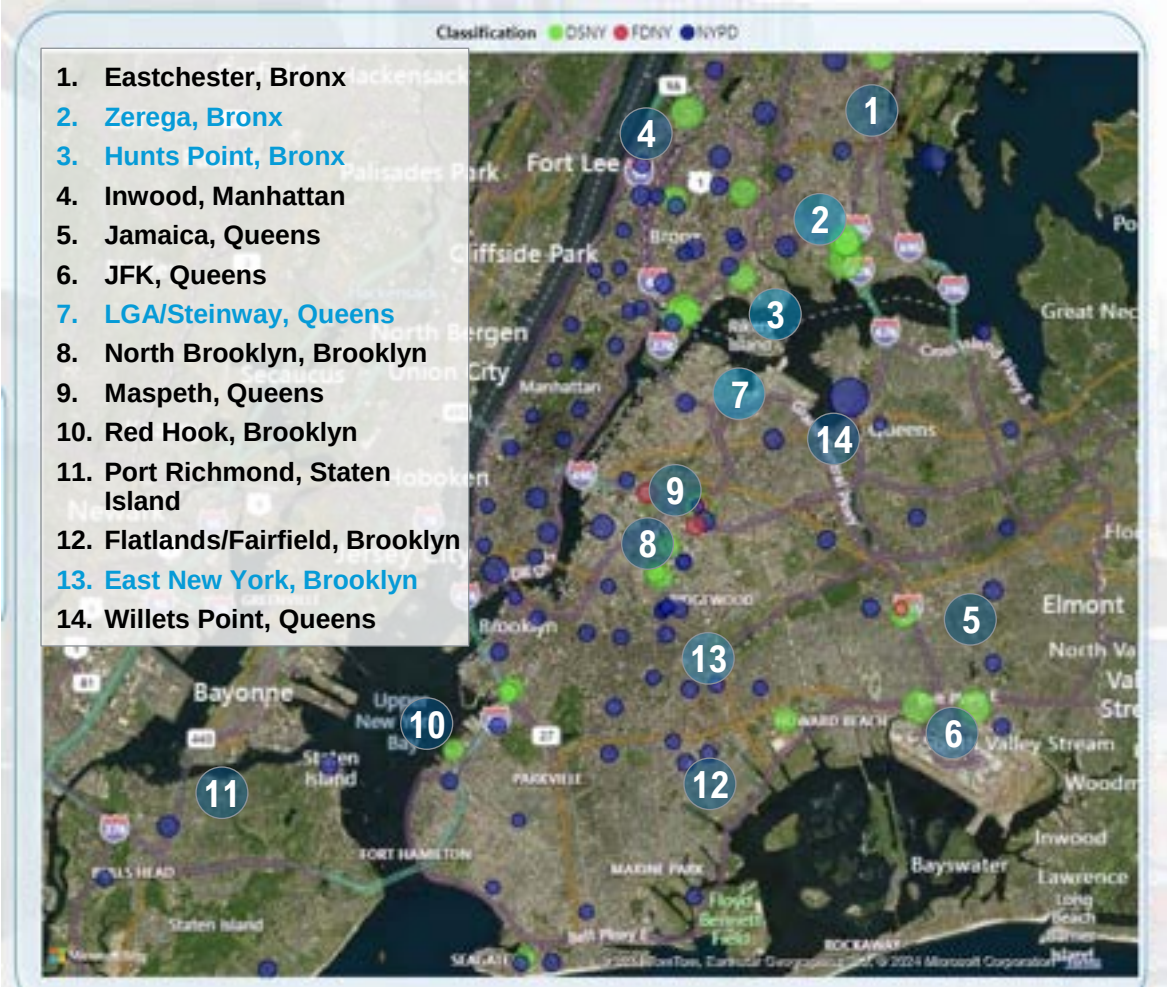
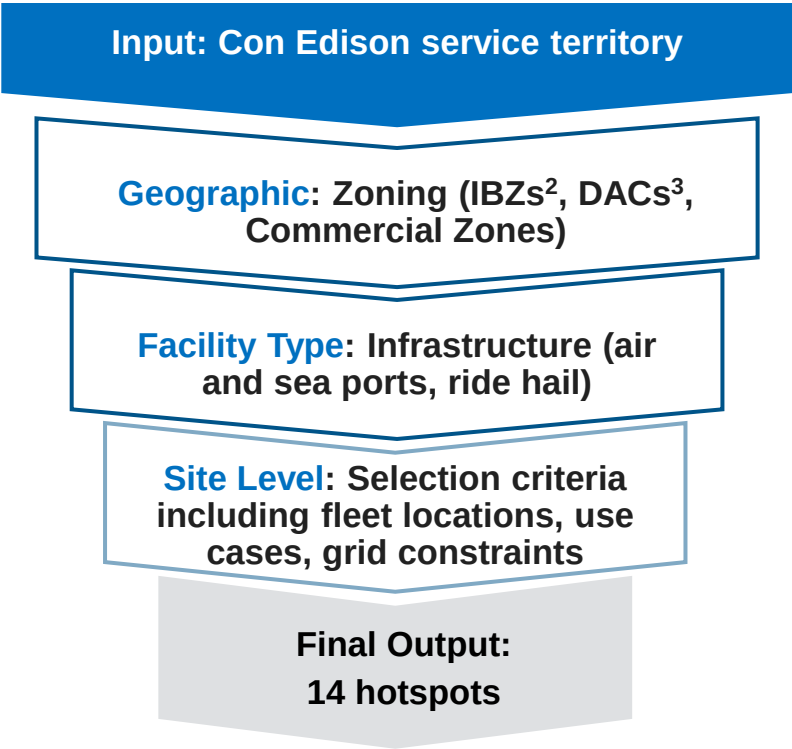
Our load study shows EV load increases dramatically, with a number of networks each adding 100+ MW

Maximum non-coincident EV load (MW)¹

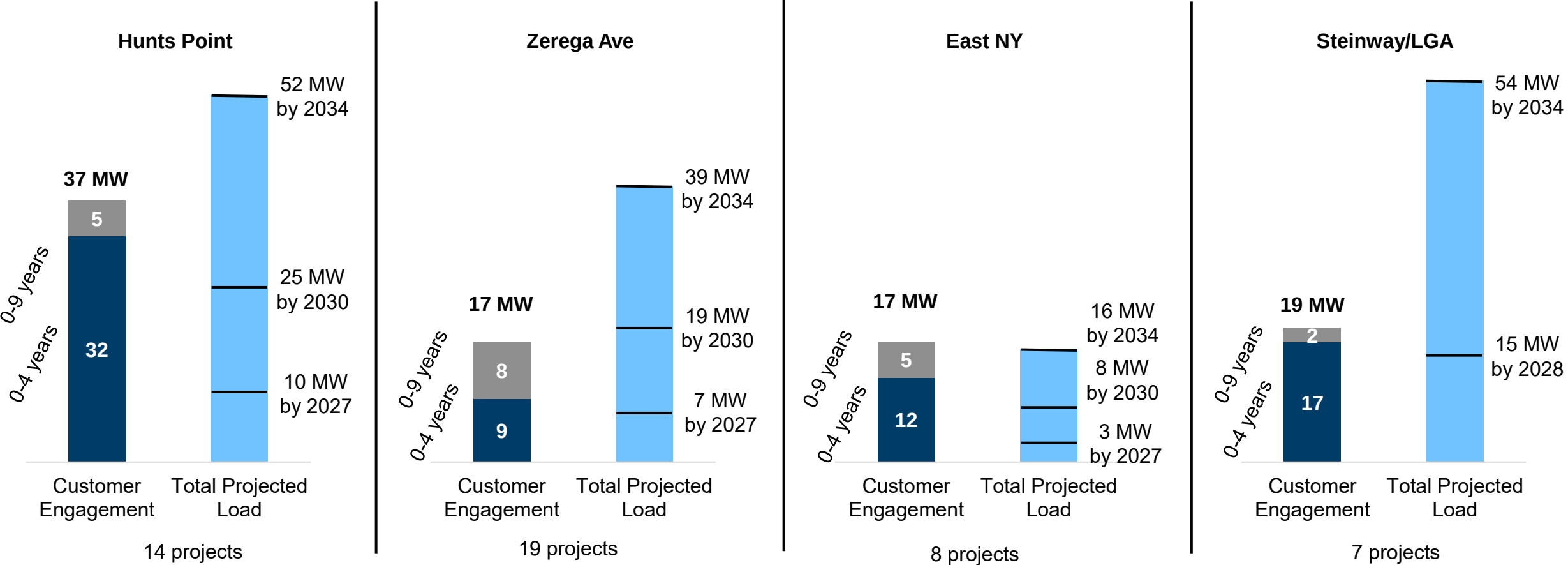


A more granular view identified 14 charging hotspots, with 4 locations prioritized based on urgent grid needs

Hotspot identification process¹

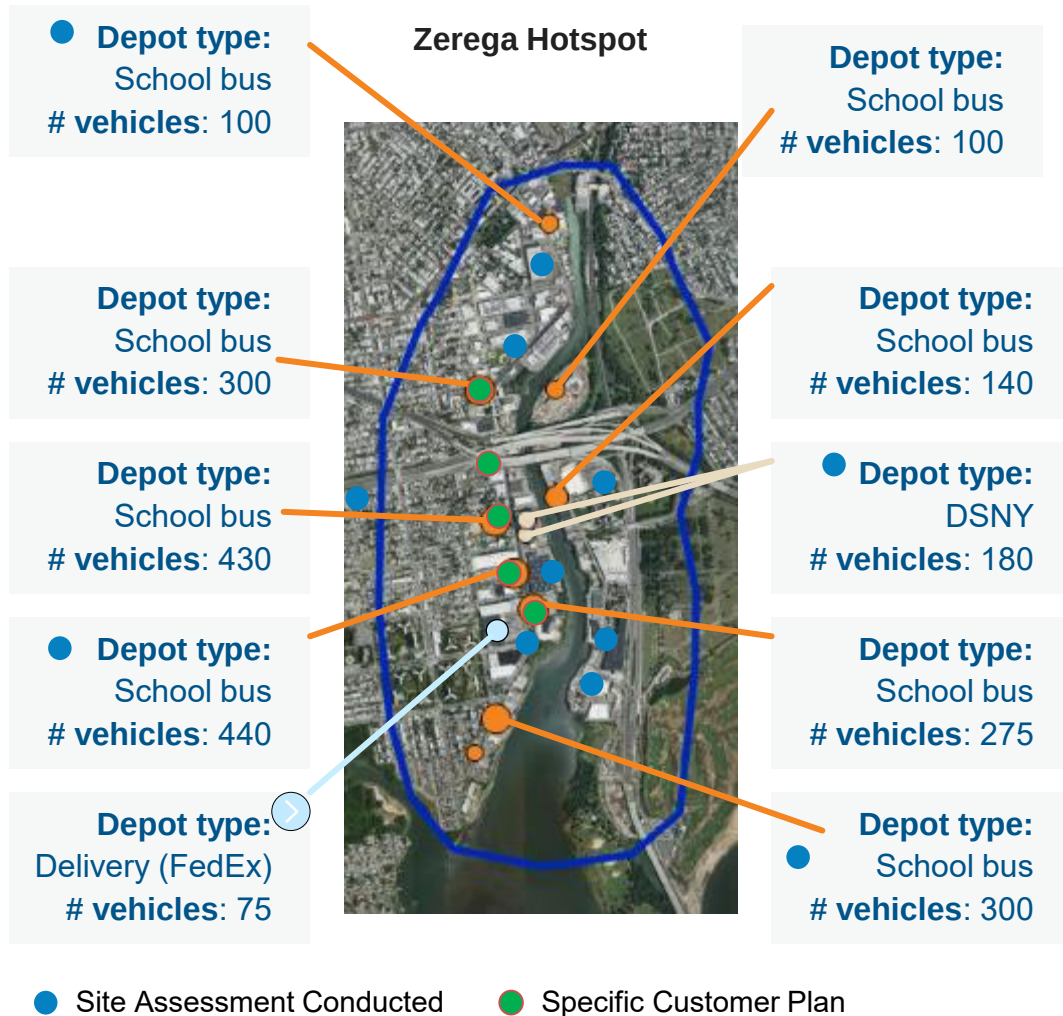


Current charging project plans identified through customer engagement show that significant activity is already underway or anticipated within the near-term timeframe in priority hotspots



1. "Customer Engagement" shows the total size of projects for specific fleets that have communicated plans with Con Edison, whereas "Total Projected Load" is projected load for all EVs anticipated in the region.
2. "Customer Engagement" is a selection of existing fleet electrification plans identified in the hotspot regions, but is not representative of all EV load/projects existing in these regions.

The Zerega Ave hotspot of ~2 square miles is home to over 20% of **New York City's school buses**



Customers Supported at Hotspot:

- Over 15,000 commercial vehicles, including:
 - Over 5,000 MHD fleet vehicles
 - Over 2,000 school buses

Specific Customer Plans at Hotspot:

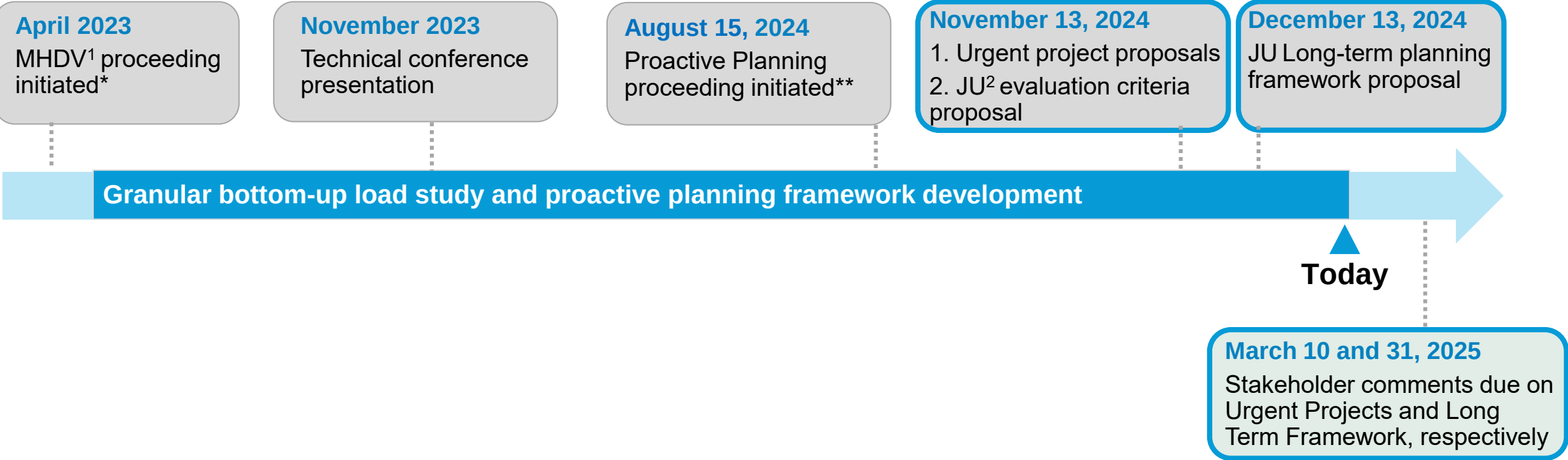
- Five school bus operators have projects across 6 depots underway at various levels of progress (ranging from planning to construction of charging stations and awaiting delivery of vehicles)
- Municipal fleet charging project is under construction
- One fleet is already operating electric school buses from a depot today
- Total of 19 fleet electrification projects identified from customer engagement and advisory services
- EPA Funding Impact:
 - 4 bus operators listed above have all won EPA funding for electric buses
 - Expect 2-3 more rounds of EPA funding opening through 2025

While current processes prepare the grid for expected load growth at a historical pace, planning should evolve to manage load forecast uncertainty

Best practices for planning in an era of rapid load growth

- 1) Direct customers to areas with capacity while building in areas where **capacity will be constrained**
- 2) Leverage **robust granular forecasts** and **early customer & supply chain engagement to optimize timing**
- 3) Plan with **load sensitivities**, considering which infrastructure is most impacted by increases in load
- 4) **Phase projects, when possible, with expandable designs**
- 5) **Build to a long-term solution**, rather than with piecemeal sequential investments, when confidence in need is high
- 6) Leverage **mitigation solutions** to provide near-term capacity and inform the long-term solution where possible (e.g., managed charging and storage)
- 7) Promote projects and/or locations that have **multiple benefit streams** (e.g., improving reliability and resiliency, serving disadvantaged communities)
- 8) **Conform to concrete State mandates, regulations, or laws**, and regularly review relevant State policies that inform assumptions and requirements for planning and solution design

NY PSC has taken the lead in addressing the need to plan more proactively with dedicated proceeding



* [Case 23-E-0070](#), Proceeding on Motion of the Commission to Address barriers to Medium- and Heavy-Duty Electric Vehicle Charging Infrastructure

** [Case 24-E-0364](#), In the Matter of Proactive Planning for Upgraded Electric Grid Infrastructure



BUILDING THE GRID TO NEED

Best Practices for Proactively Developing Grids to Support EVs

Cole Jermyn
3.27.25



**Environmental
Defense
Fund**

Challenges for Grid Planners

- The Rapid Pace of Electrification
- Fleet Clustering
- Alignment with Regulators

GRID UPGRADE TIMELINES

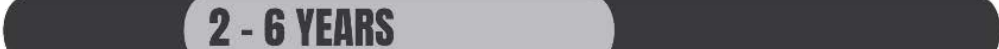
TRANSFORMERS, SWITCH GEARS, NEW CIRCUITS

1 - 2 YEARS

A horizontal progress bar with a dark grey background. A yellow segment on the left represents the 1-2 year timeline.

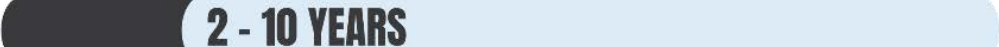
DISTRIBUTION SUBSTATIONS

2 - 6 YEARS

A horizontal progress bar with a dark grey background. A light grey segment in the middle represents the 2-6 year timeline.

TRANSMISSION SUBSTATIONS

2 - 10 YEARS

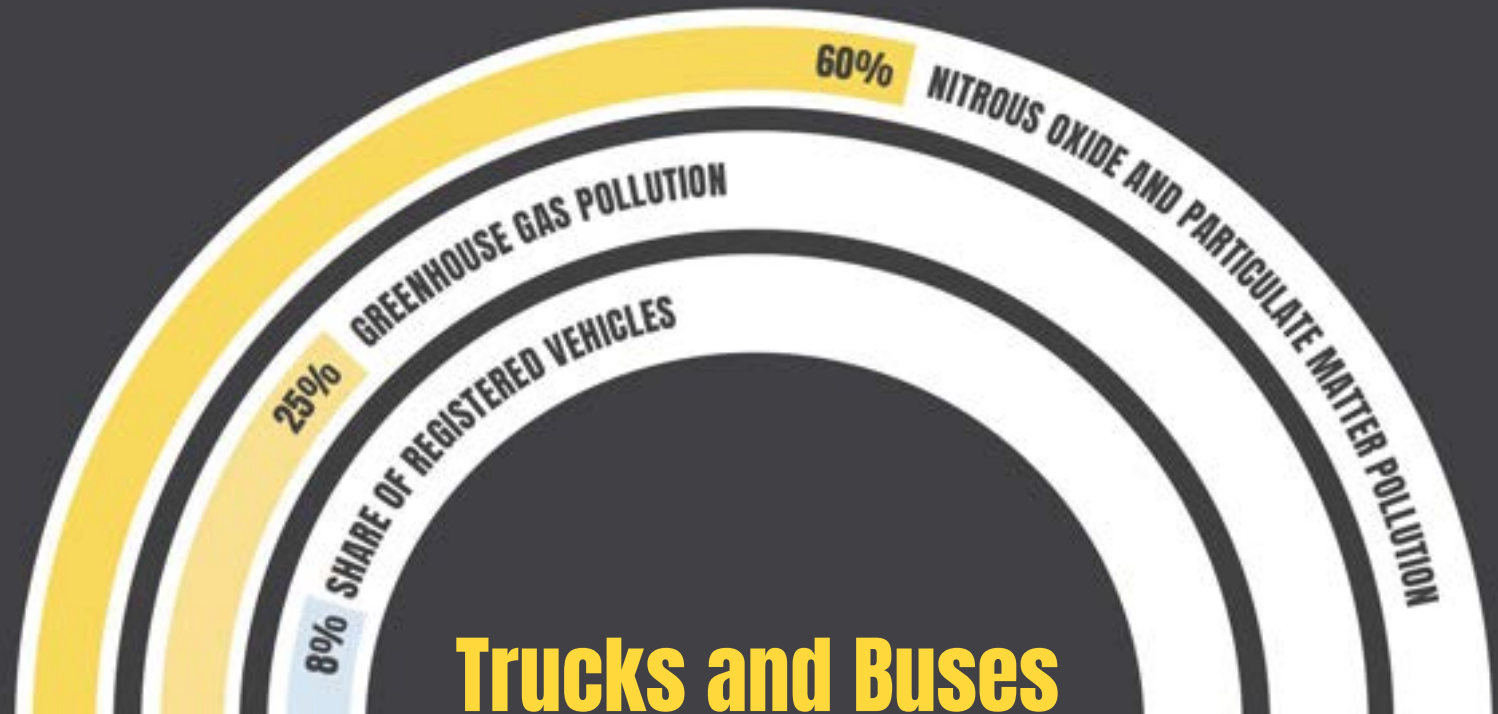
A horizontal progress bar with a dark grey background. A light blue segment on the right represents the 2-10 year timeline.

Benefits of Truck and Bus Electrification

The Transportation sector causes the largest share of GHG emissions in the U.S.

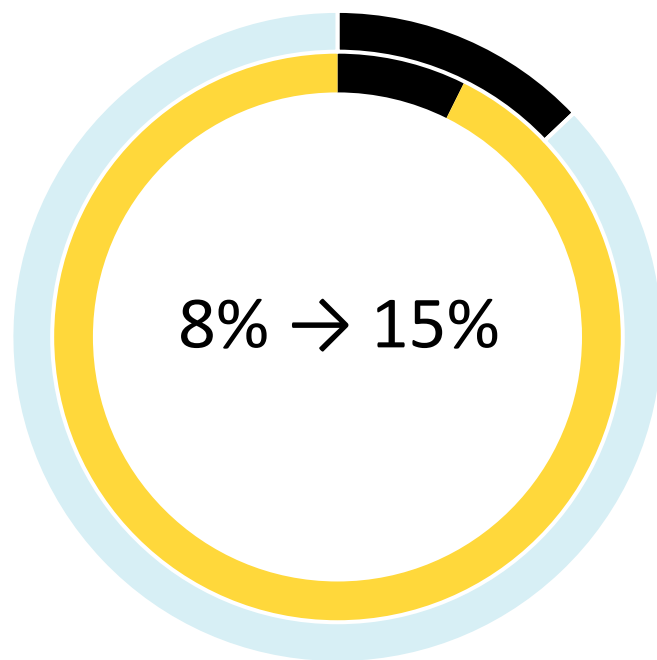
Trucks and buses are responsible for an *outsized share of these emissions*, and of local air pollution

The air pollution from these vehicles is particularly harmful to *low-income communities and communities of color*.



The Scale of EV Load Growth

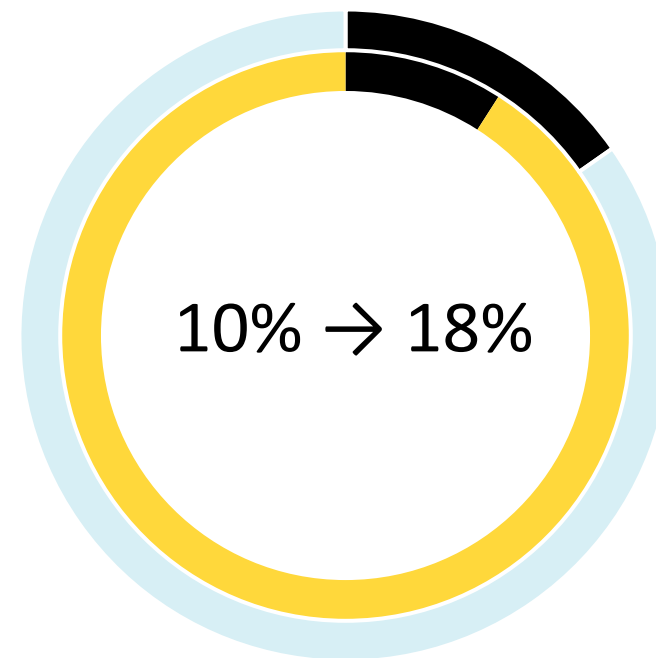
Forecasted EV share of
peak load in NYISO



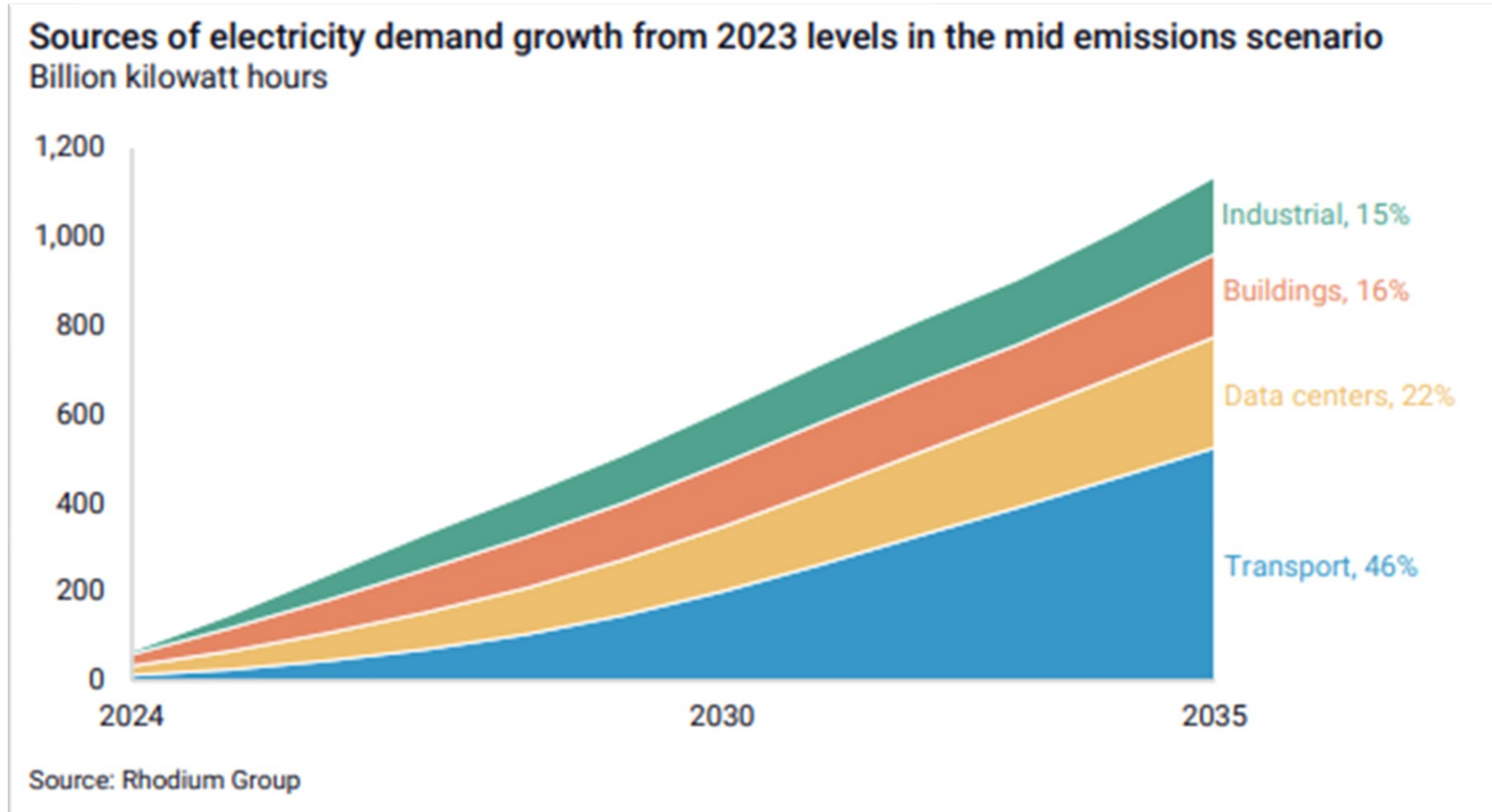
Forecasted EV share of energy
consumption in NYISO

2035

2050



Rhodium Group – “Taking Stock 2024”



Not all Load Growth is Created Equal

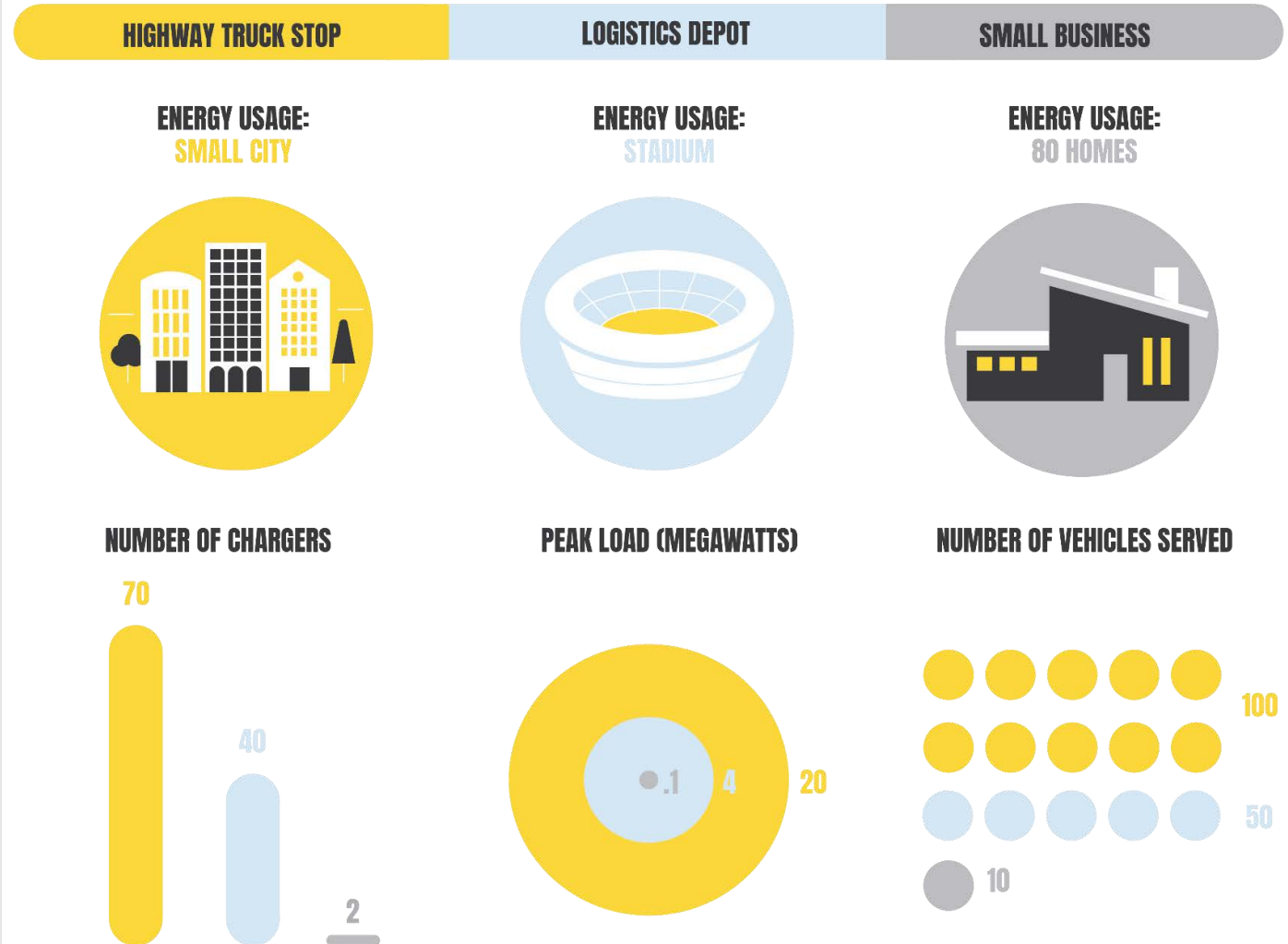
EV Charging	Data Centers
Some flexibility	Little to no flexibility
Low to medium load factors	High load factors
Small to medium loads	Large loads
Small clusters throughout utility territory	Concentrated loads



Transmission vs. Distribution Needs

- EV charging will primarily be a focus for distribution planners
- Large charging hubs will eventually need transmission or sub-transmission connection

EXAMPLES OF ELECTRIC MHDV FLEET POWER DEMANDS



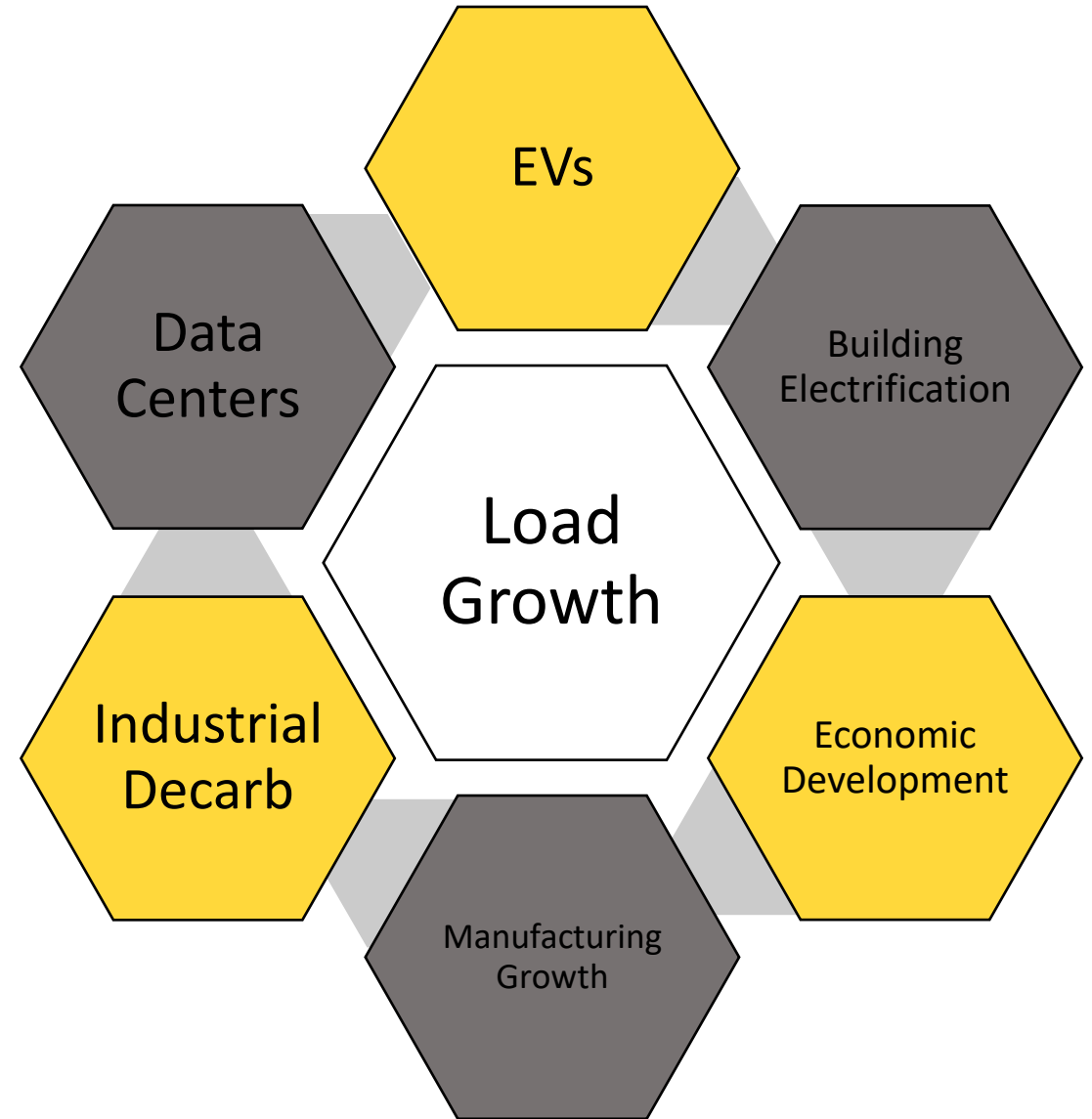


EVs as a Grid Resource

- Not just vehicle-to-grid
- Lower contributions to peak
- Demand Response
- Load Flexibility – ramp-up and ramp-down
- Increased asset utilization → lower unit costs

Don't Think About EVs in a Vacuum

- EVs are new but not alien
- EV load growth will overlap with other trends
- Thoughtful forecasting, not siloed planning



Mitigating Risks

Forecasting and Planning

Updating forecasting methods

- Leveraging best available data
- State agency collaboration
- Bottom-up forecasting
- Ground-truthing with fleets

Upside and downside risks of grid buildout

Generation vs. distribution buildout risks



New York Case Study

Forecasting and Planning

- Proactive Planning Proceeding
- Coordinated Grid Planning Process

Infrastructure

- Make-ready Incentives
- EV Interconnection Working Group

Charging Behavior

- Managed Charging Programs
- Load Management Tech Incentive Program

Grid Flexibility

- Grid of the Future Proceeding





Conclusions

Proactive grid buildout
speeds vehicle electrification

EV charging can cross the
distribution/transmission
divide

EVs can be a grid resource
at all levels of the grid



Building the Grid to Need Report

Thank you

cjermyn@edf.org





Driving Change: *Grid Planning Implications & Opportunities from EV Load Growth*

Northeast Power Coordinating Council | March 27, 2025

Ben Shapiro | RMI

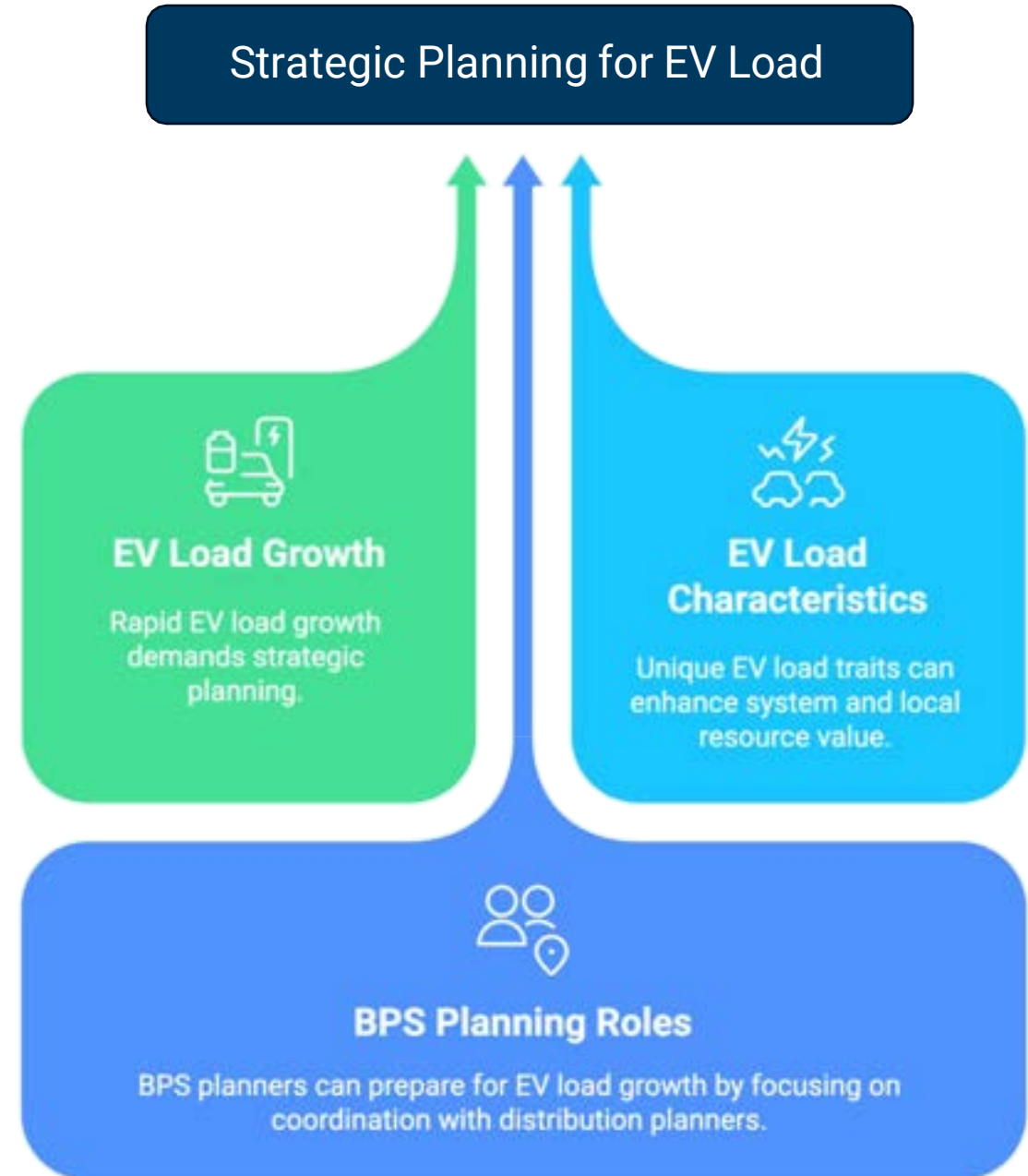


Agenda

- **Perspective (~30 min)**
 - **How much EV load are we talking about?**
 - **Not your grandmother's load growth.**
 - **Coordinated, proactive planning for EVs to unlock their full value.**
- **Discussion (~10 min)**

If you remember three things from this talk...

1. EV load growth: growing quickly, large in the aggregate.
2. Characteristics make EVs a valuable resource that should be integrated into planning.
3. Key role of BPS planners: coordination with distribution system planning.

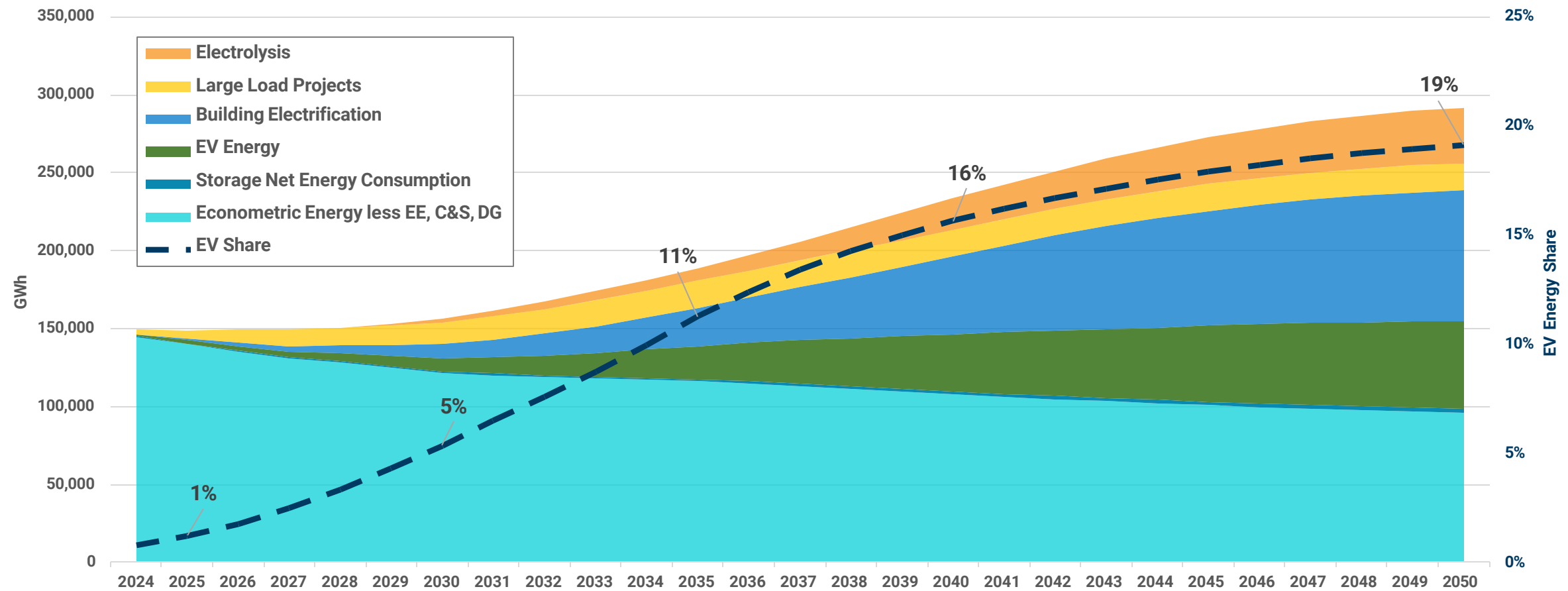




**How much EV load
are we talking
about?**

EV load is set to grow significantly, nearing 20% by mid-century.

NYISO Gold Book 2024: Annual Energy Forecast, Policy Scenario

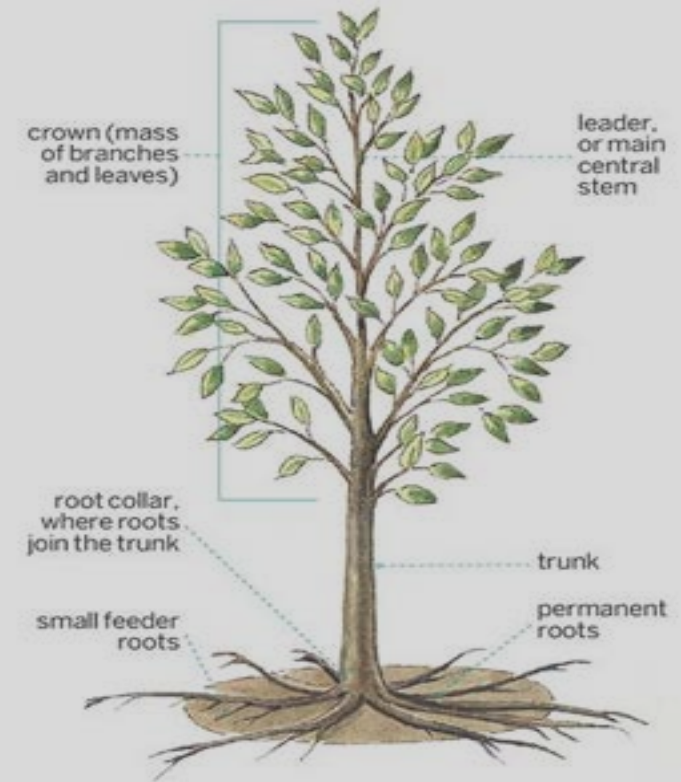


When and where will this load materialize?
Detailed, bottoms-up load forecasting helps to shed some light.

Where we've been...

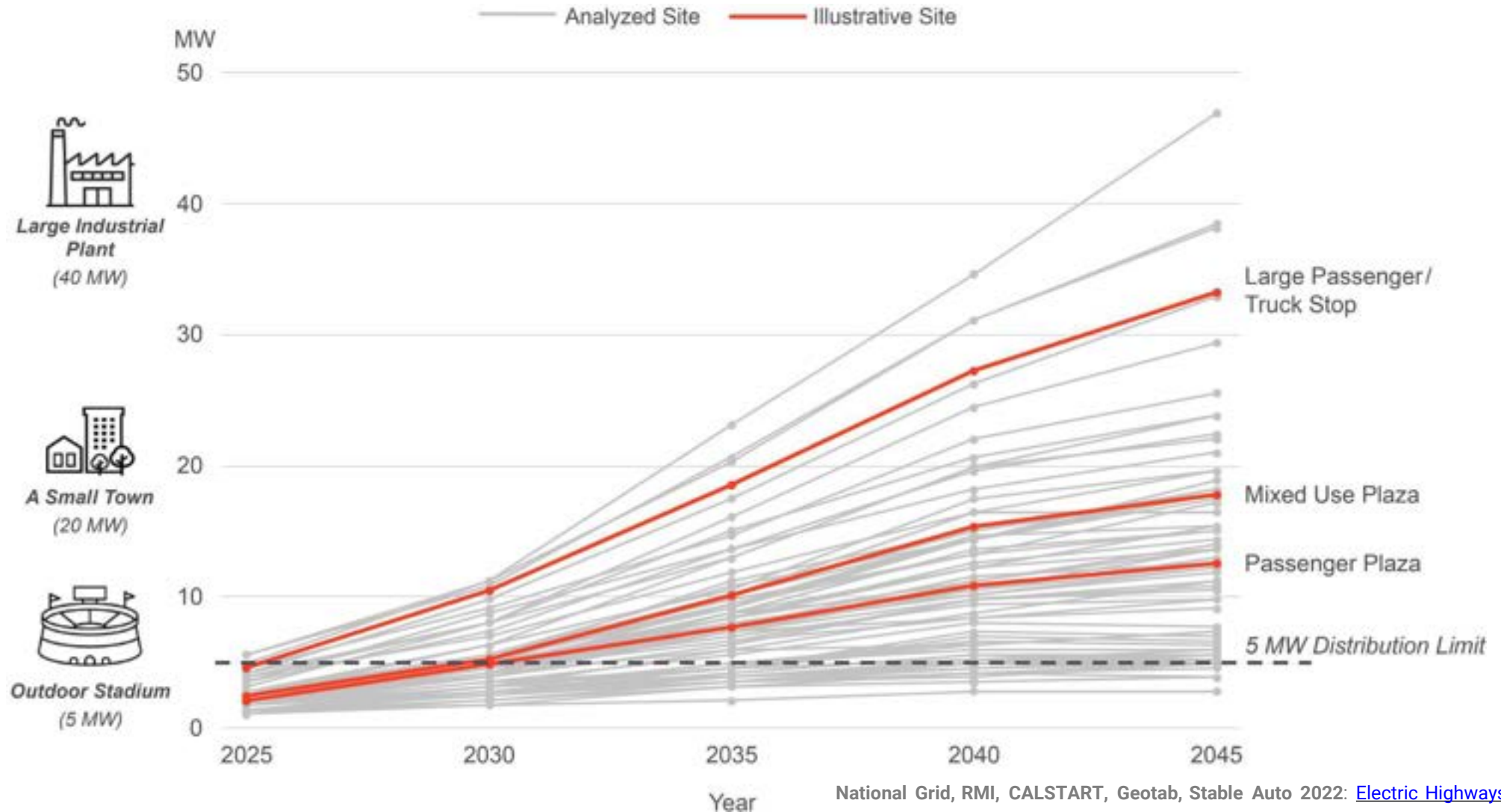


...where we're going.



Individual sites may quickly require 5 to 40+ MW.

Capacity Required to Meet Annual Peak Demand at Each Site



RMI's GridUp tool uses detailed vehicle travel data to project EV power and charging needs at the local level.

1

Aggregate and sample trip and population data



2

Assign charging availability and preferences



3

Simulate charging behavior based on energy needs, charger availability, stops



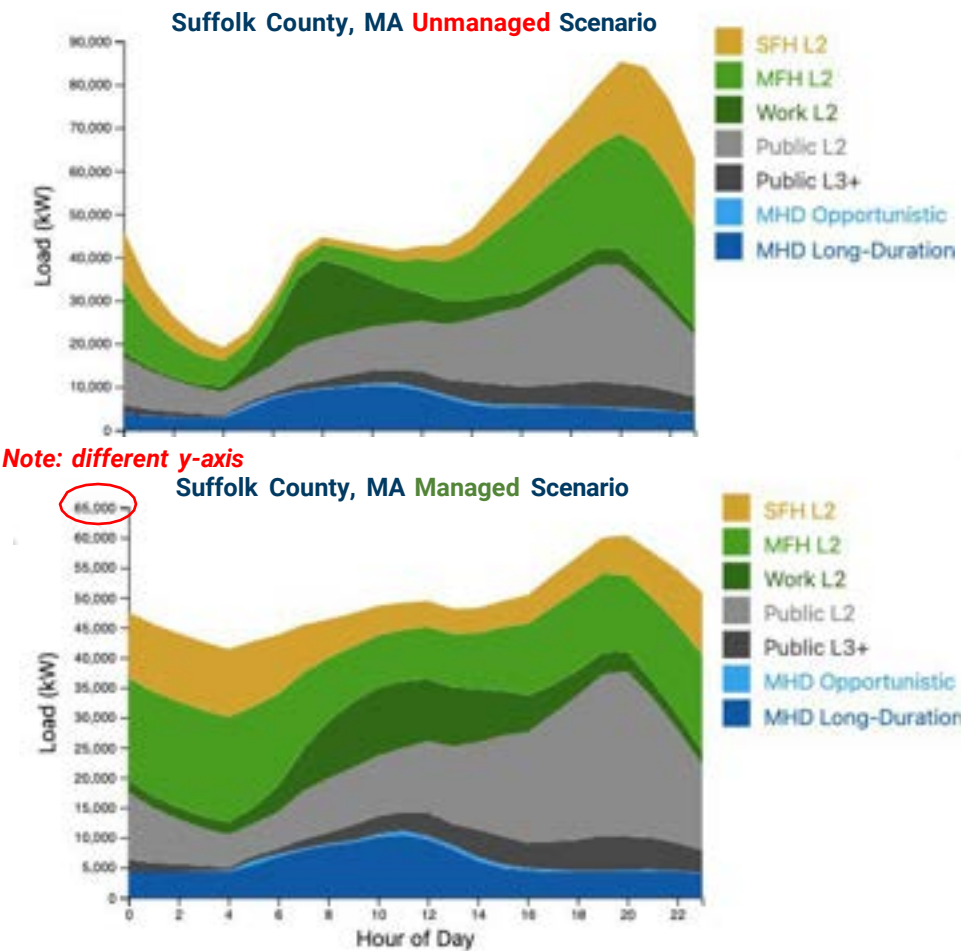
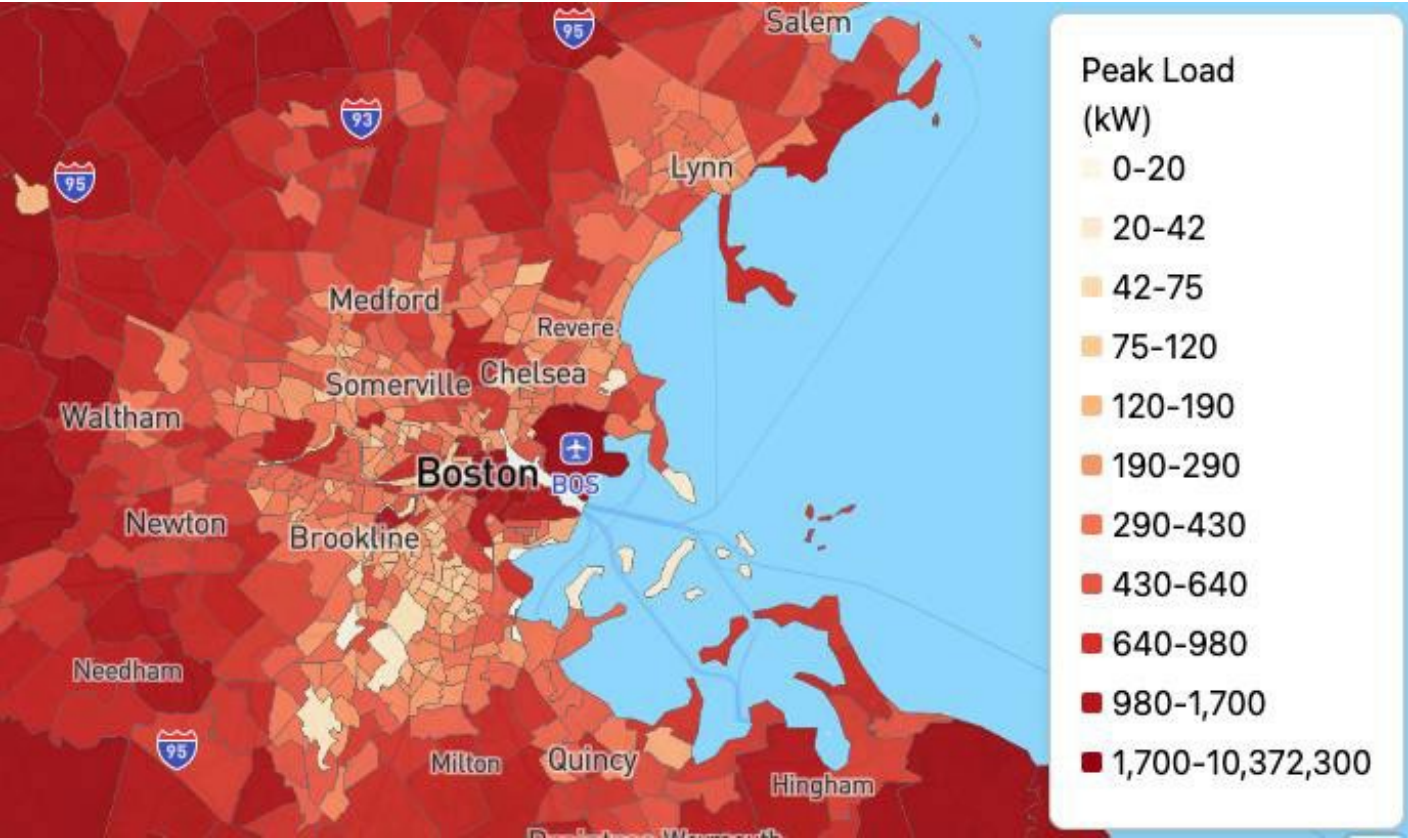
4

Summarize load curves and power needs by census block group



Case Study: Boston, 2035

RMI’s GridUp tool provides detailed estimates of EV charging load at the neighborhood level.



EV load in the Northeast will be sizeable by 2035.



NPCC New York	
EV Peak (U)	2,894 MW
EV Peak (M)	1,876 MW
Daily energy	33.8 GWh
Charging ports	2.8MM

NPCC New England	
EV Peak (U)	3,735 MW
EV Peak (M)	2,543 MW
Daily energy	42.7 GWh
Charging ports	3.0MM

} **35% reduction**

} **32% reduction**

Vermont	
EV Peak (U)	218 MW
EV Peak (M)	170 MW
Daily energy	2.8 GWh
Charging ports	141k

New Hampshire	
EV Peak (U)	369 MW
EV Peak (M)	260 MW
Daily energy	4.2 GWh
Charging ports	244k

Maine	
EV Peak (U)	335 MW
EV Peak (M)	242 MW
Daily energy	4.0 GWh
Charging ports	233k

Massachusetts	
EV Peak (U)	1,652 MW
EV Peak (M)	1,099 MW
Daily energy	18.6 GWh
Charging ports	1.4MM

Rhode Island	
EV Peak (U)	247 MW
EV Peak (M)	165 MW
Daily energy	2.8 GWh
Charging ports	210k

Connecticut	
EV Peak (U)	914 MW
EV Peak (M)	611 MW
Daily energy	10.2 GWh
Charging ports	750k

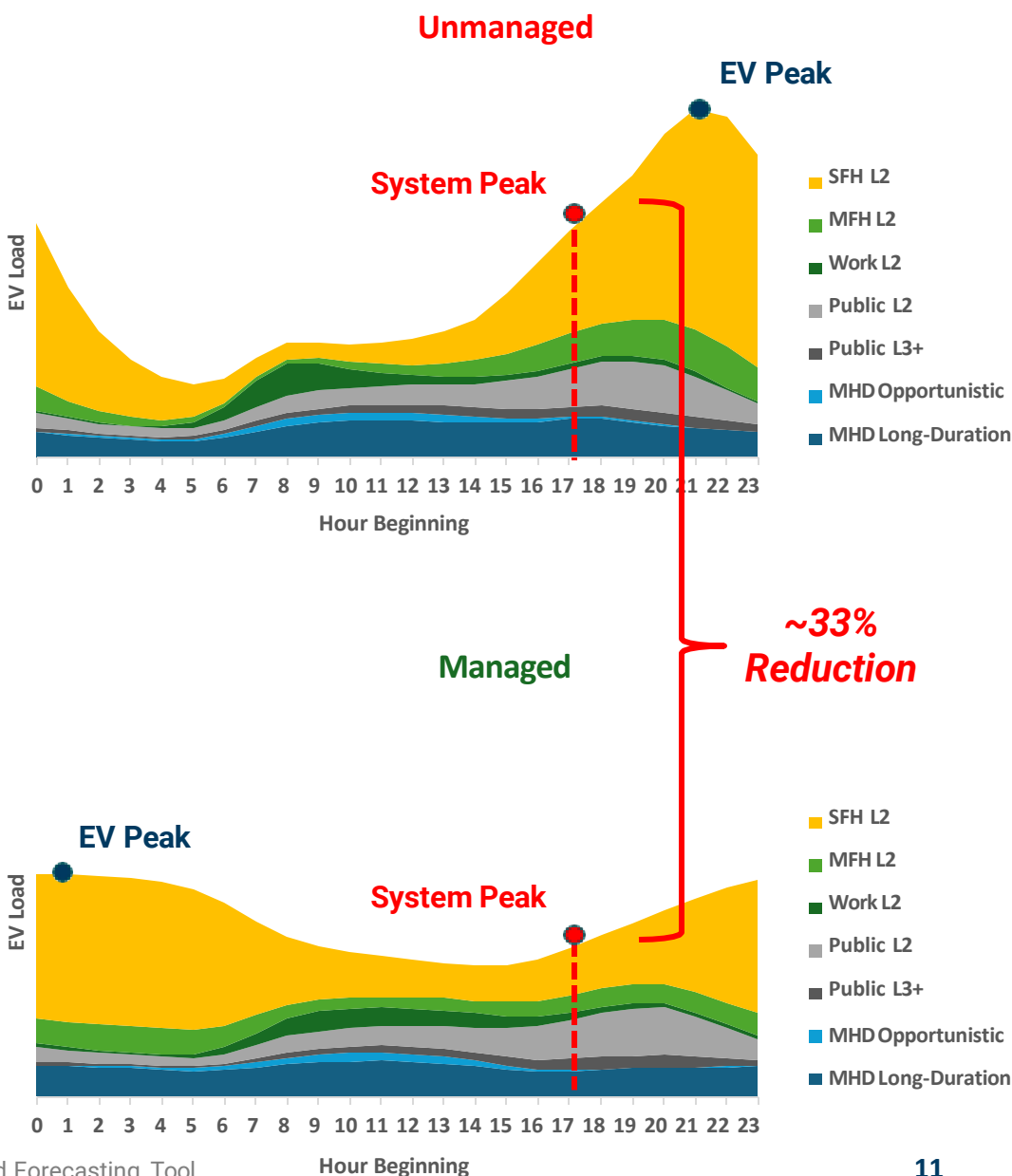
New York / NYISO	
EV Peak (U)	2,894 MW
EV Peak (M)	1,876 MW
Daily energy	33.8 GWh
Charging ports	2.8MM

What does this mean for NPCC's system peak?

Case Study: New York, 2035

NYISO Gold Book Scenarios	Baseline	High Demand
Summer Coincident Peak (MW)	34,520	38,150
EV Contribution (MW)	2,741	3,434
EV Contribution (%)	8%	9%
Managed Charging Peak Shaving Potential (MW)*	931	1,167
Managed EV Contribution to Peak (%)*	5%	6%

GridUp 2035 NY EV Load Shapes

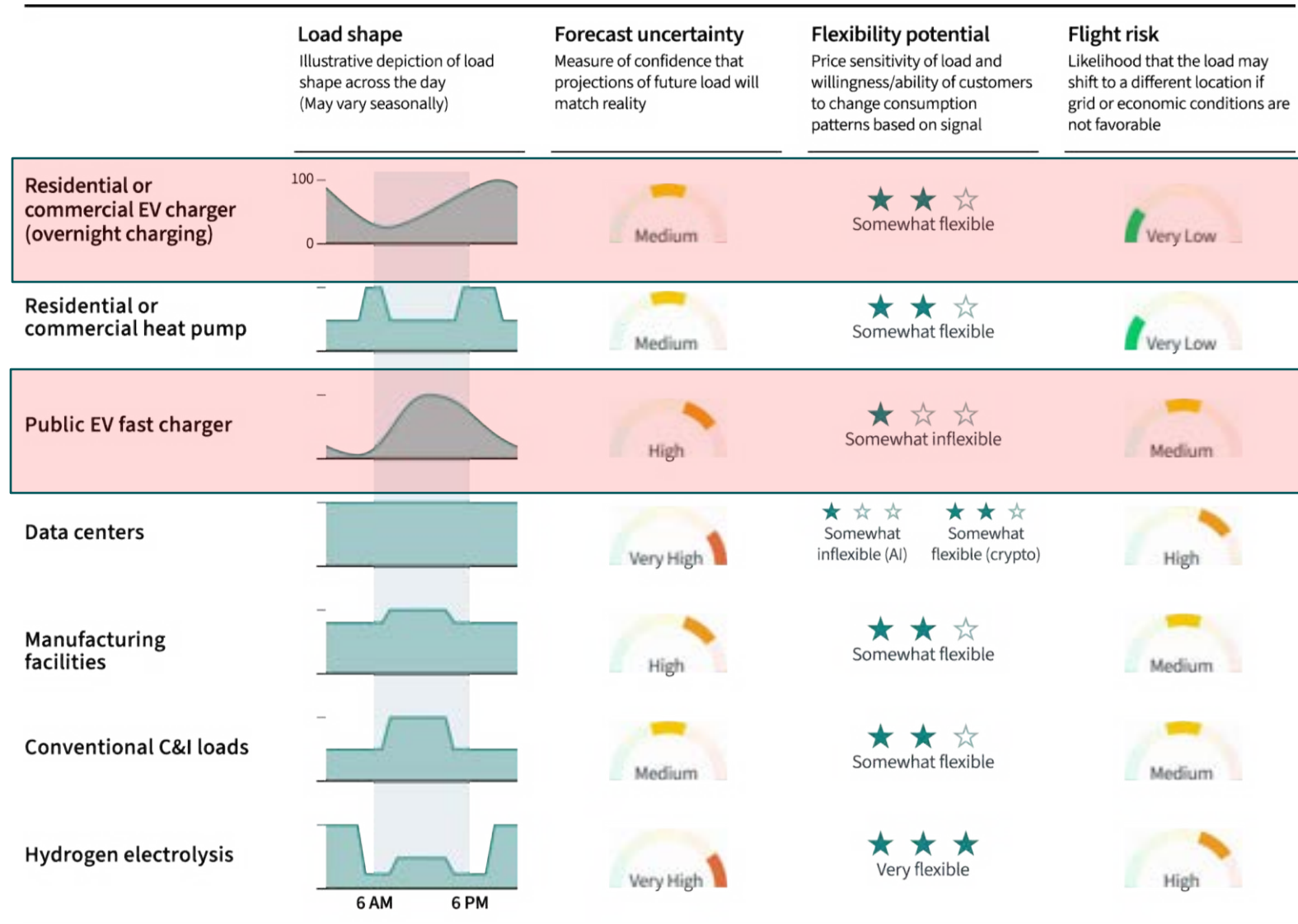




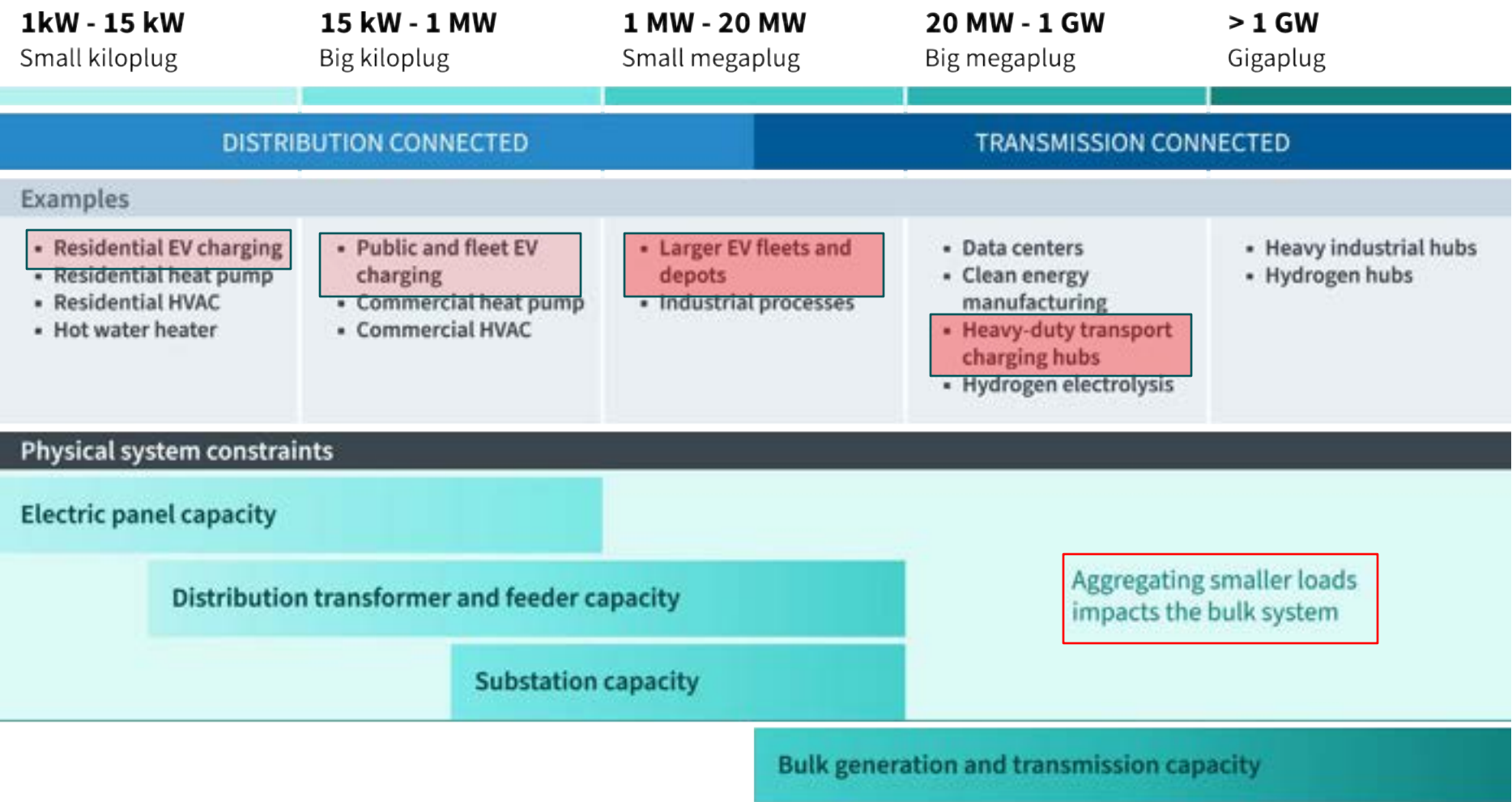
**Not your
grandmother's
load growth.**

EV load is distinct from other sources of load growth.

- **Light-duty EV load:**
 - Smaller, generally dispersed
 - Mobile (home, workplace, public charging)
 - Somewhat flexible
- **Medium-/heavy-duty EV load:**
 - Larger, often concentrated
 - Somewhat inflexible



While most directly a distribution planning consideration, EV load will impact all levels of grid infrastructure.



- Fleets and larger charging hubs most *directly* relevant for BPS planning
- Accounting for aggregate load from smaller charging use cases still necessary
- EVs one of many new sources of load

EV flexibility through bi-directional charging is getting close to prime time.

- New pilot in Massachusetts through National Grid, Eversource, Unitil
- Promising opportunity for grid resilience, reliability

DIVE BRIEF

Massachusetts to deploy 100 bidirectional EV chargers in first-of-its-kind 'V2X' pilot

The program is available for residential, commercial, municipal and school customers and could add 1.5 MW of flexible grid capacity by September 2026, program partners said.

Published March 4, 2025

PRESS RELEASES

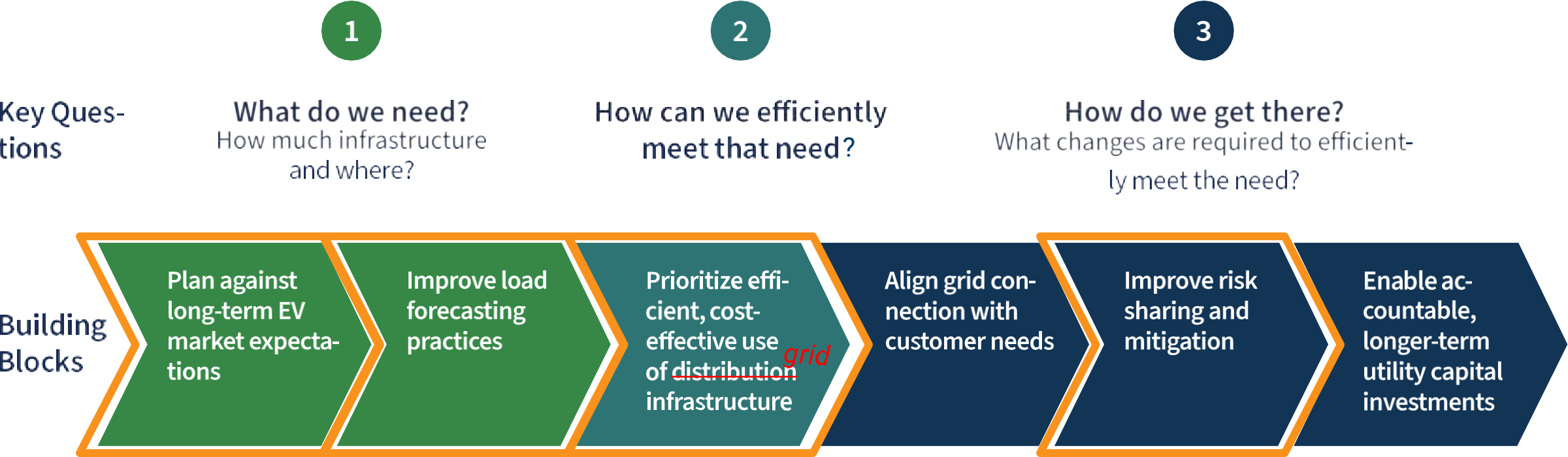
Resource Innovations and The Mobility House Tapped to Lead Massachusetts Statewide Vehicle-to-Everything (V2X) Demonstration Program



**Coordinated,
proactive planning
for EVs to unlock
their full value.**

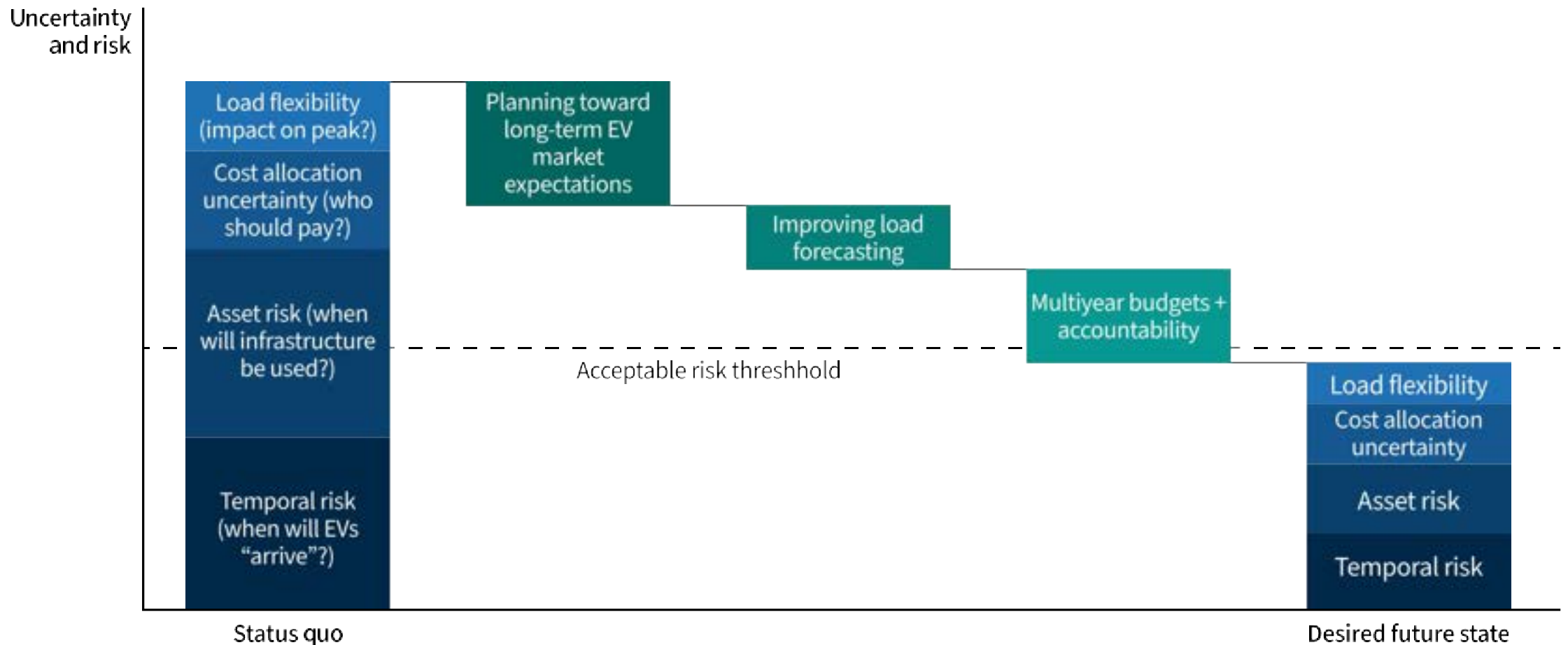
Regulators, utilities, and market operators can improve transportation electrification planning and investments – largely through coordination.

RMI’s TE Building Blocks largely focus on Dx system planning, but are relevant for BPS as well.



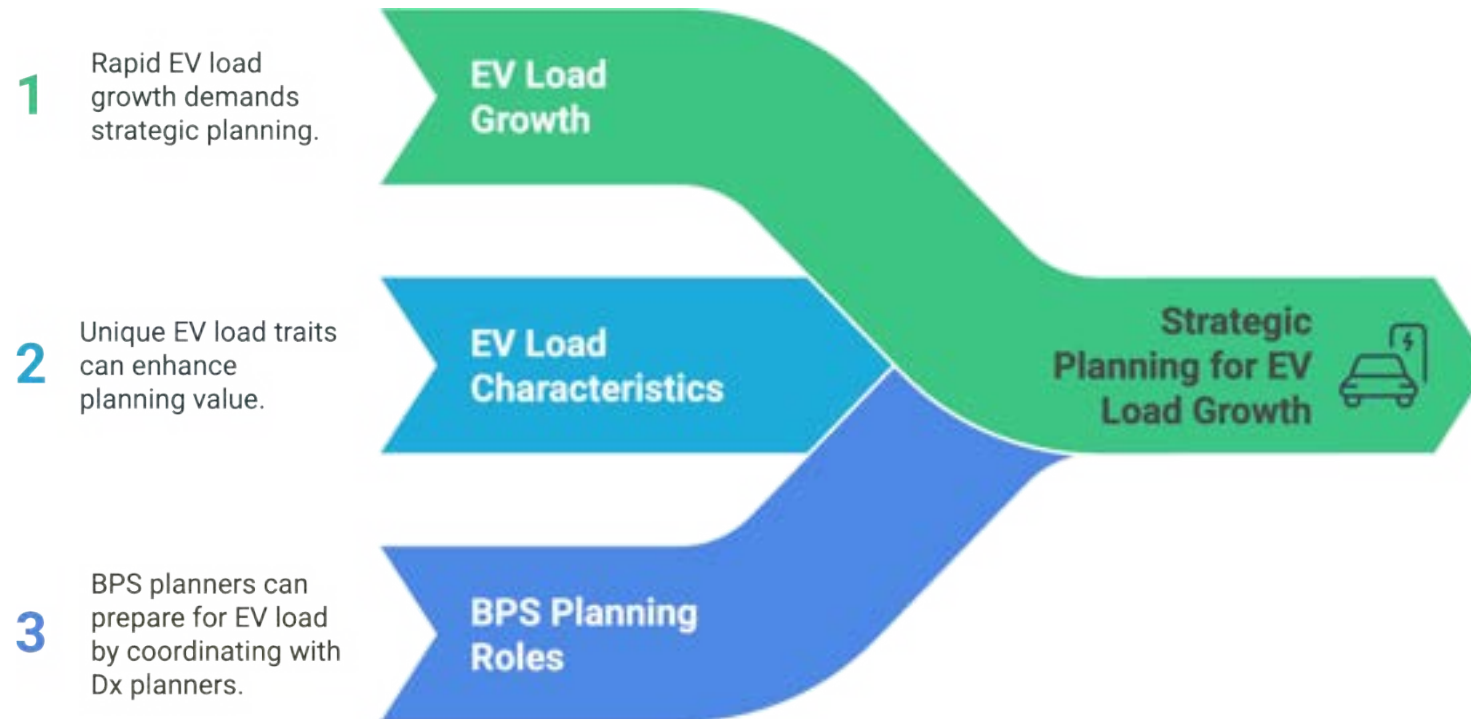
A useful way to think about the building blocks is as a diverse set of measures that collectively reduce uncertainty and risk.

Illustrative example of reducing uncertainty and risk through a combination of practices



Closing Thoughts

What were those three things again?





Thank You!



Ben Shapiro

Principal, Transportation

bshapiro@rmi.org

Resources:

[GridUp EV Load Forecasting Tool](#)

[Transportation Electrification Building Blocks](#)



Appendix

Markets: RTOs, alongside state regulators, are slowly advancing VPP participation in wholesale markets.

RTO	2222 Compliant?	State Regulatory Actions ¹
CAISO		
NYISO		
PJM		NJ: BPU issued an RFI to understand how utilities are preparing for DER aggregation and to solicit feedback on implementation from stakeholders. PA: PUC initiates Advance Notice of Proposed Rulemaking Order to implement FERC 2222.
ISO-NE		
MISO		MI: Public Service Commission formed a Demand Response Aggregation Working Group. WI: Public Service Commission opened investigation into aggregation of retail customers into demand response resources. IN: Utility Regulatory Commission closed its investigation into public utility status of distributed energy resource aggregators.
SPP		

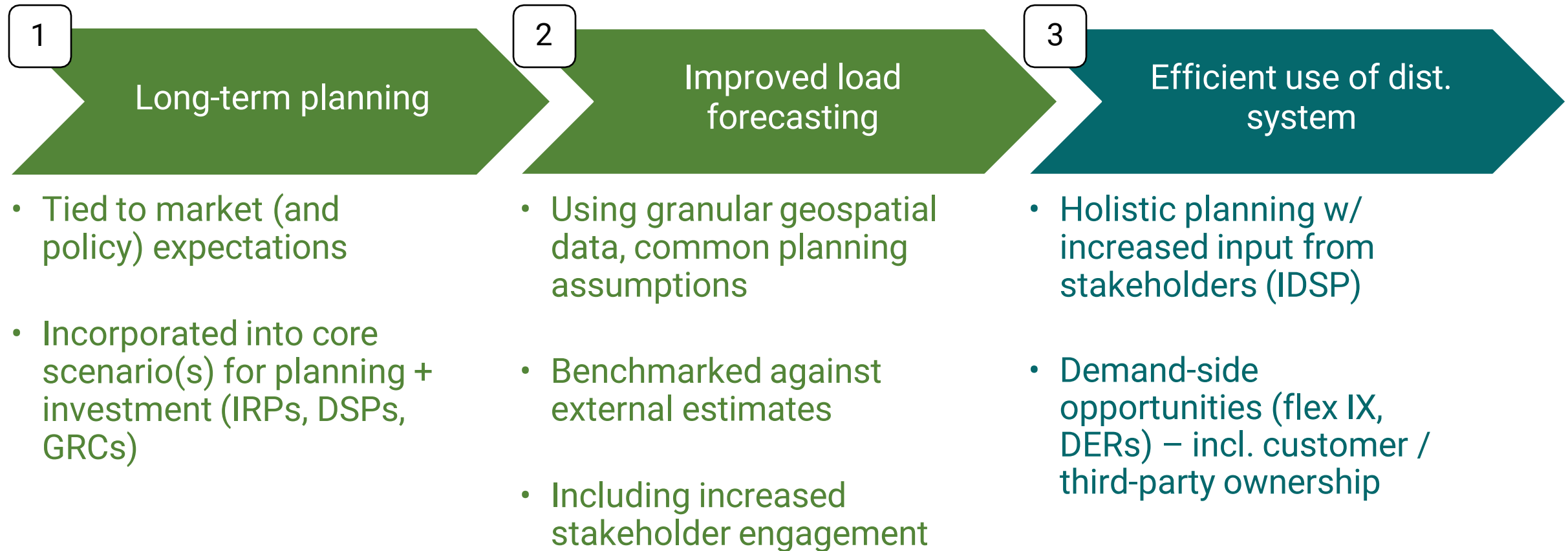
2222 Compliance: At the end of 2024, only CAISO and ISO-NE were fully compliant with Order 2222. SPP and PJM submitted updated plans to FERC in 2024, but these were deemed to not be fully compliant with order 2222.

State Action: Five state regulators took proactive action to anticipate challenges and prepare for participation of DER aggregations in wholesale markets in 2024 (see table above).

ERCOT: ERCOT is not subject to FERC authority. However, the Texas PUC, with guidance from the *ADER Task Force* continued to expand ERCOT's ADER Pilot and explore broader participation of DERs in wholesale markets.

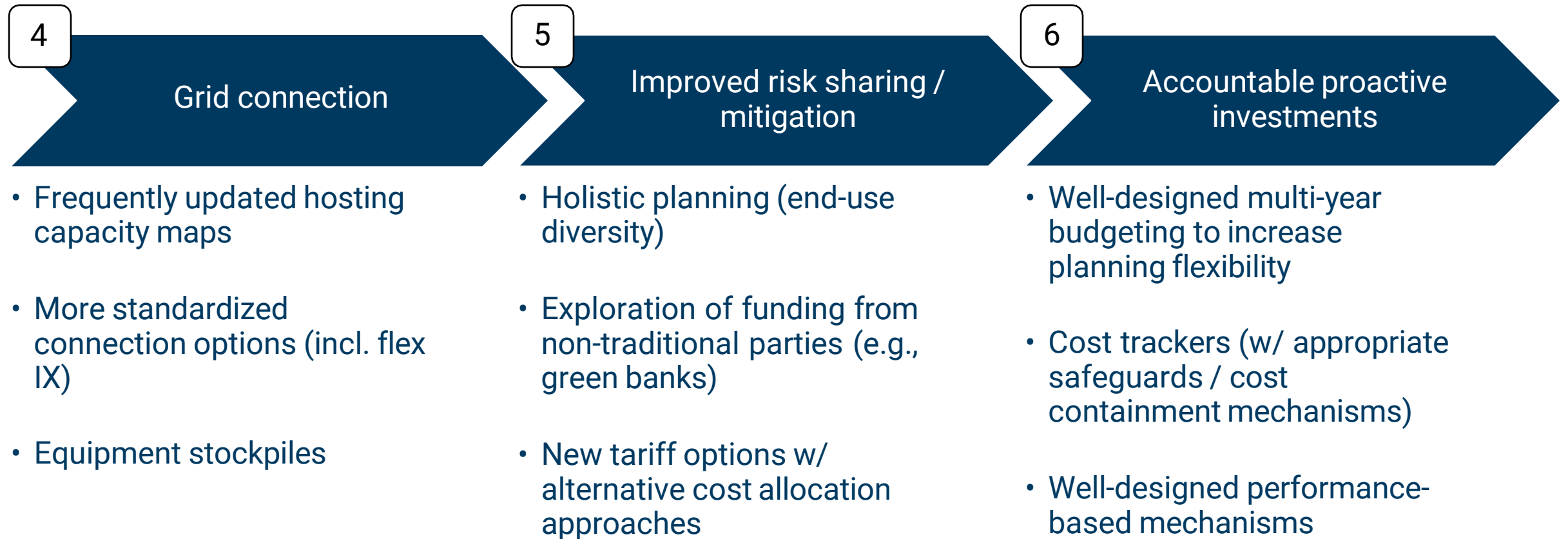
Identifying and holistically planning for infrastructure needs.

Building Blocks #1-3



Updating approaches to meet the needs of the moment.

Building Blocks #4-6





NPCC Long Term Strategy

To assure effective and efficient reduction of risks to the reliability and security of the grid

- NPCC Seasonal Reliability Assessments
- IBR Standard and Registration Projects
- Northeast Gas/Electric System Study
- NPCC More Stringent Reliability Criteria



NPCC Long Term Strategy

To assure effective and efficient reduction of risks to the reliability and security of the grid

Comments/Suggestions:

[Contact Us | NPCC](#)

[NPCC Reliability Forums](#)

[NPCC Guidance Document](#)