

Getting Ahead of EV Charging Demand With Transportation Analytics

After Massachusetts announced ambitious plans to achieve Net Zero emissions by 2050, modelers at Eversource, New England's largest utility, turned to StreetLight's transportation intelligence to help forecast electric vehicle (EV) charging demand and understand where to make critical upgrades and investments.

Mission: Ensure Sufficient Bulk Station Capacity for Growing Demand

Eversource is readying itself for accelerating electric vehicle (EV) charging demand spurred by Massachusetts' ambitious decarbonization goals. To ensure capacity at bulk stations, the utility needed to know when, where, and how long drivers charge.

"We're kicking off an avalanche, and if we don't stay ahead of that as a distribution utility, then catching up is going to be impossible," said Gerhard Walker.

Knowing that MassDOT's National Electric Vehicle Infrastructure (NEVI) plan was powered by StreetLight analytics, Eversource also turned to StreetLight to enhance their travel pattern modeling and build charging profiles through 2050. These profiles will inform EV charging rates, substation upgrades, and energy management strategies for years to come.

EXECUTIVE SUMMARY

- To ensure sufficient capacity at bulk substations, Eversource needs to model where, when, and how EVs charge.
- StreetLight's traffic volume, trip characteristics and Origin-Destination metrics help predict charging behaviors through 2050.
- The analyses inform which substation upgrades will be needed and energy management strategies to ensure reliable grid capacity.

"As MassDOT plans its electrification transition...., it made a lot of sense to base both [their and our] analyses on [StreetLight data] to...have consistency between the transportation agency and the infrastructure side."

GERHARD WALKER
MANAGER OF ADVANCED
FORECASTING AND MODELLING

EVERSOURCE



Analysis: Mobility Data Helps Forecast Charging Behaviors Through 2050

Eversource modelers use StreetLight Vehicle Volume by time of day, type of day (e.g., workday vs. weekend vs. holiday), season, vehicle type (personal vehicle, medium- and heavy-duty truck) and zip code to understand how EV charging demand fluctuates across their entire service area.

“Dwell time and trip attributes like distance, duration, and purpose help their model better predict when vehicles charge and for how long. Long dwell times allow for more flexibility in charging, while longer trip distances correlate with longer charge times,” said Mahfuz Ali Shuvra at Eversource.

FIGURE 1

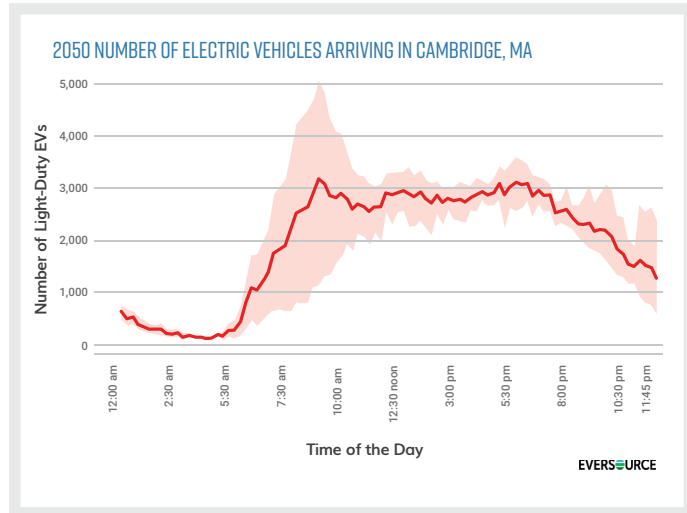
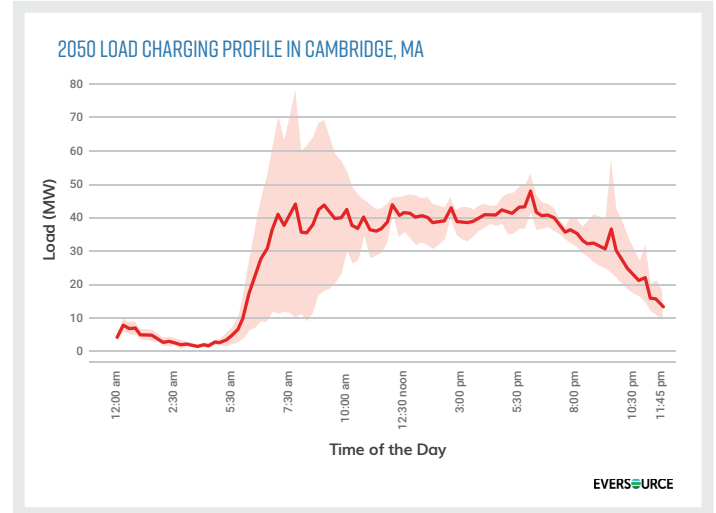


FIGURE 2



With 15-minute granularity, Eversource modelers use historical vehicle volumes to forecast the all-electric vehicle volumes (Figure 1) and associated grid load (Figure 2) in 2050

Results: Substation Upgrades, Rate Design, and Public Partnerships

With granular traffic insights from StreetLight, Eversource is building sophisticated models to predict charging behaviors and ensure capacity stays ahead of peak charging demand.

PUBLIC-PRIVATE ELECTRIFICATION COLLABORATION

Model findings allow Eversource to coordinate long-range electrification planning with public agencies. When the analysis revealed a high weekday morning charging peak in Cambridge zip codes if left unmanaged, Eversource shared these findings with Cambridge City Council. Working together to tackle the high influx of commuter traffic will enable city transportation to go fully electric by 2050 without exceeding grid capacity.

SYSTEM PLANNING & CHARGE MANAGEMENT

Eversource developed yearly charging profiles with date-specific impacts (such as holidays) to forecast demand and determine where and when station upgrades may be needed.

Demand forecasts allow charging management teams to plan strategies such as Time-of-Use (TOU)-based tariff design — where charging rates are lower at off-peak hours — and overnight adaptive charging to spread out peak charging demand and ensure ample capacity.

Ready to advance EV charging in your region?

With StreetLight's solution for EV planning, get the reliable data you need to answer critical EV infrastructure site selection questions:

- What is existing traffic demand?
- How long are vehicles staying at certain sites?
- Where are vehicles coming from and going?
- What are the demographics of existing drivers near sites?
- How much EV activity is happening in your region?

