

## DOCKETED

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# Transportation Electrification: The PEV Market, Environmental Impact, and Future Technology

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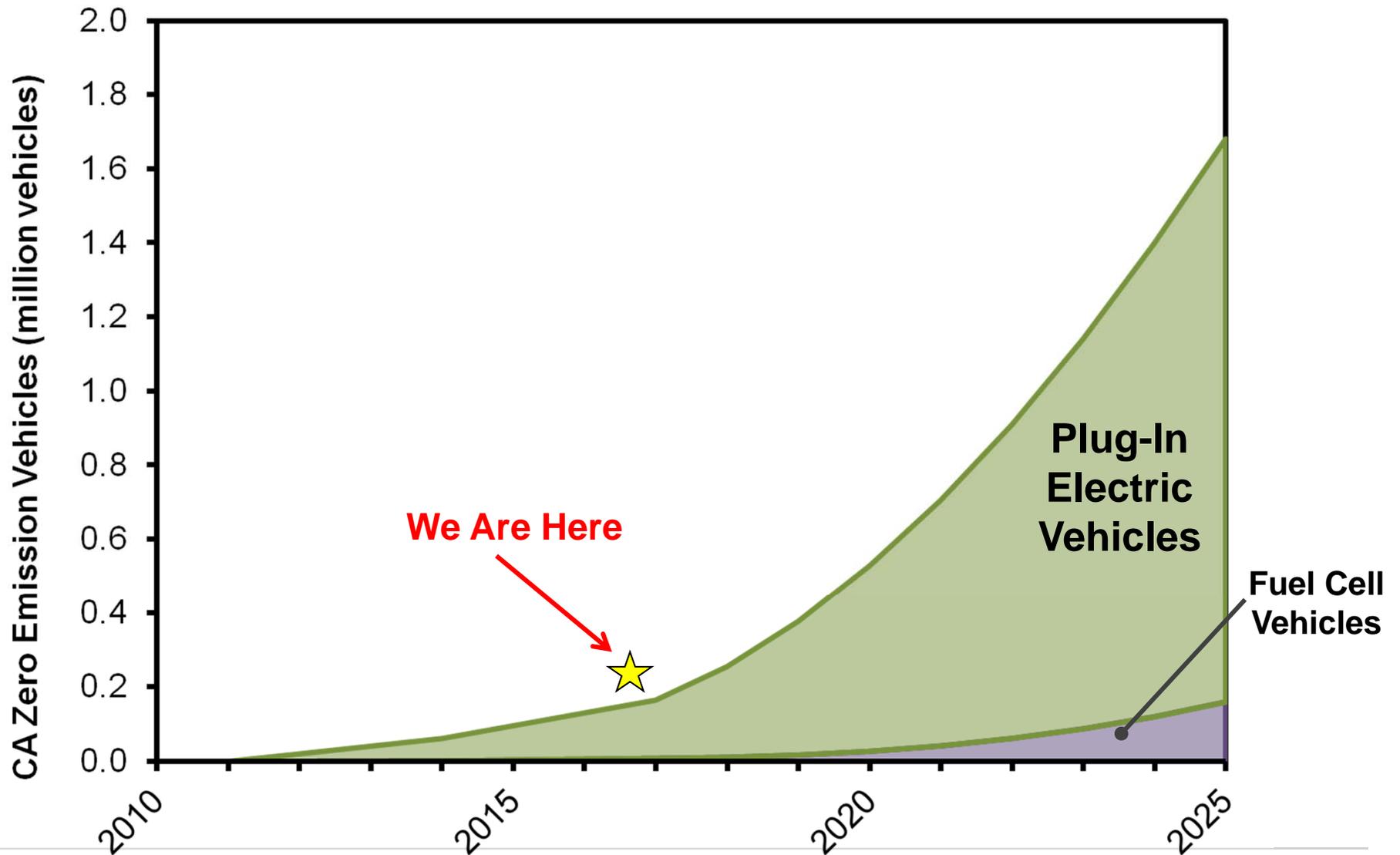


# What is Electric Transportation?

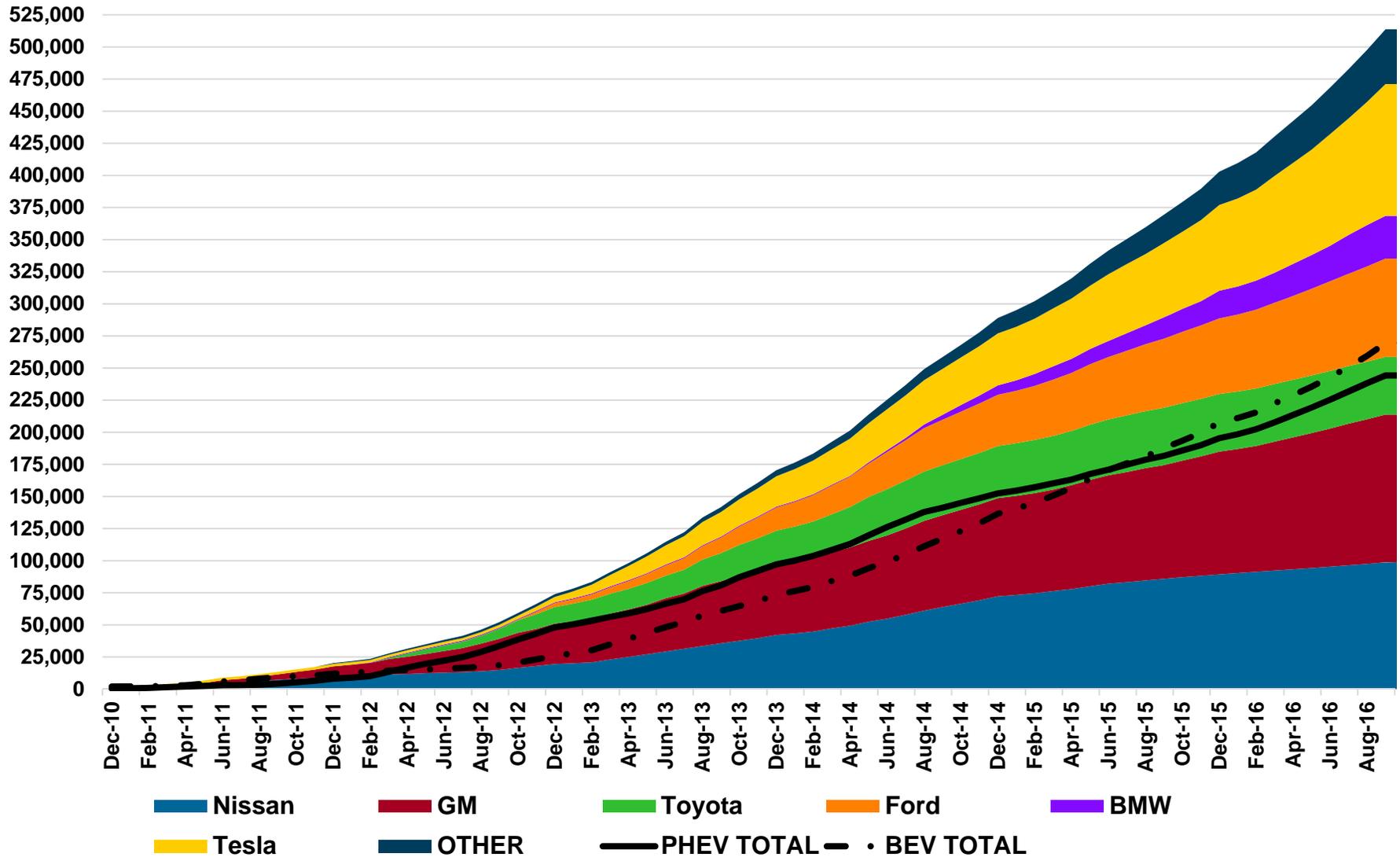
- Car
- Truck
- Bus
- Marine
- Airport
- Forklift
- Marine
- Motorcycle
- Scooter



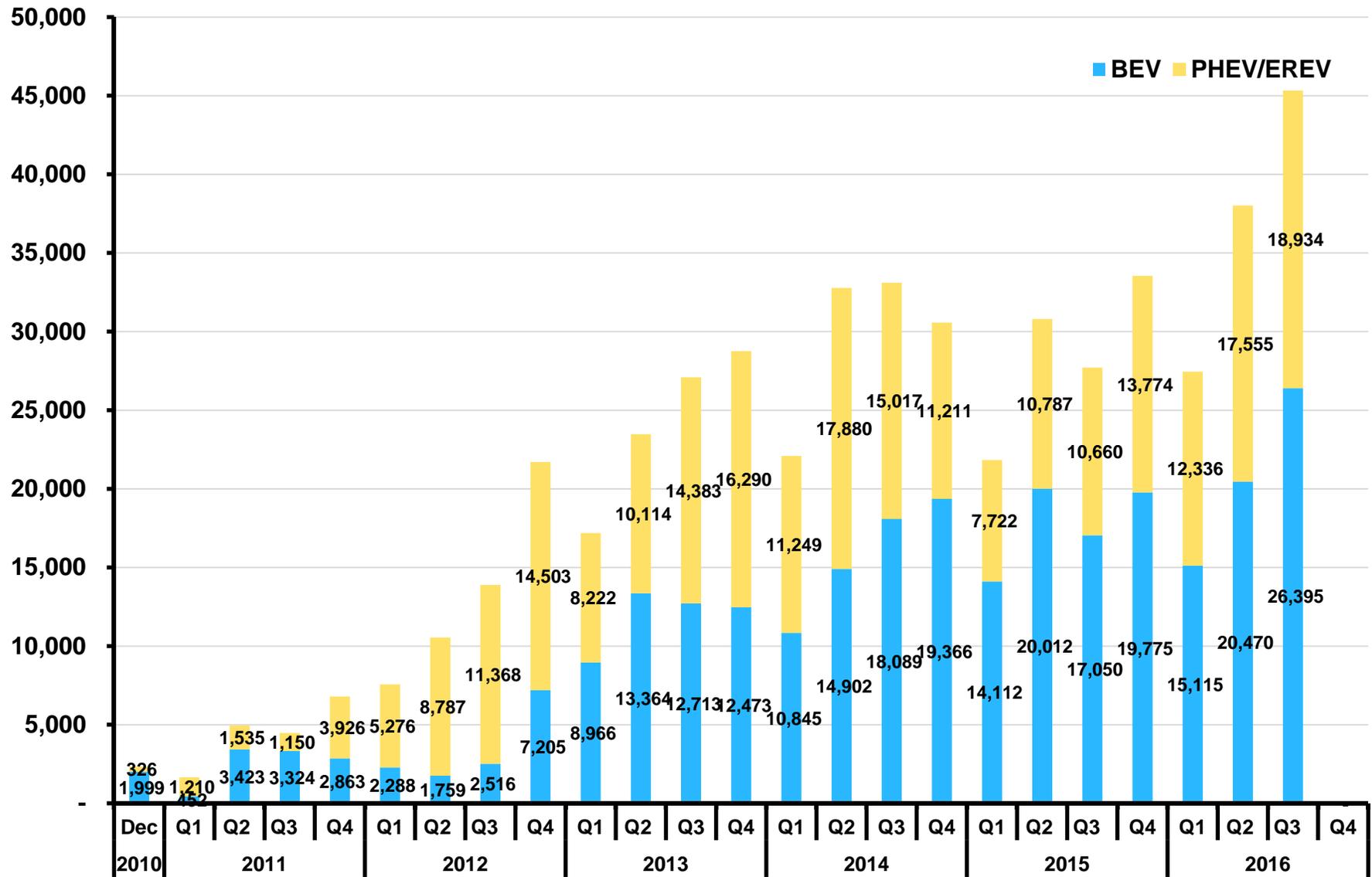
# Regulatory Push – California has mandated 1.5M ZEVs by 2025 (3.3M including seven other states)



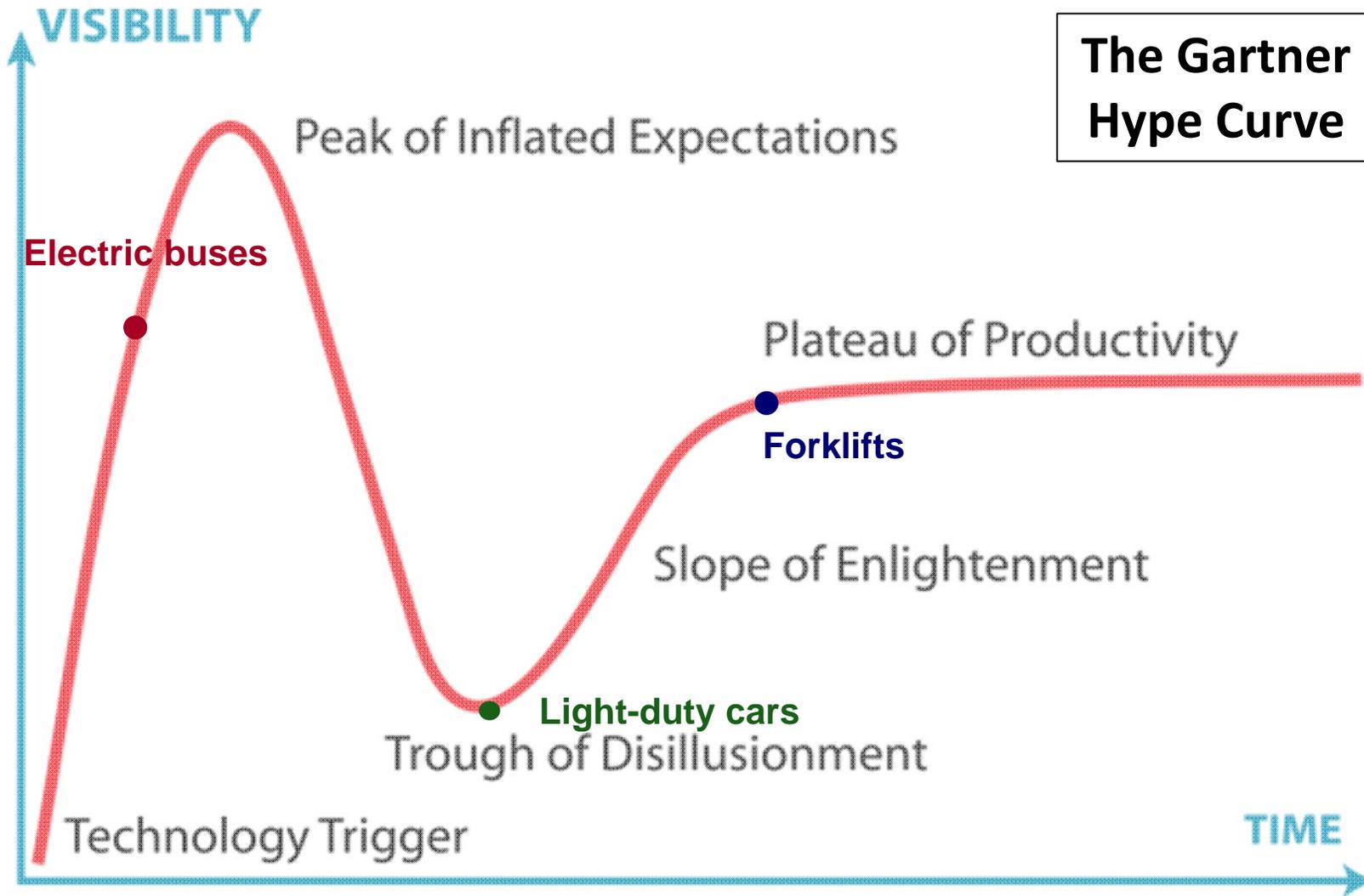
# Cumulative US PEV Sales to Date > 513,000



# PEV Sales 2016 YTD Up 34% Over 2015



# Moving beyond the hype cycle...

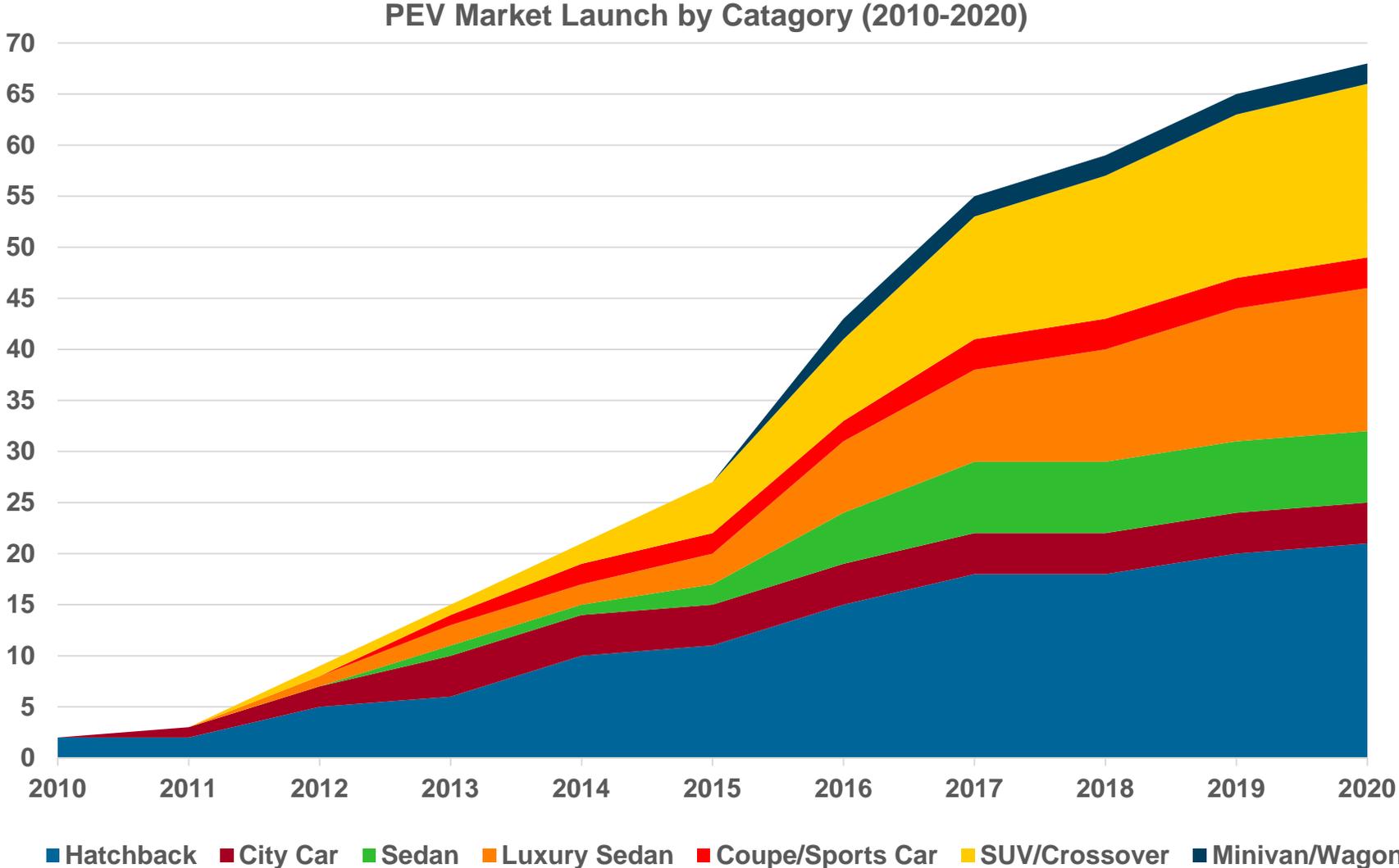


Focus on the real opportunity for electric transportation in the next 5 to 10 years

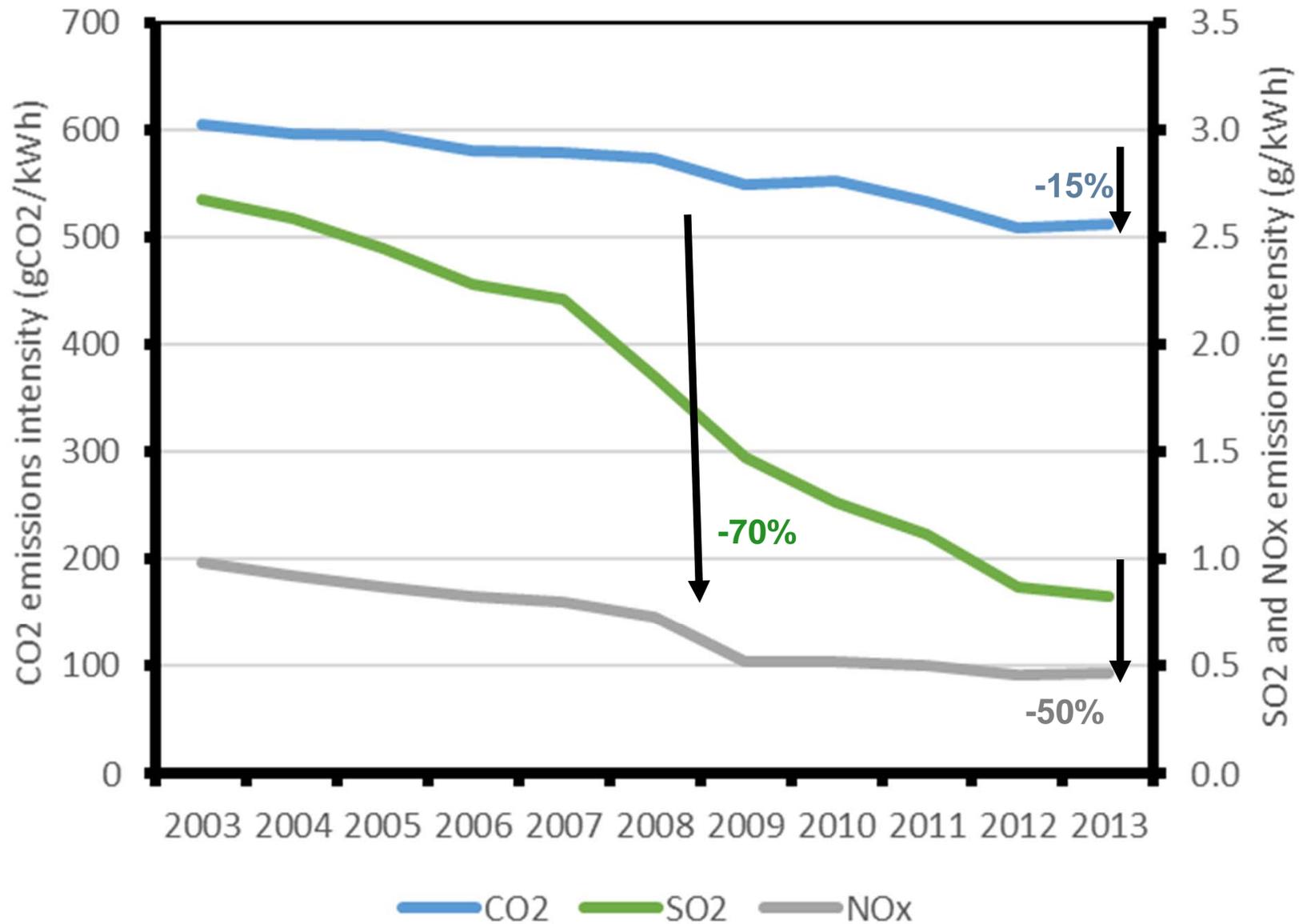
# Customer choice is increasing ~41 new PEVs coming in 2016-2020



# Customer choice increasing with 41 PEVs announced to hit market from 2016 – 2020

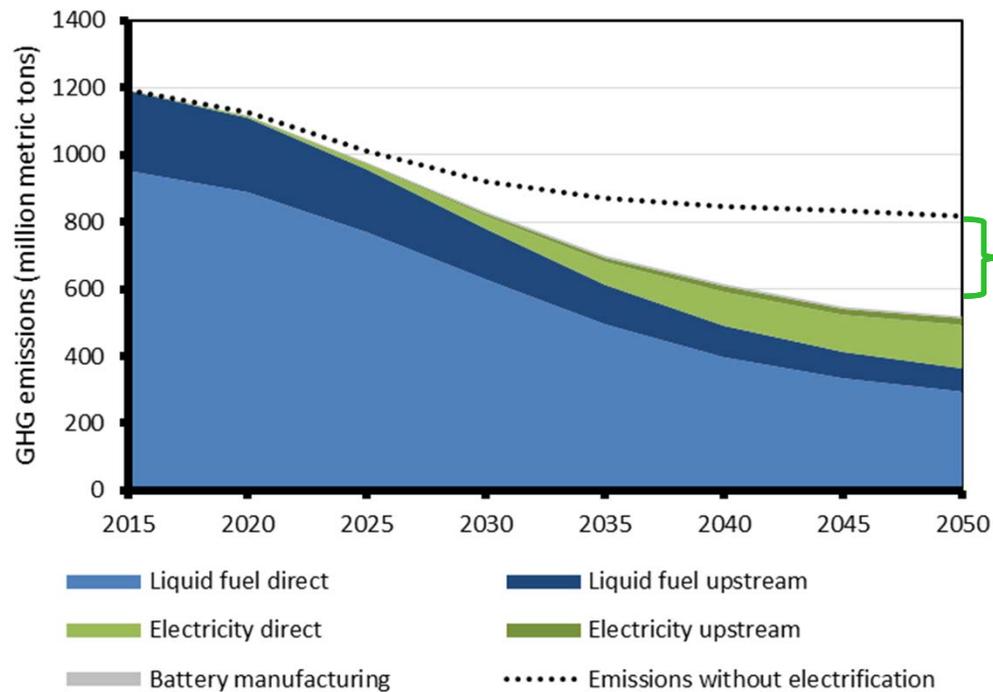


# The electric grid is clean and getting cleaner – 15, 70, 50

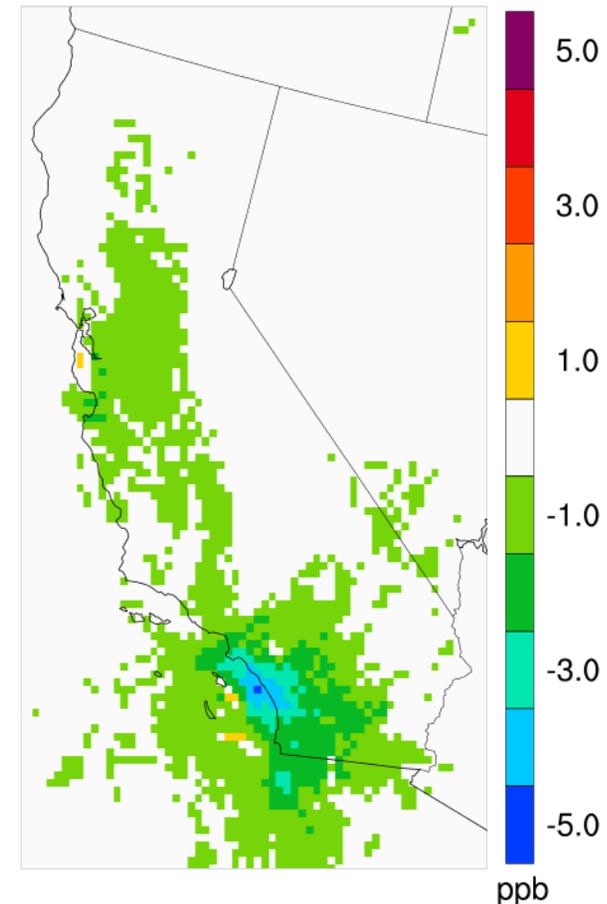


# Electricity is also a clean transportation fuel

Reduction in GHG due to electrifying transportation through 2050

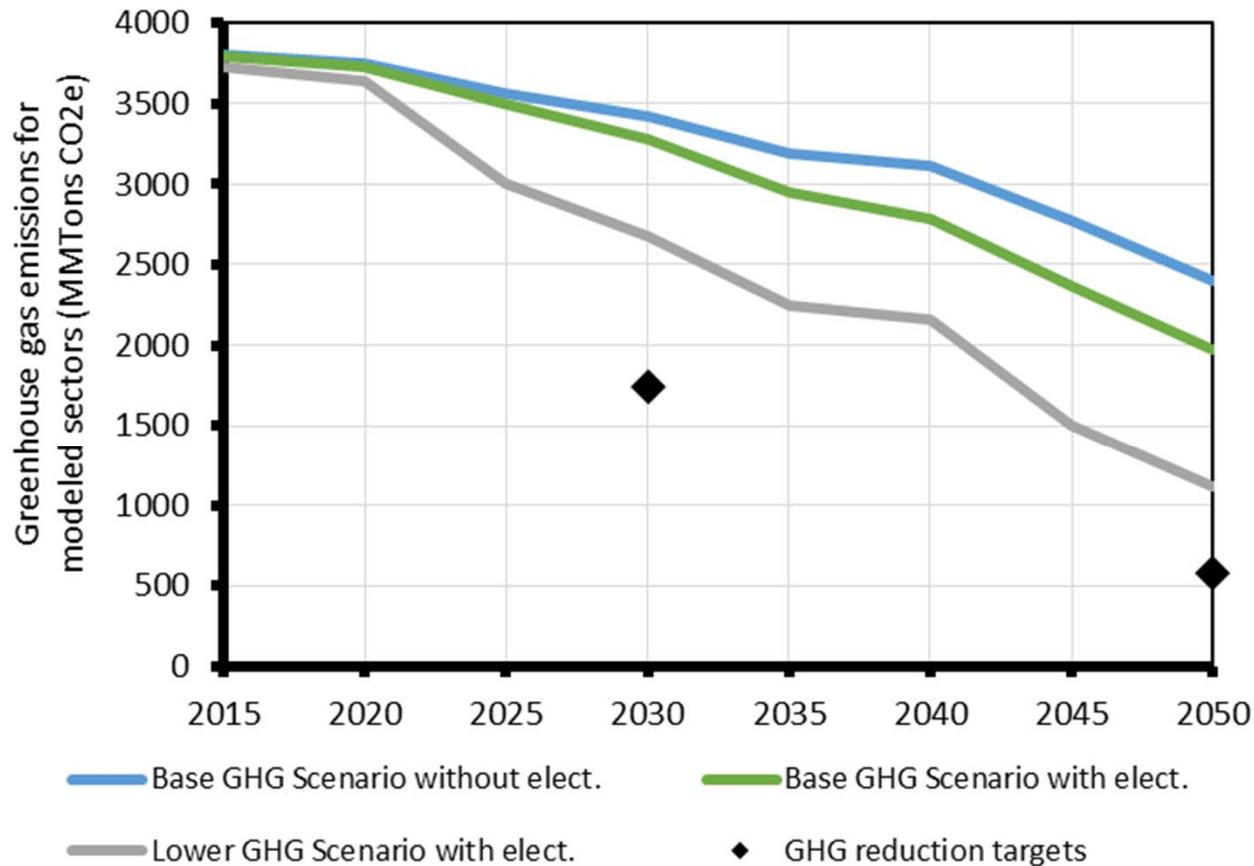


Improvements to air quality (human health) due to electrifying transportation through 2030



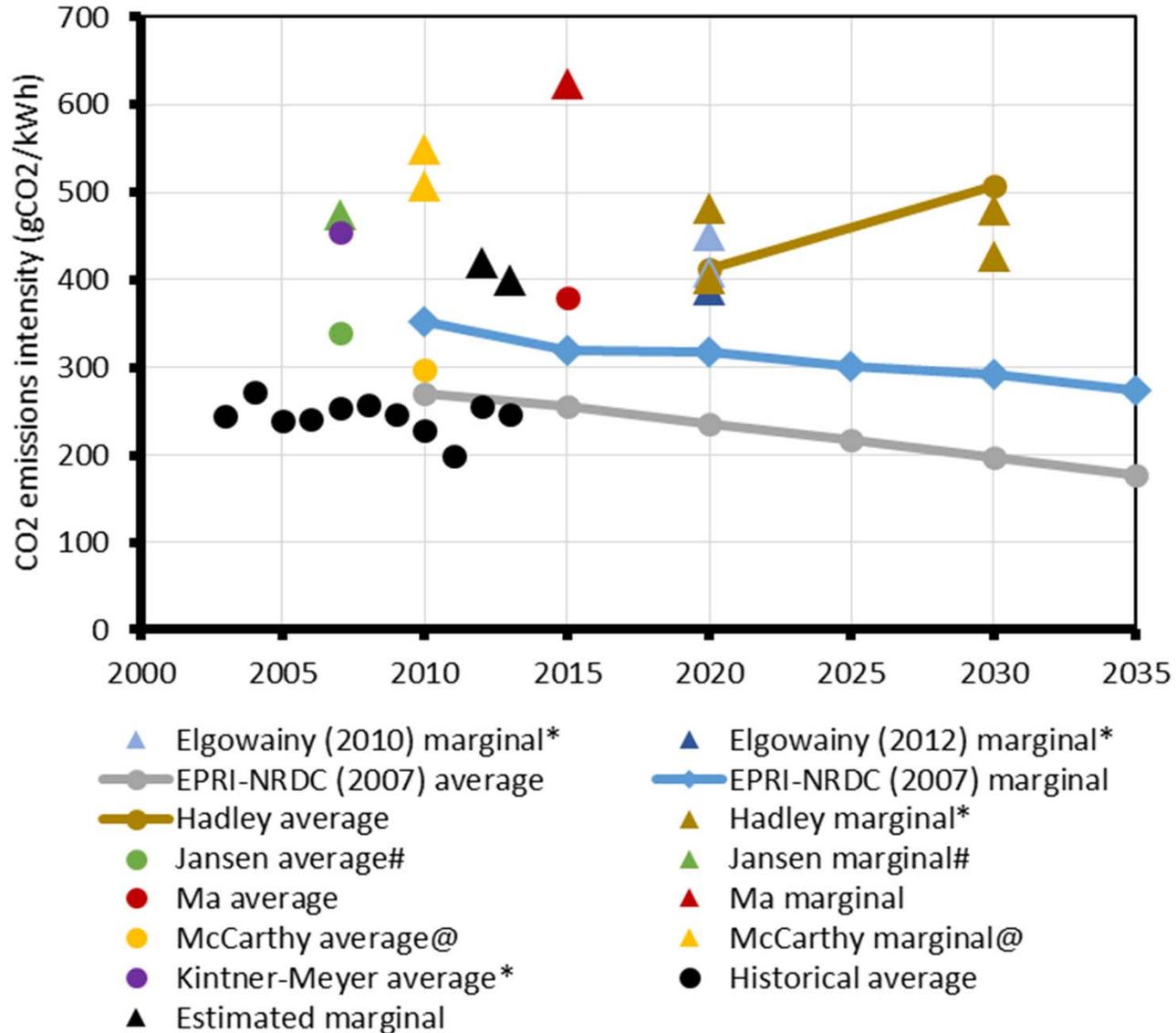
Min(33,24) = -4.74, Max(31,18) = 1.17

# Transportation Electrification reduces California's greenhouse gas emissions but needs to move faster



- In our more aggressive scenario the electricity sector and transportation sector can approach California's targets, but there is still a significant gap

# But what about those headlines that claim electric vehicles are bad for the environment?



# Customer education - Charging is sometimes like getting gas, but more often like charging your phone or laptop



Public



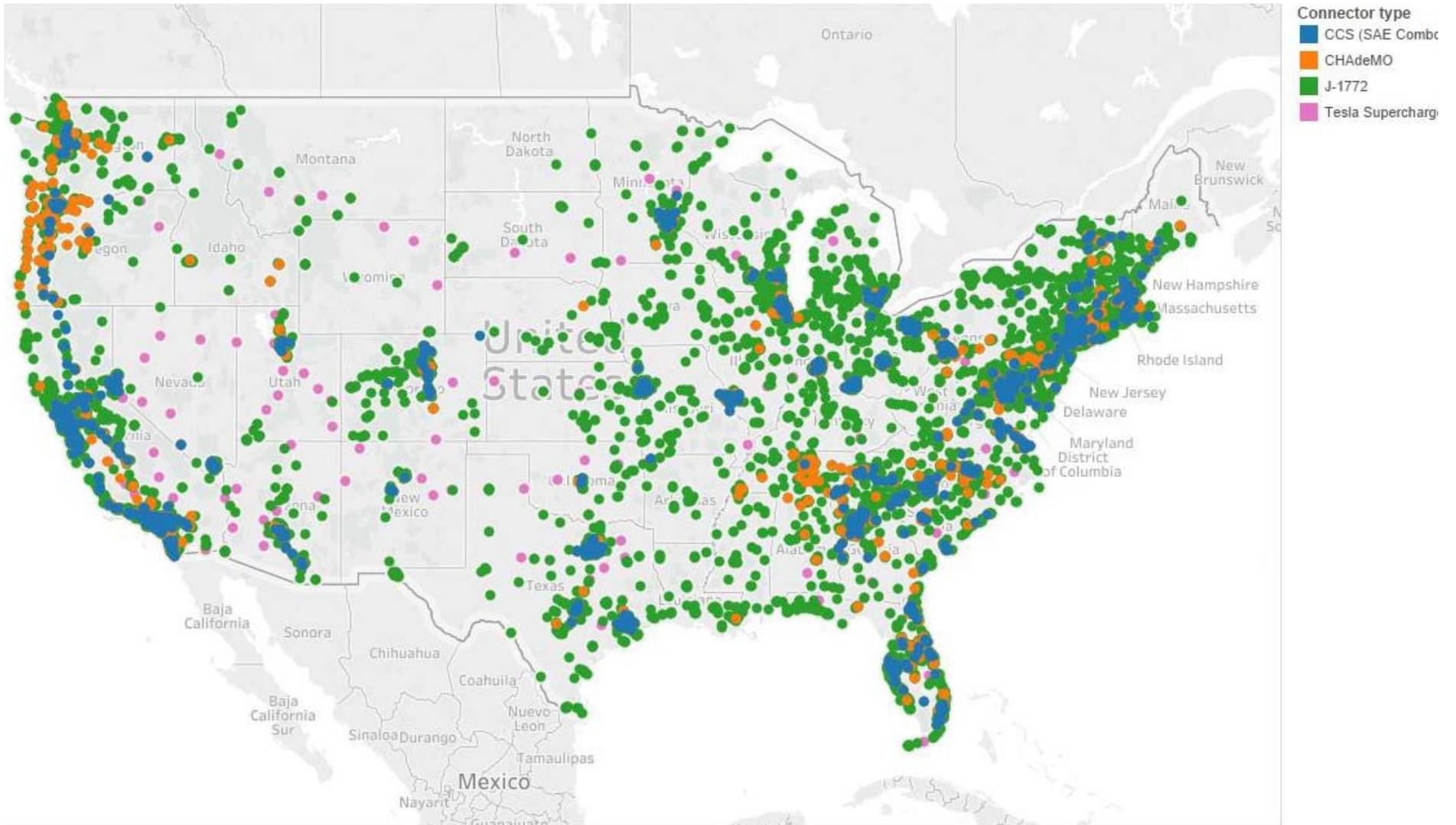
Workplace  
or Retail



Residential

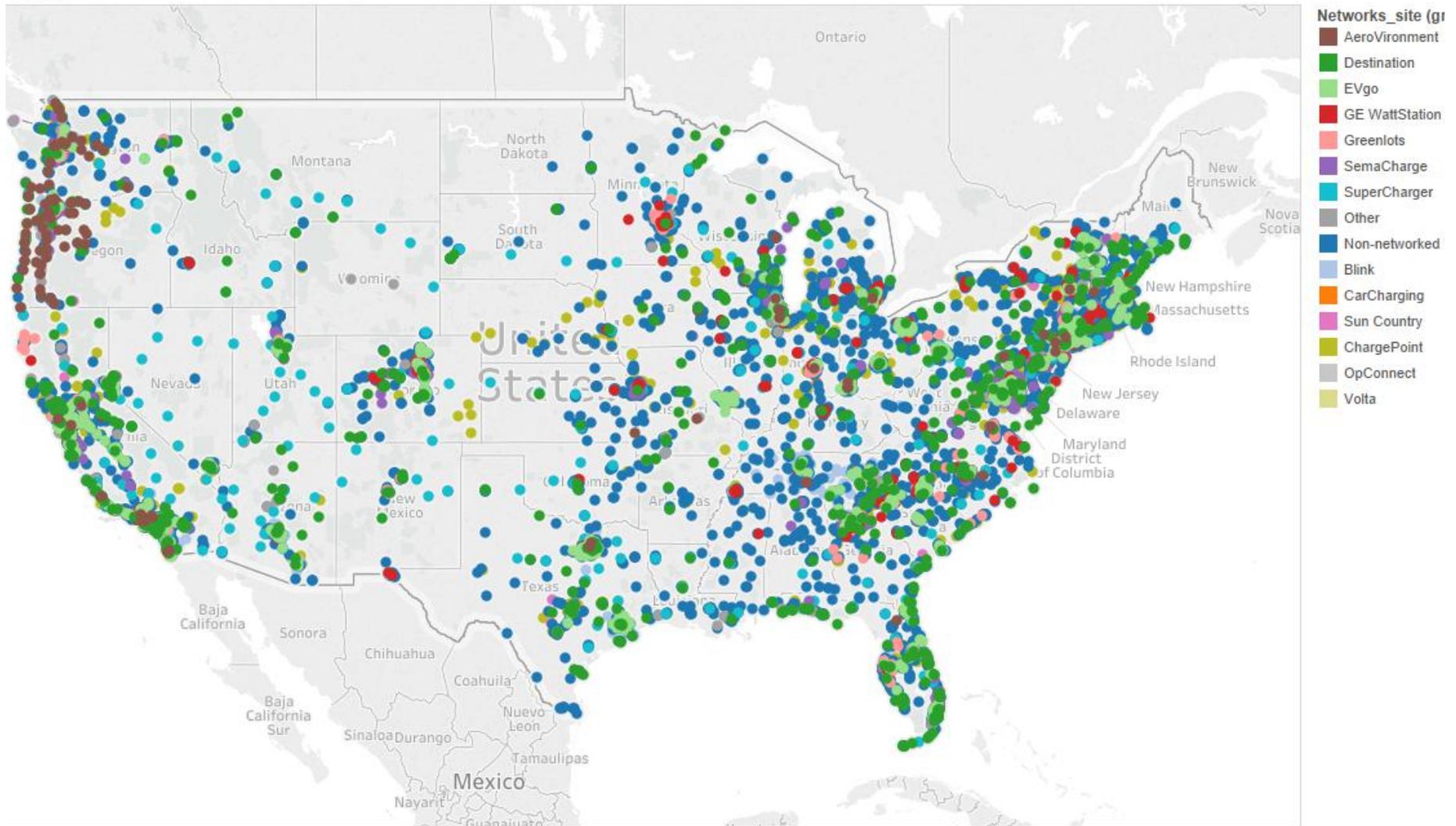


# PEV charging infrastructure is increasing



Longitude and Latitude. Color shows details about Connector type. Details are shown for # locations. The data is filtered on Country, which keeps US. The view is filtered on Connector type, which keeps CCS (SAE Combo), CHAdeMO, J-1772 and Tesla Supercharger.

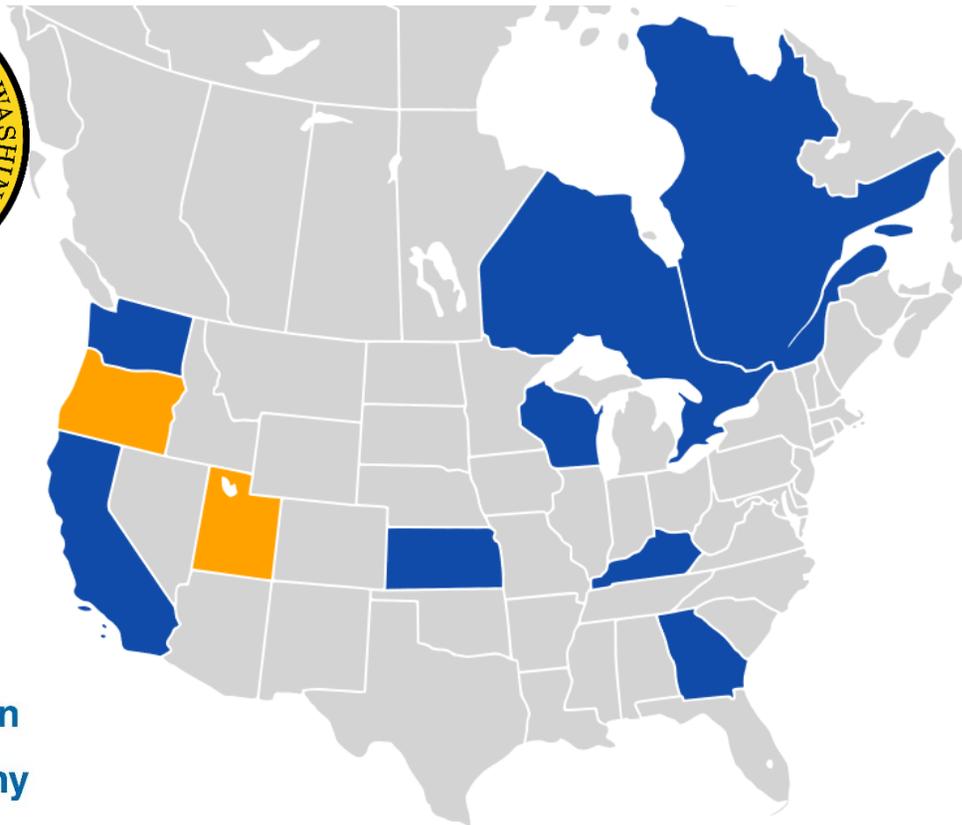
# But most public charging networks remain fragmented



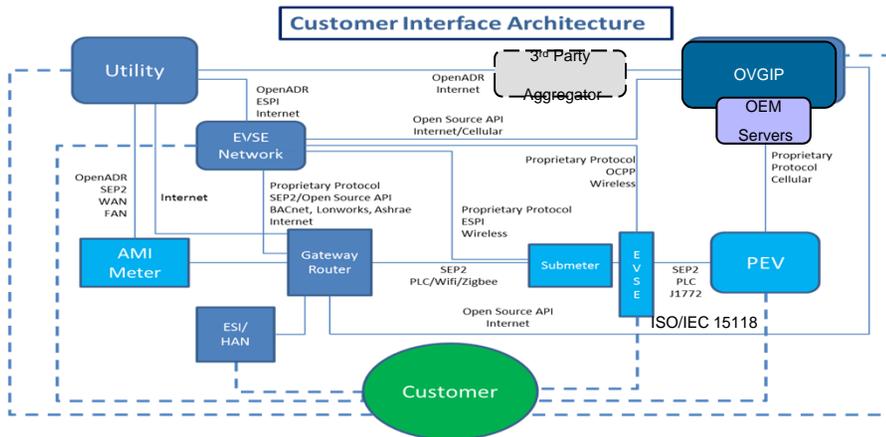
Map based on Longitude and Latitude. Color shows details about Networks\_site (group). Details are shown for # locations. The data is filtered on Connector type, Network and Country. The connector type filter keeps CCS (SAE Combo), CHAdeMO, J-1772 and Tesla Supercharger. The Network filter keeps 20 of 20 members. The Country filter keeps US.

# Utility charging infrastructure and market support

## Current activities

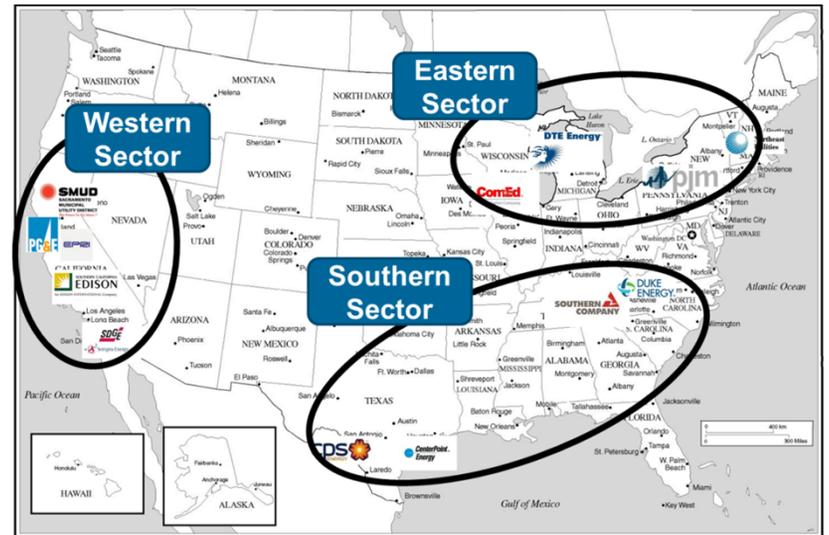
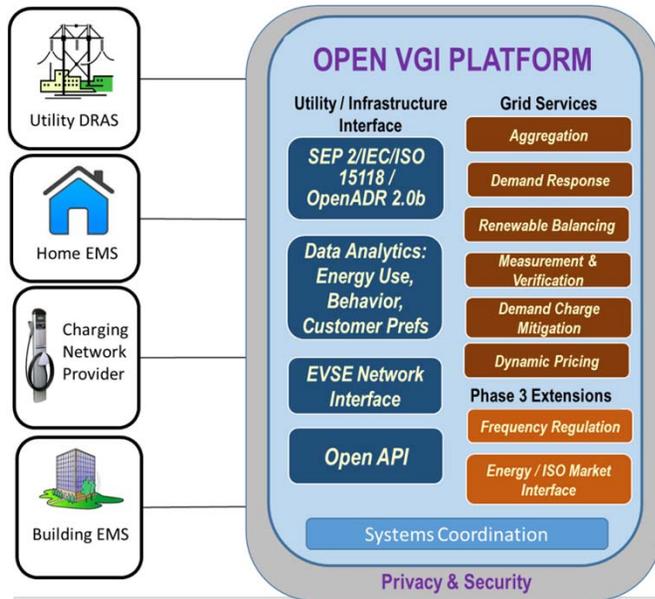


# To help the PEV market scale, need to make the complex both simple and easy for the customer



Interface to Customer can be Smart Phone APP, Website, In-Home Display, EVSE Display, or In-Vehicle Display

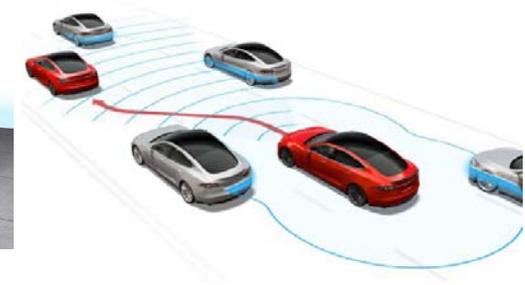
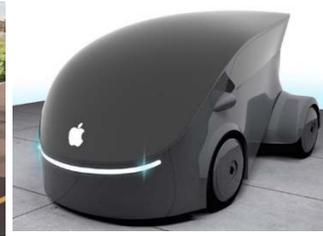
OVGIP Intends to Resolve Business and Operational Rules with Multiple Stakeholders



# What's next?

## Now and in the future

- Autonomous driving
  - Tesla, Apple, Google
- High power charging
  - Current 50 kW; future 150 kW; goal 350 kW
- Long-distance (~200 mile) mass-market battery electric vehicles
  - Chevy Bolt
  - Tesla Model 3
  - Gen 2 Nissan LEAF
- Ownership Models / Transportation On-Demand
  - Car share / Lyft / Uber





# Together...Shaping the Future of Electricity