

# Geographic Dispersion of EV Charging Considering Travel Needs, Emission Targets, and Grid Planning

## Implementing Assembly Bill (AB) 2127



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California Energy Commission Demand Analysis Working Group  
Transportation – Electric Vehicle Forecast  
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# Overview

- Background on AB 2127 Charging Infrastructure Assessment
- Need for an integrated charging network that meets needs from multiple planning objectives
  - Example: South Coast Air Quality Management District (SCAQMD) scenario for 2031 attainment
- Concept for methodology
- Request for collaboration with stakeholders via the Demand Analysis Working Group



# Public Resources Code §25229

- Biennial statewide charging infrastructure assessment to meet:
  - 5 million ZEV by 2030
  - GHG reductions to 40% below 1990 by 2030
- Expand upon the CEC's EV infrastructure projections to consider all necessary charging infrastructure:
  - Charging infrastructure
  - Make-ready electrical equipment
  - Hardware and software
  - Other programs to accelerate adoption
- Examine existing and future needs:
  - Throughout California
  - Low-income communities
- Seek data and input from stakeholders:
  - CPUC, CARB, utilities, transportation & transit agencies, electrical infrastructure, environmental groups, automobile manufacturers, and others

## *All Vehicle Categories*

- Road (On-Road)
- Highway (On-Road)
- Off-road
- Port (Seaport, Inland)
- Airport



# Variety of Stakeholder Efforts

Air Districts CARB	Reduce GHG and Criteria Pollution to Attain State & Federal Mandates	County(ies) Topography	35 Districts
Municipalities Regional Planners	Efficient Local/City/Metro Planning Climate Action Targets	City(ies) County(ies)	58 Counties 18 MPOs
CEC CPUC CAISO	Charging Infrastructure Planning Electricity Demand Forecasting Transmission Planning	Partial/Full County Service Territory Forecast Zones (FZ)	28 FZs (20 Named and 8 Other)
Utilities EV Service Providers	Distribution Grid Planning Applications and Ratemaking EVSE/Charger Installations	Service Territory Markets	53 Utilities
Residential Drivers Private Companies Public Agencies	Travel/Mobility People & Goods Movement	Intra-Regional Inter-Regional Travel Analysis Zones (TAZ)	Licenses by Class <sup>1</sup> <ul style="list-style-type: none"> <li>• Class C: 26M</li> <li>• Class A: 0.5M</li> <li>• Class B: 0.2M</li> <li>• Class M: 1.4k</li> </ul>

Territory-specific charging infrastructure needs, given land and air policy efforts that affect electrification, is unknown.

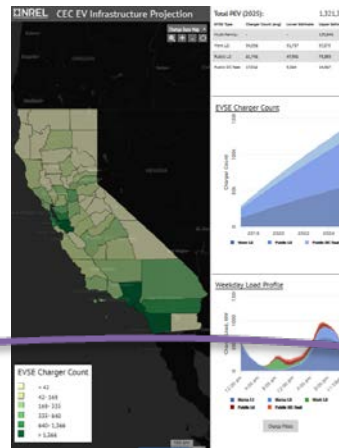


# Expanded EV Infrastructure Projections

Regulatory Requirements to Achieve GHG and Air Pollutant Reductions



Demand Forecasting  
Charger Needs Analysis  
Investment Proposals  
Grid Upgrade Planning

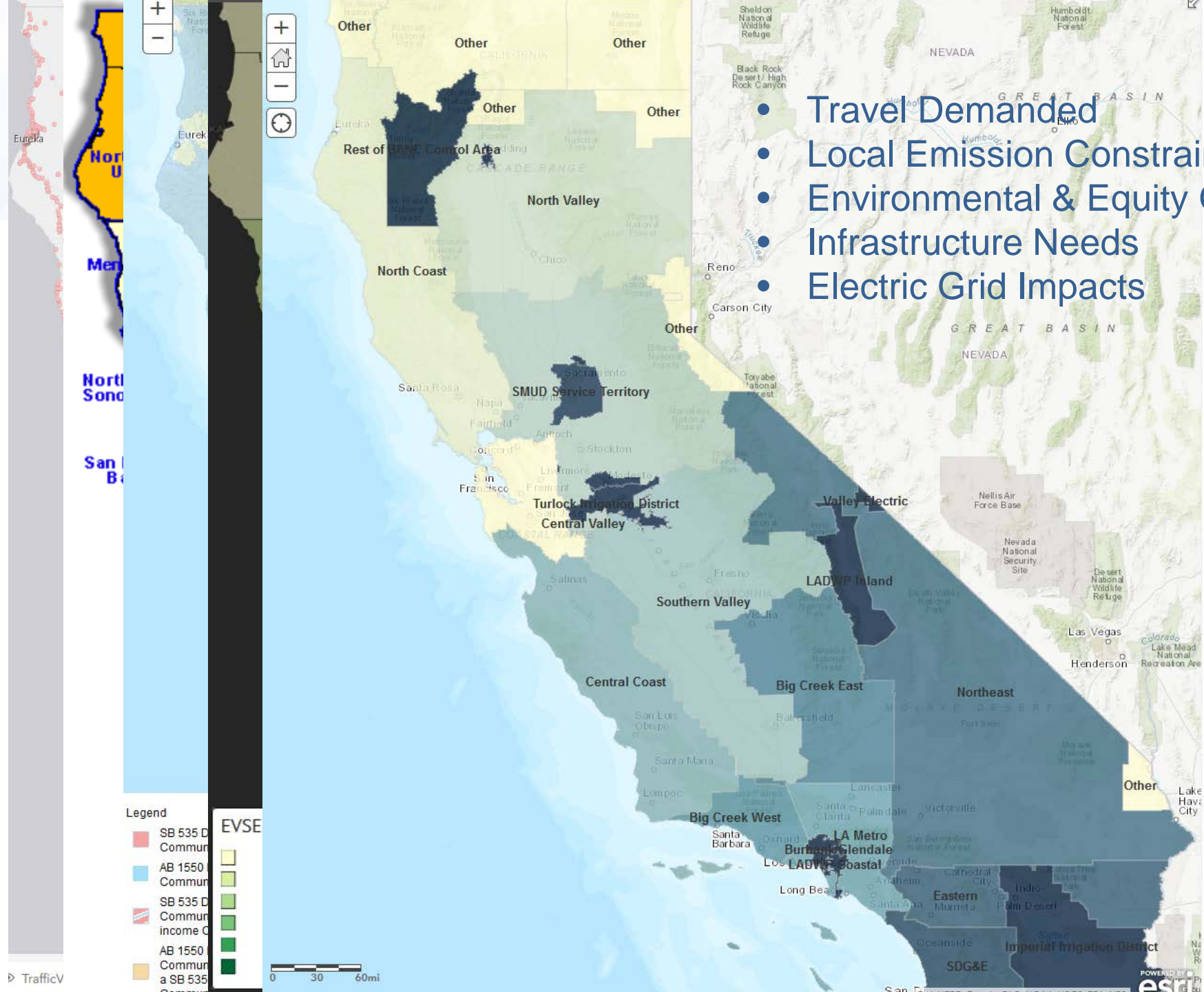


**Technology Analysis and Modeling of Needed Charging Infrastructure Throughout All of California**

Municipal Planning  
Transportation Planning  
Land Use & Conservation

Funding Deployment  
Charging Installation  
Provision of Service

- Travel Demanded
- Local Emission Constraints
- Environmental & Equity Goals
- Infrastructure Needs
- Electric Grid Impacts



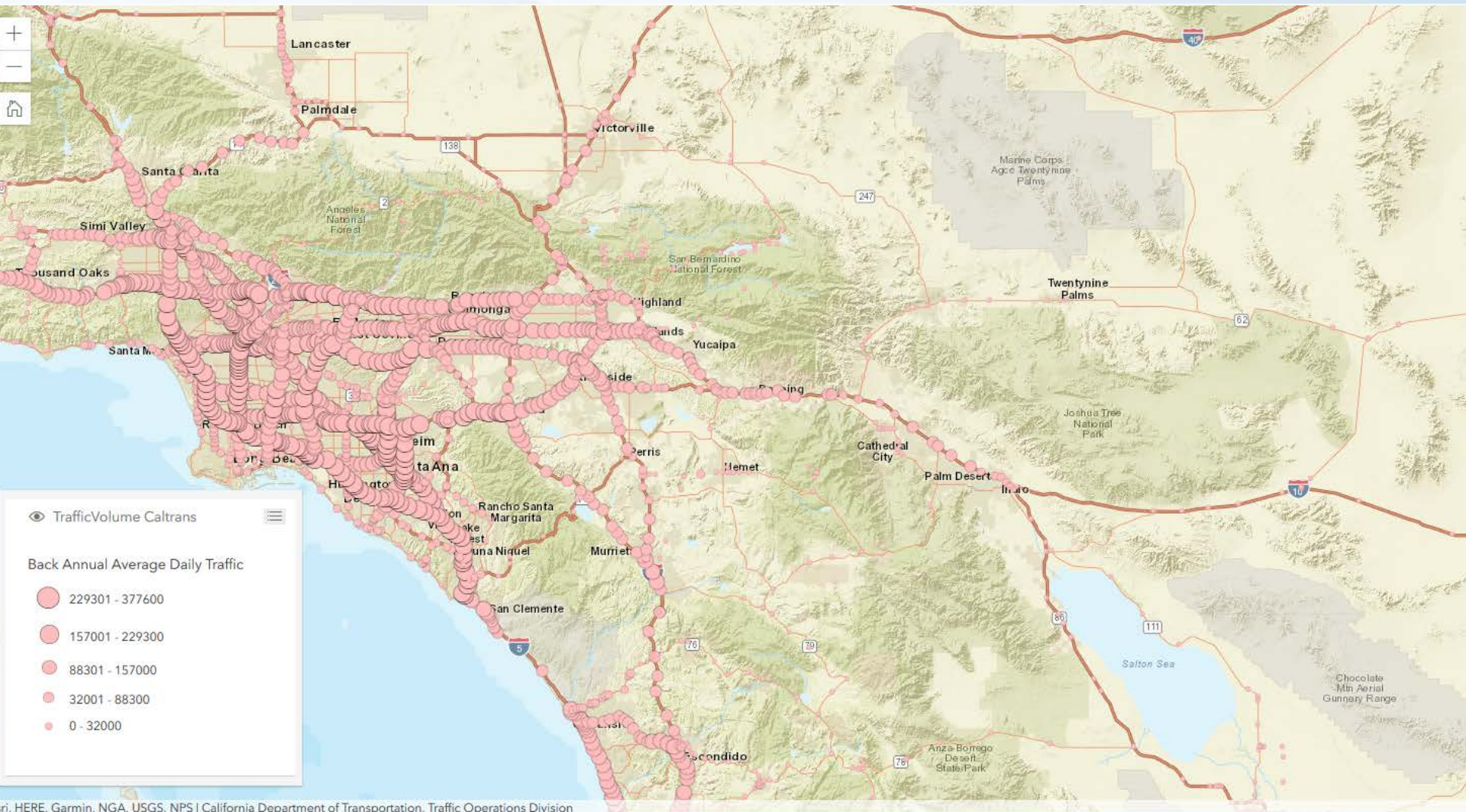
- Legend
- SB 535 D Commu
  - AB 1550 Commu
  - SB 535 D Commu
  - income C
  - AB 1550 Commu
  - a SB 535

- EVSE
- Light yellow
  - Light green
  - Medium green
  - Dark green
  - Dark blue





# Daily Traffic Volume

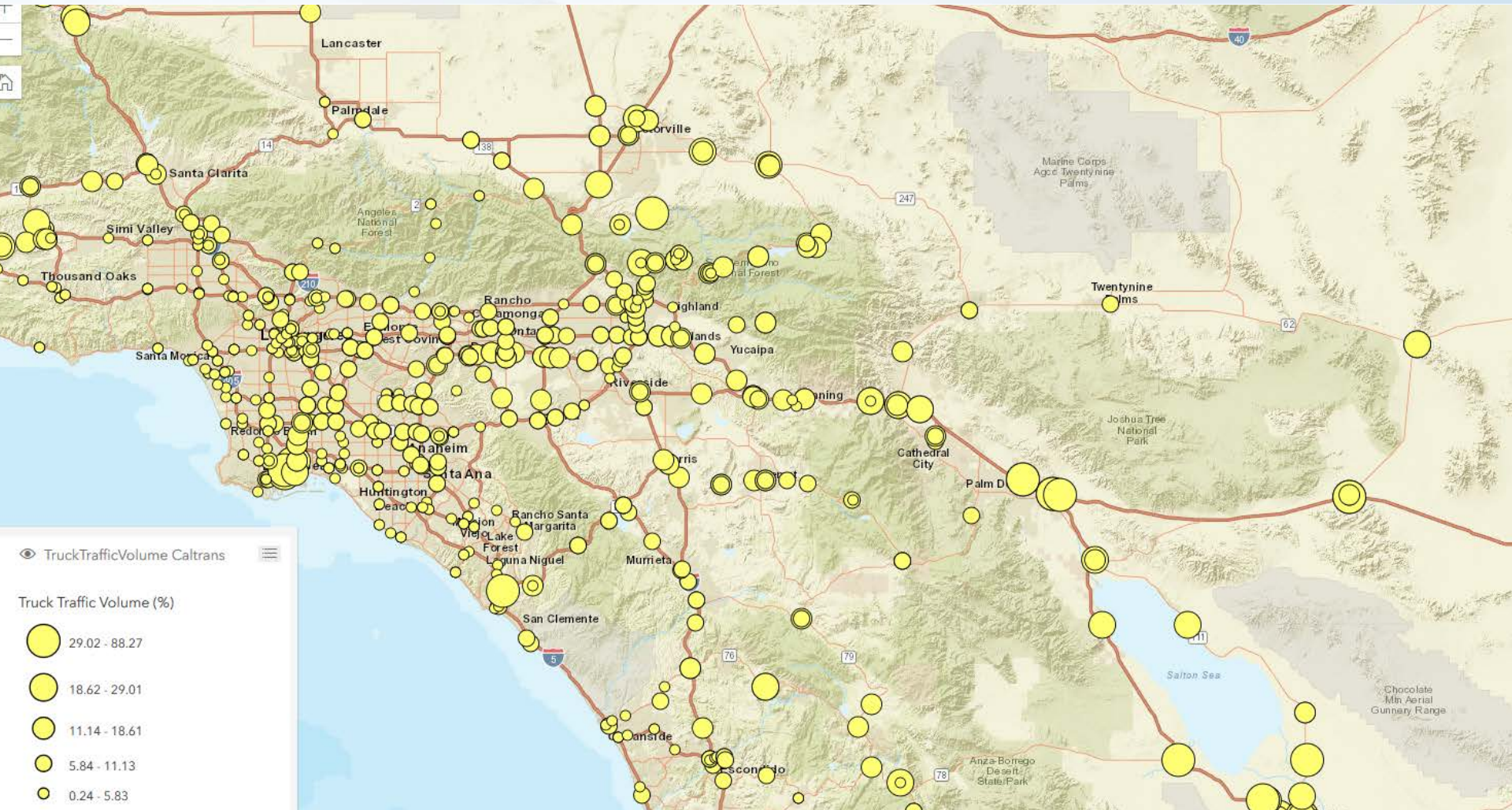


Source: HERE, Garmin, NGA, USGS, NPS | California Department of Transportation, Traffic Operations Division

[http://geohub/metadata/Transportation/TrafficVolume\\_Caltrans.html](http://geohub/metadata/Transportation/TrafficVolume_Caltrans.html)



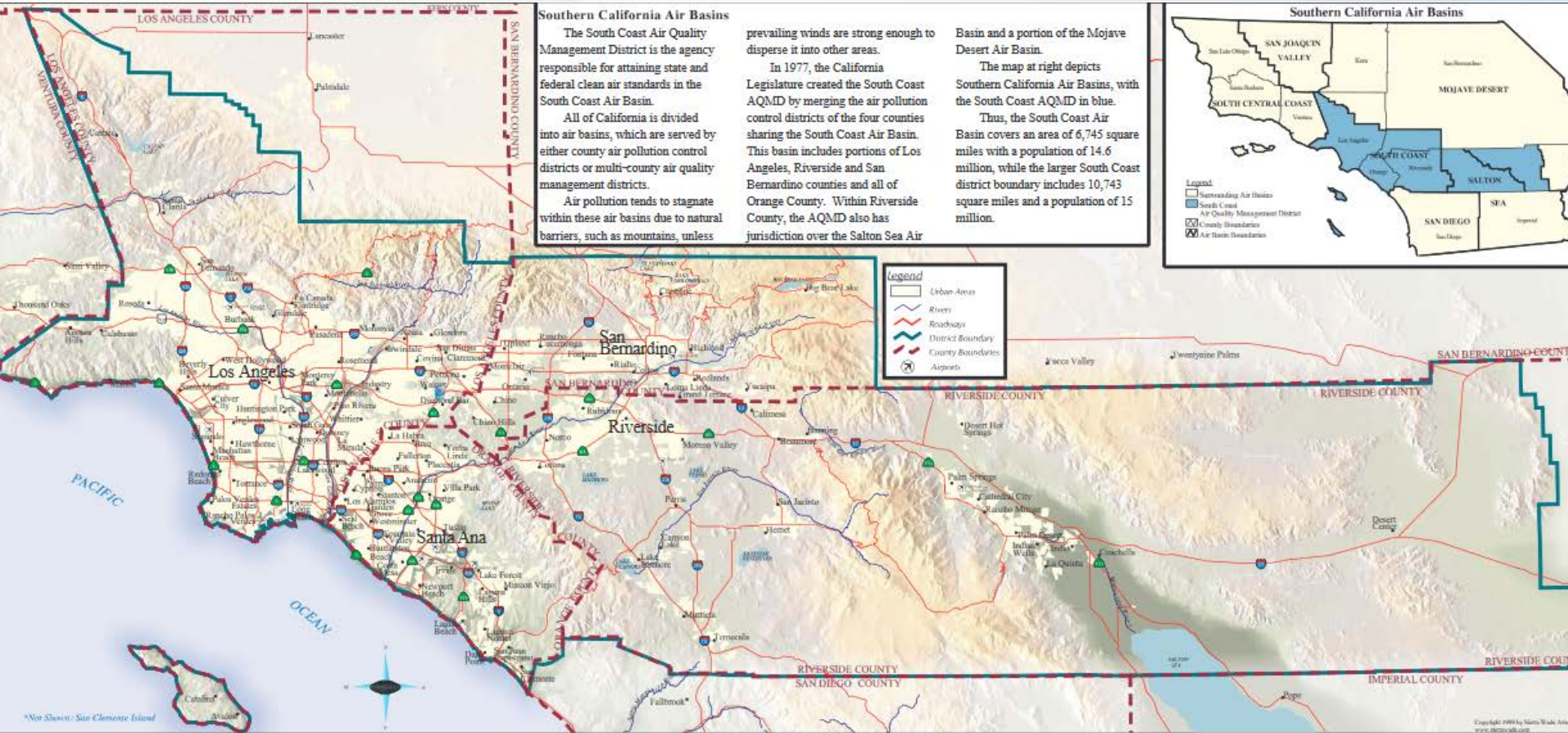
# Daily Truck Traffic Volume





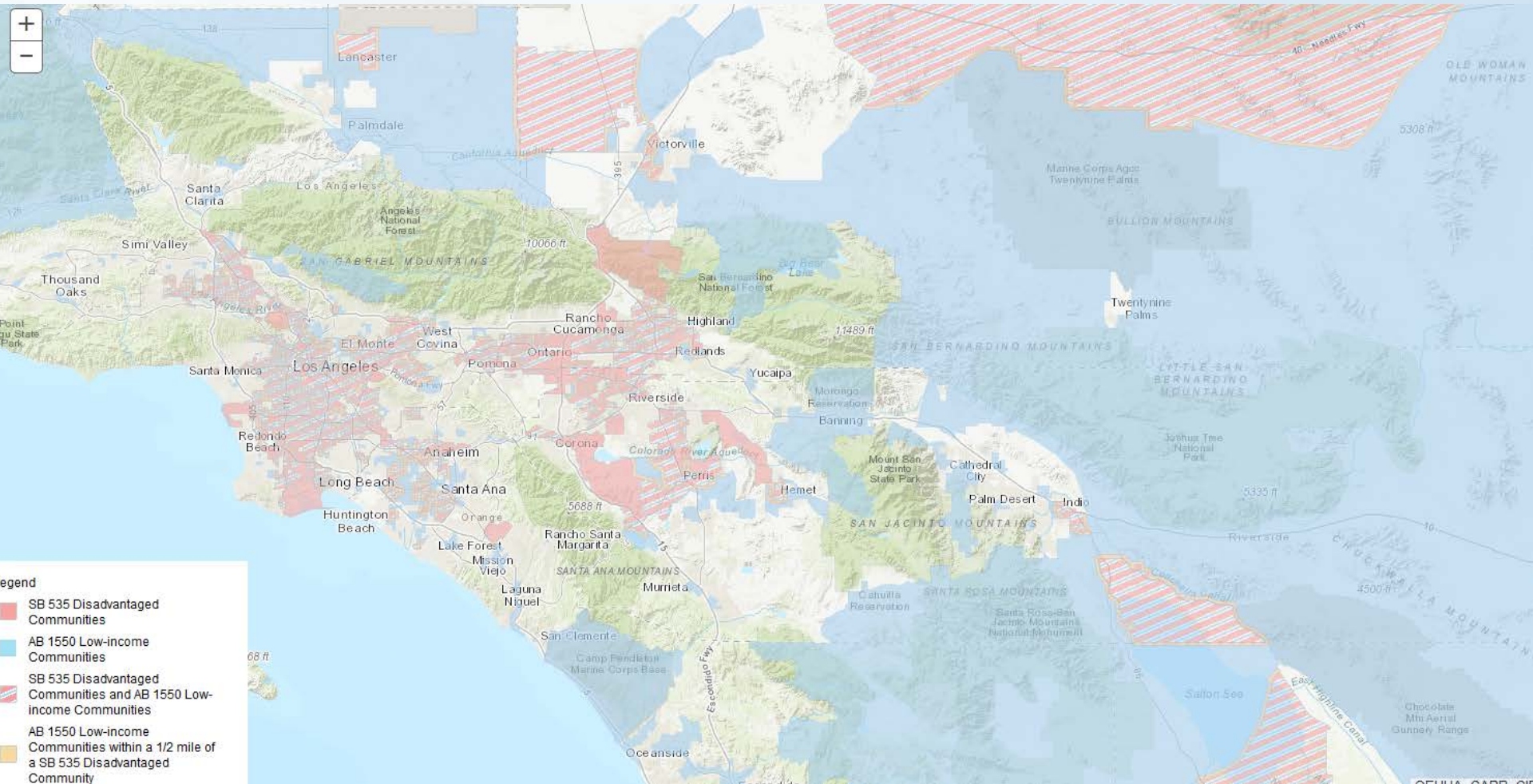


# Air Quality Management District



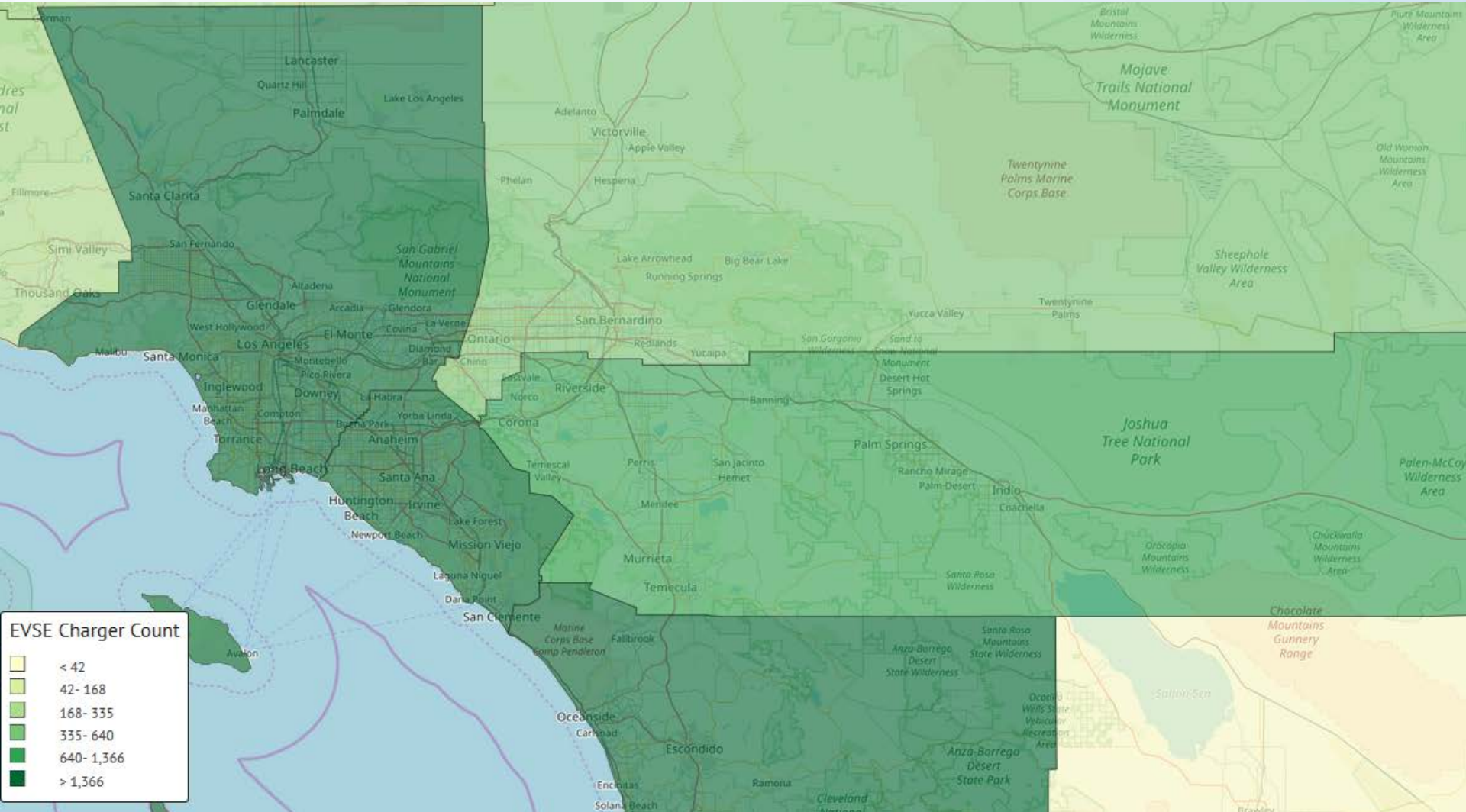


# Low-Income and/or Disadvantaged Communities



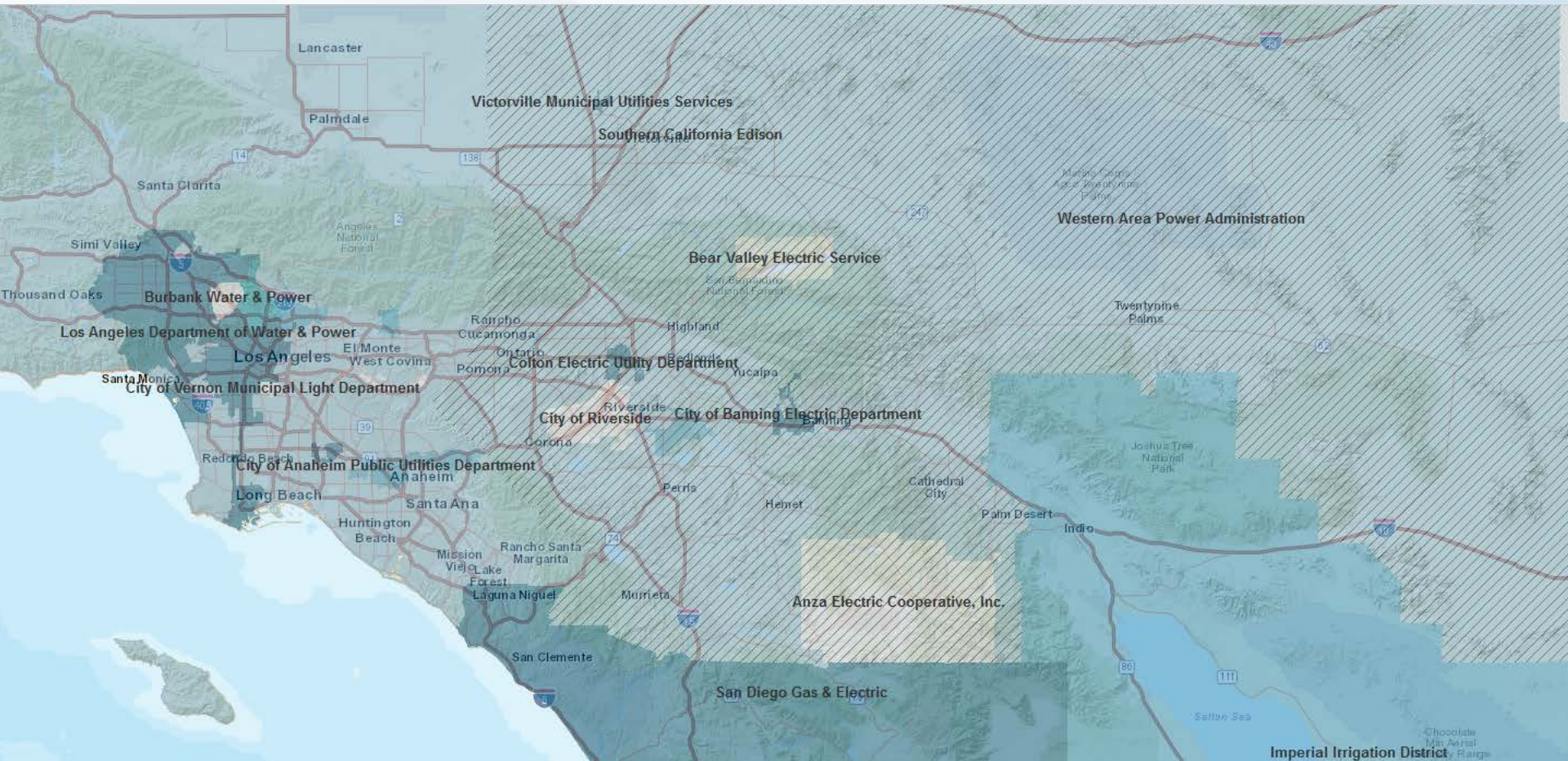


# EV Infrastructure Projections (EVI-Pro)





# Electric Utility Territories





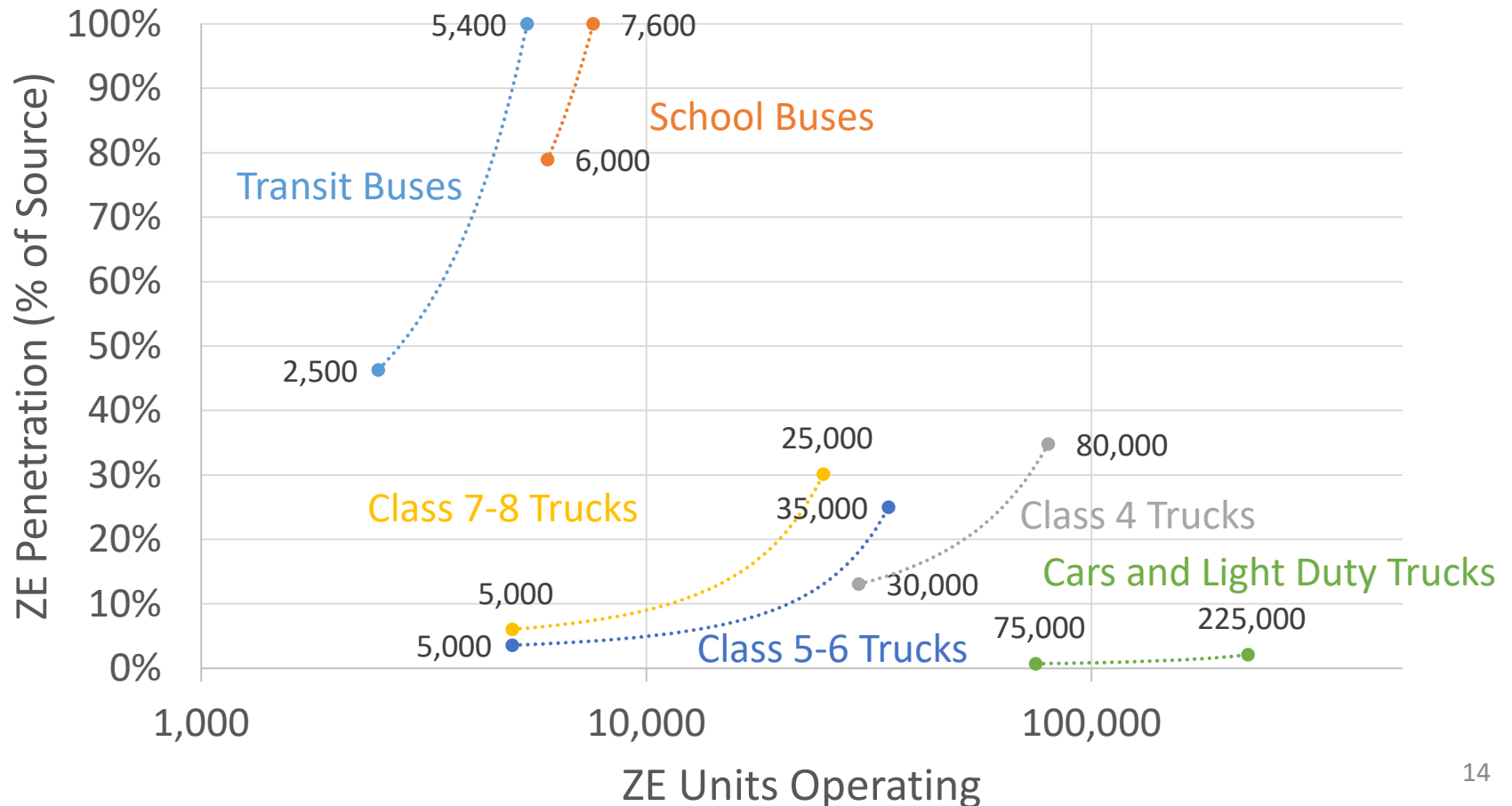
# Energy Commission Forecast Zones





# Scale of Turnover for 2031 Federal Ozone Standards (Road Vehicles)

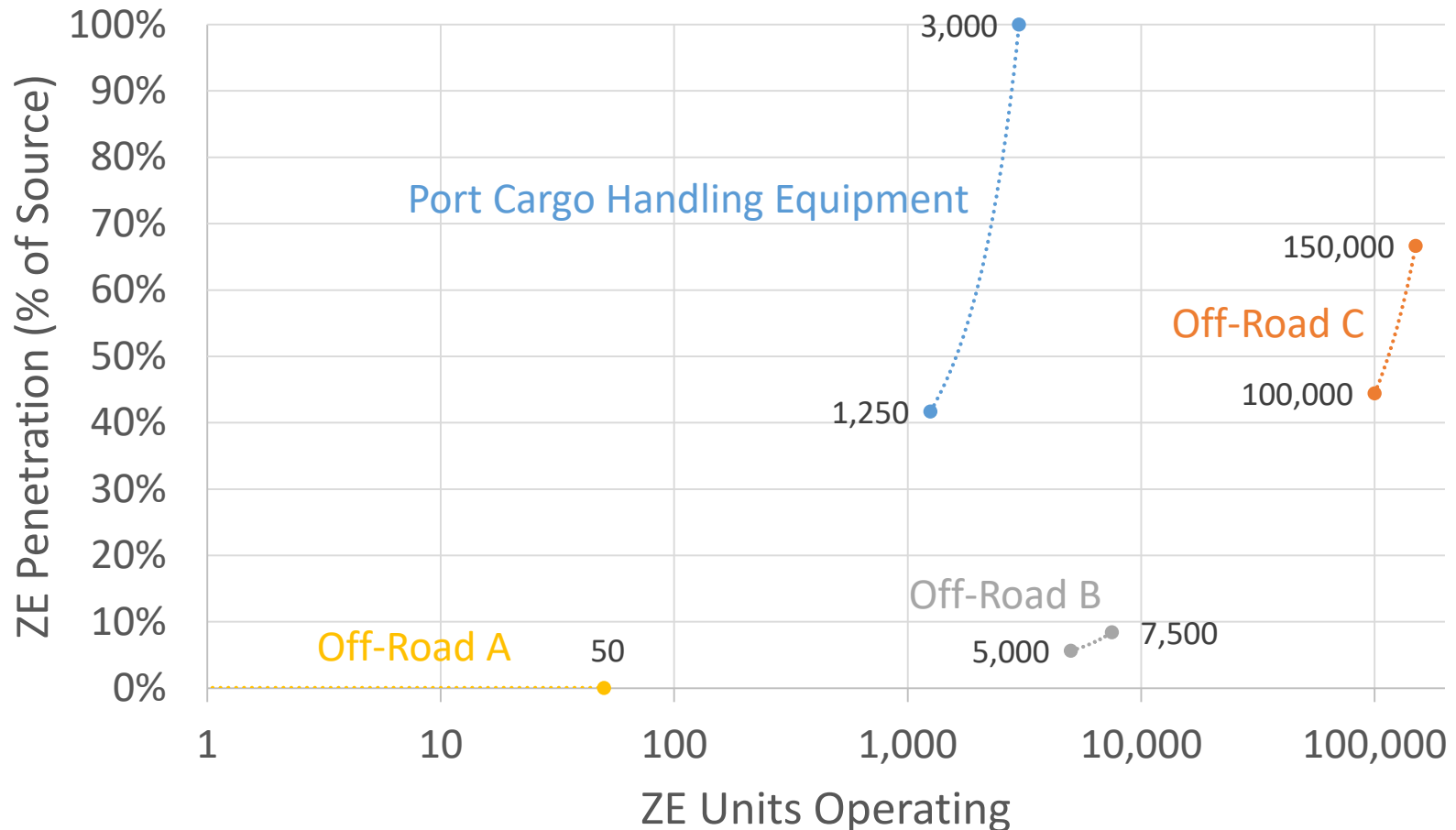
Replacement of On-Road Sources to Zero Emissions between 2021-2026 & 2026-2030





# Scale of Turnover for 2031 Federal Ozone Standards (Off-Road & Port Vehicles)

Replacement of Off-Road and Port Sources to Zero Emissions between 2021-2026 & 2026-2030



**Southern California Association of Governments**

**South Coast AQMD**

**Mojave Desert AQMD**

**Electric Distribution Utilities**

Colorado River Indian Irrig. Pj.

**Colton**

Rancho Cucamonga

Bear Valley Electric Svc.

**Victorville**

Aha Macav Power Service

**SCE**

**Needles**

- CEC Forecast Zones**
- Burbank Glendale
  - Eastern
  - Imperial
  - LA Metro
  - LADWP Coastal
  - LADWP Inland
  - Needles
  - Northeast
  - SDG&E

**San Bernardino County (24 Cities)**

**Anza**

**Banning**

**Corona**

**Riverside**

Moreno Valley

Imperial Irrig. Dist.

**SCE**

**Riverside County (28 Cities)**

**Antelope Valley AQMD**

**Burbank**

**Glendale**

**Los Angeles**

**Los Angeles**

**Pasadena**

**Vernon**

**SCE**

**Azusa**

**Los Angeles County (88 Cities)**

**SDG&E**

**Anaheim**

**Intersection of Land, Air, and Grid Stakeholders (Southern California)**

**Orange County (34 Cities)**





# Concept for Analyzing the Distribution of Charging in an “Attainment Scenario”

Travel Demand → Vehicles Use → Infrastructure Need<sup>1</sup>

Inputs	Land Use Plans	Air Quality Constraints	Integration Capacity Analysis
	O/D Surveys	State/Local GHG Reductions	(ICA) Maps
	DMV Database		Distribution Planning
	Vehicle Inventories		
Analyses	VMT Sensitivity	Markets for Electrification	Customer Fleet Sites
		Environmental & Equity Goals	Public Charging Corridors
Outputs			# of Sites with Charging
			Density of Corridor Needs
			Electricity Load Profiles
			Territory Grid Upgrades

1. See page 32 of CEC presentation during March 11, 2019 Workshop on AB 2127

O/D = Origin/Destination, VMT = Vehicle Miles Travelled



# Request and Discussion: A Need for Collaborative Analyses

- Goals: Improve regional estimates of EV infrastructure needs and improve its representation as electric demand
- Feedback from stakeholders and members of the of the Demand Analysis Working Group
  - Refine stakeholders' analytical needs
  - Volunteers to partner with CEC and other agency staff (and consultants) on location-specific analysis
  - Develop improved forecast allocation methodology
  - Identify and share datasets

# Thank you!

**For more on AB 2127, please visit:**

[Docket 19-IEPR-04](#)

Staff Workshops regarding:

[On-Road Electrification](#)

[Off-Road, Port, and Airport Electrification](#)

Formally [submit](#) a comment.

**For questions, please contact:**

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