

**DOCKETED**

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# Local EV Infrastructure Siting: Research from the UCLA

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# Some Objectives

- **Siting charging stations to**
  - maximize utilization
  - Support TNCs
  - Gap analysis by landuse categories
- **Serving Disadvantaged Communities**
- **Future research**
  - TNCs support
  - Incorporating utilization data
  - Evaluating impacts of legal settlements, IOU programs and other investment initiative

# Recent Work: Overview

- **2016**

- Factors Affecting Plug-in Electric Sales in California
- Overcoming Barriers to Electric Vehicle Charging in Multi-unit Dwellings: A Westside Cities Case Study

- **2017**

- Design and Implementation of the Enhanced Fleet Modernization Plus-Up Pilot Program
- Siting Analysis for Plug-in Electric Vehicle Charging Stations in the City of Santa Monica

- **Current**

- Southern California Plug-in Electric Vehicle Readiness Atlas: 2017 Update

# Coming Research:

- **Upcoming**

- Understanding Differences in Growth Across the California Electric Vehicle Charging Station Market: 2010-2017
- Estimating Health Benefits, Comparative Cost-Effectiveness and Distributional Equity from California's Largest Grassroots Transport-Focused Environmental Justice Initiative in the San Joaquin Valley: Tune In & Tune Up

- **Future**

- Identifying the Charging Demand of Electric Rideshare Vehicles

# Outline: Examples Santa Monica

- Local growth of PEVs
- Targeting:
  - Workplace charging
  - Commercial Retail Charging
  - Curbside Charging
  - Multi-unit Dwellings

# Future research

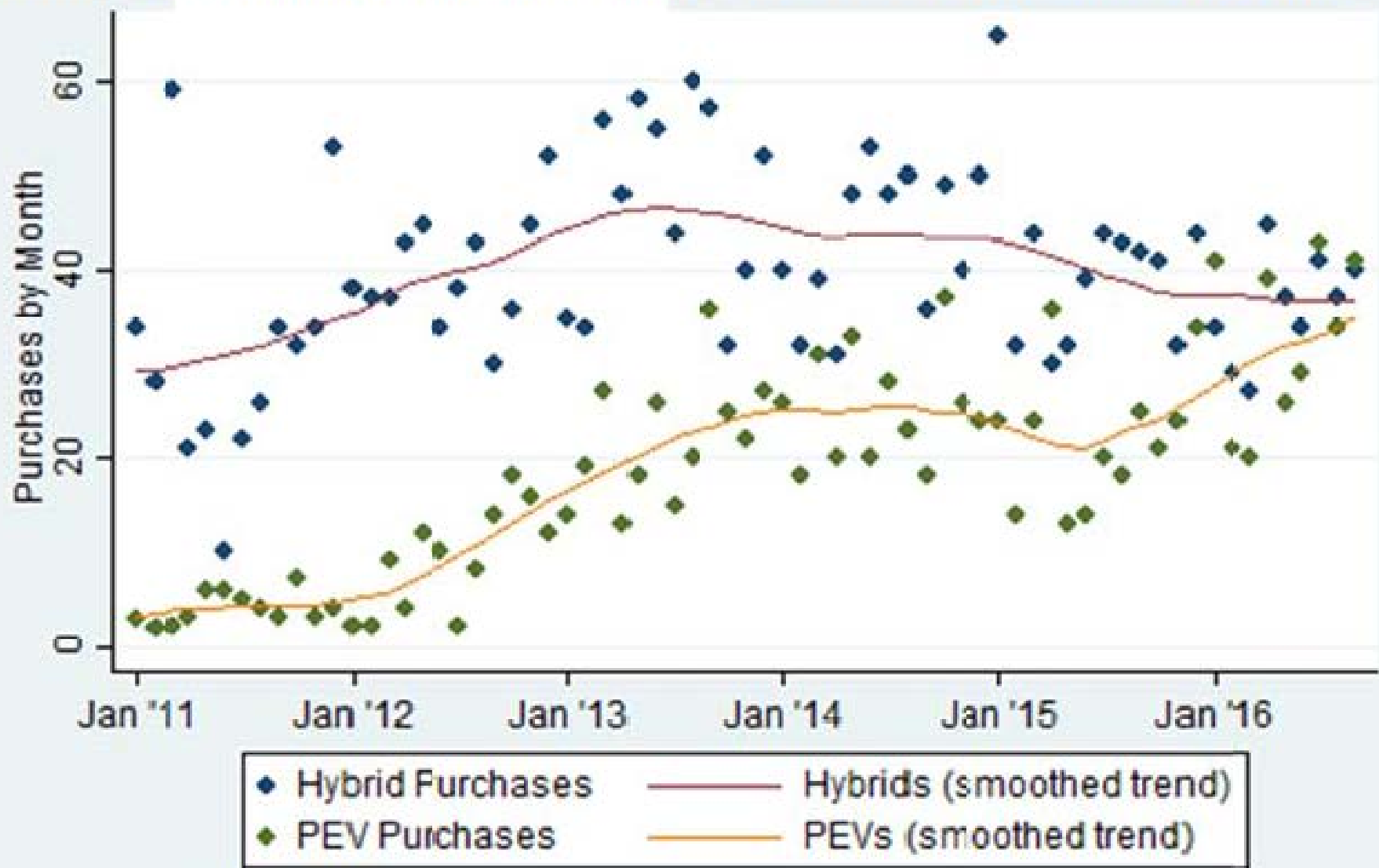
# Future research

- **TNCs support,**
- **Incorporating utilization data,**
- **Evaluating impacts of legal settlements, IOU programs and other investment initiative**
- **Ultra-fast charging: innovation in the MUD space**

# Local Plug-in Electric Vehicle Growth

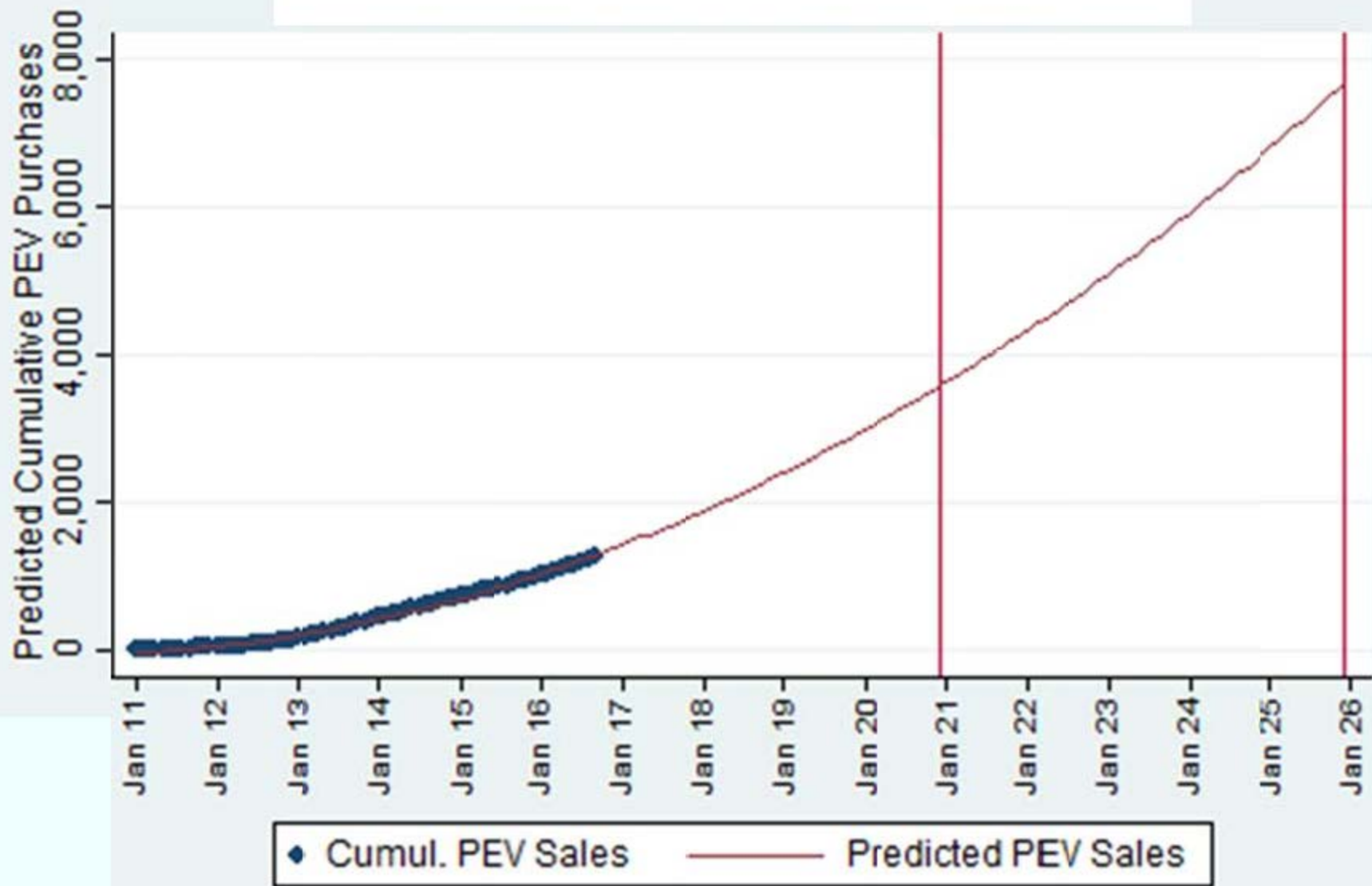


# Figure 2. Monthly Hybrid and PEV Purchases in Santa Monica



Source: IHS Auto

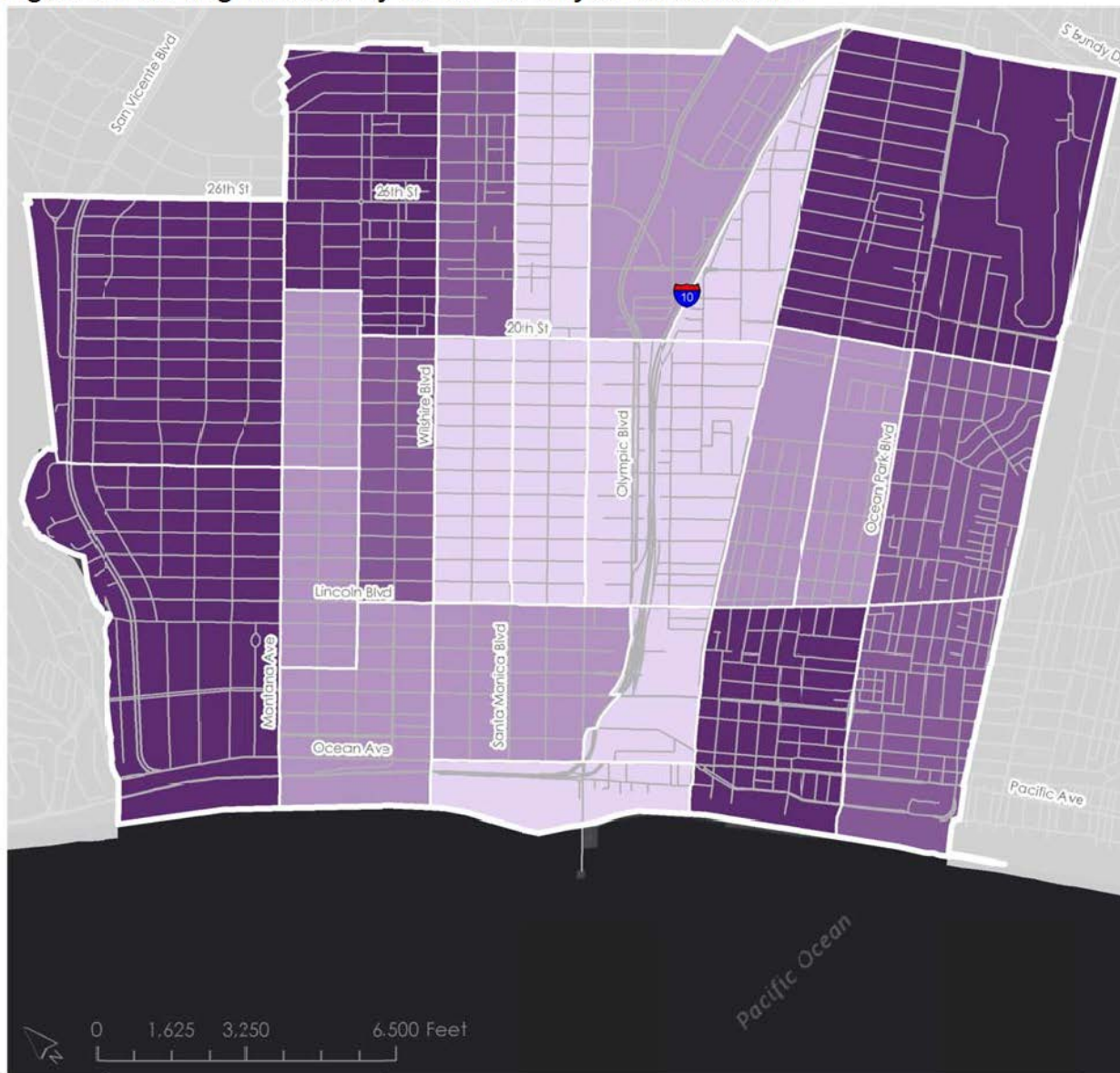
Figure 5. Predicted Cumulative PEV Purchases in Santa Monica (Since December 2010)



Source: IHS Auto

# Highly spatially resolved analysis

Figure 6. PEV Registrations by TAZ in the City of Santa Monica

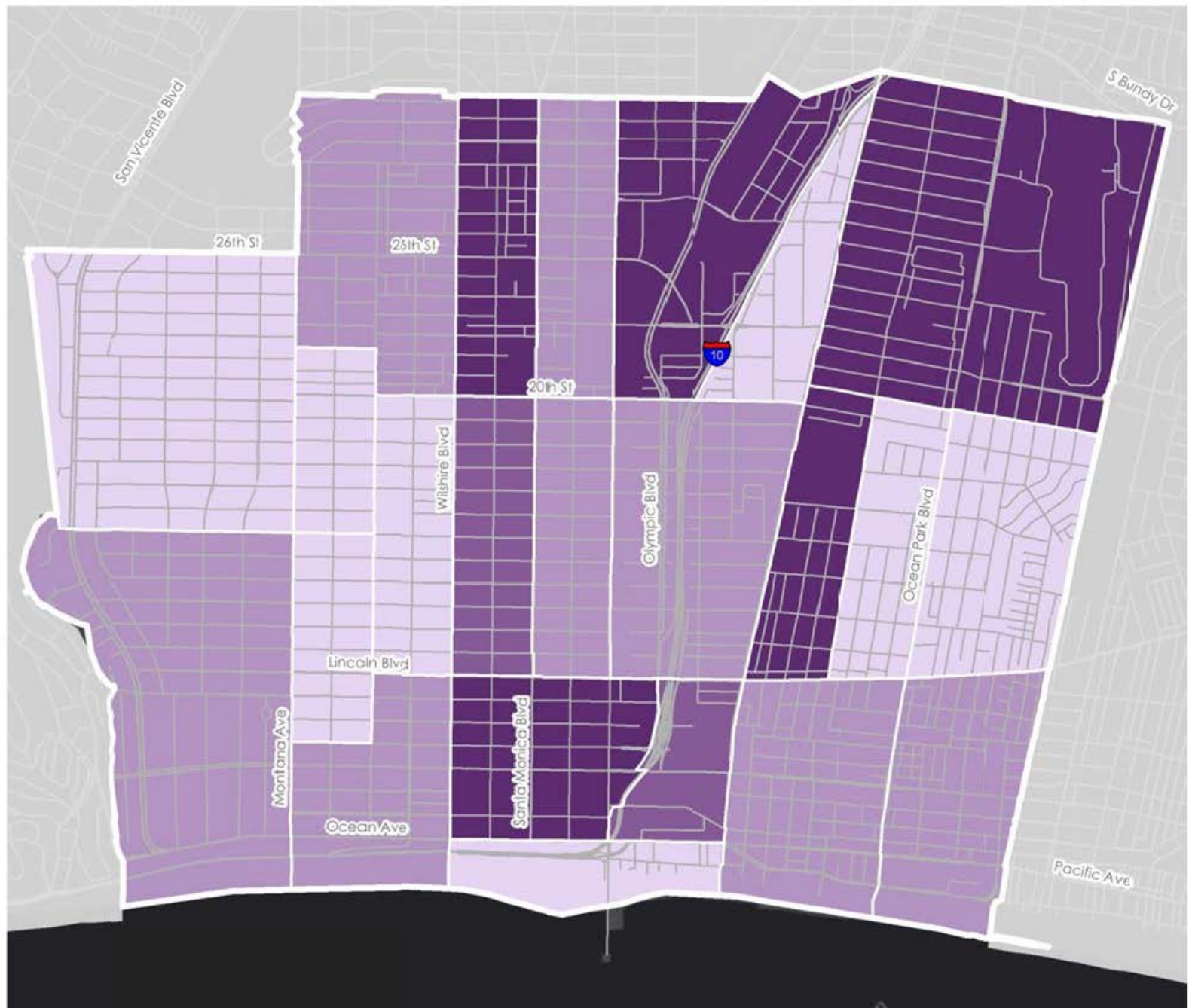


**PEV Registrations**



Datasources: 12/2010 - 9/2016 PEV New Registration (2017 IHS Automotive); Tier 1 TAZs for the 2012-2035 Regional Transportation Plan (2015 SCAG); ArcGIS Online (2017 ESRI). Map prepared by Norman Wong, UCLA Lewis Center for Regional Policy Studies

Figure 7. PEV Destinations between 6AM and 9AM by TAZ in the City of Santa Monica



# Targeting Workplace Charging

Figure 10. Locations of Publicly-accessible Charging Stations across Santa Monica



Figure 9. PEV Destinations between 9AM and 3PM by TAZ in the City of Santa Monica



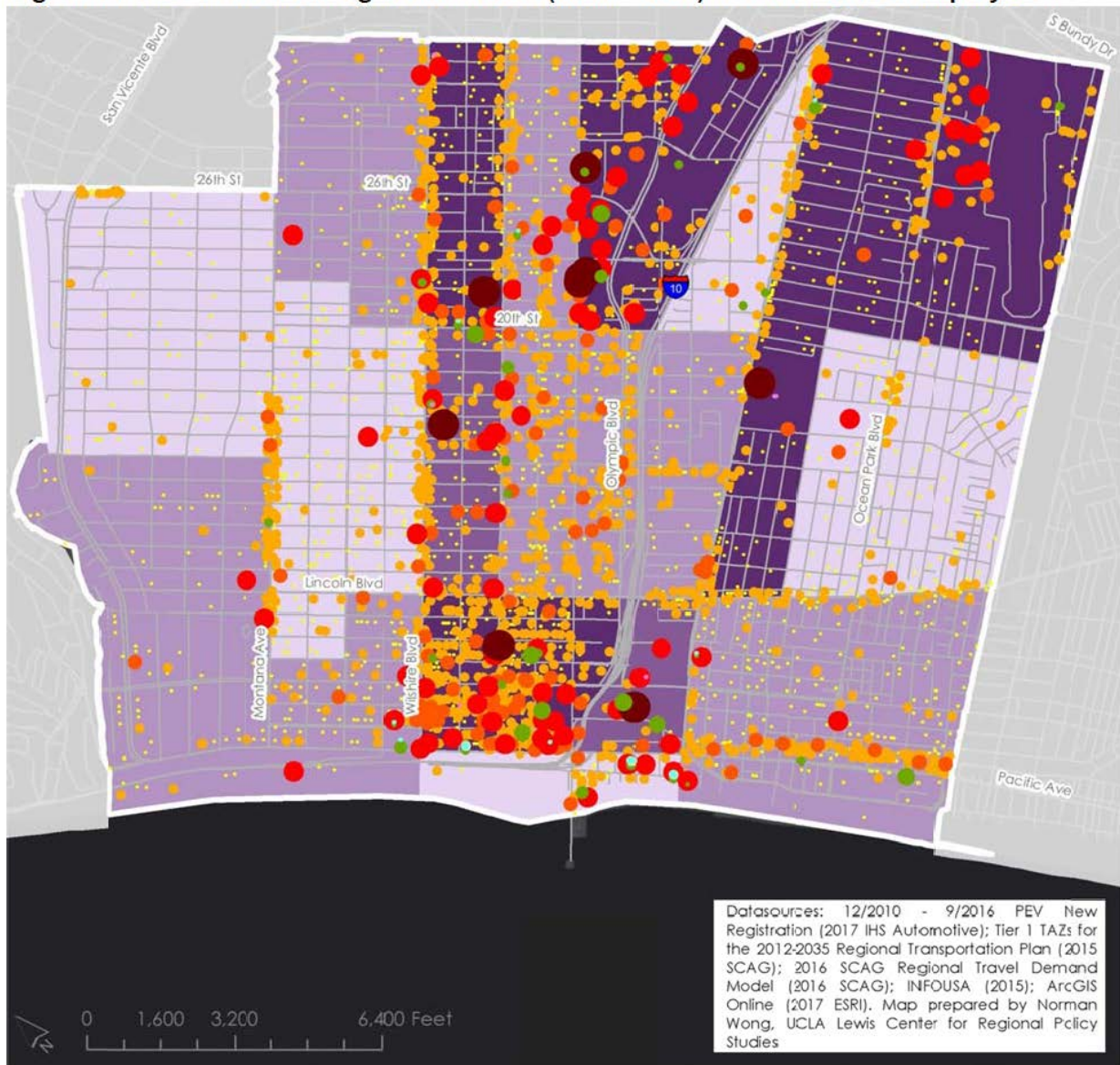
**Number of Employees**

- 1 - 5
- 6 - 50
- 51 - 100
- 101 - 500
- 500 +

Datasources: INFOUSA (2015); ArcGIS Online (2017 ESRI). Map prepared by Norman Wong, UCLA Lewis Center for Regional Policy Studies



Figure 11. PEV Peak Morning Destinations (6AM – 9AM) and Number of Employees



PEV AM Peak Destinations	Number of Employees	Level 1	Level 2	DC
< 50	1 - 5	1 - 2	1 - 2	1 - 2
51 - 75	6 - 50	3 - 7	3 - 7	3 - 7
76 - 100	51 - 100	8 - 10	8 - 10	8 - 10
> 100	101 - 500	11+	11+	11+

Figure 12. Top 25 Workplace Sites that do not Currently Host On-site Charging



▲ Top 25 Workplace Sites

Level 1	Level 2	DC
● 1-2	● 1-2	● 1-2
● 3-7	● 3-7	● 3-7
● 8-10	● 8-10	● 8-10

# Targeting Commercial/Retail Charging

Figure 13. Commercial Land Uses in the City of Santa Monica



**Commercial Destinations**

- Regional Shopping Center
- Retail Centers
- Modern Strip Development
- Older Strip Development

Datasources: 2012 SCAG Land Use (2017 SCAG); ArcGIS Online (2017 ESRI). Map prepared by Norman Wong, UCLA Lewis Center for Regional Policy Studies

Figure 14. PEV Mid-Day (9AM – 3PM) Destinations and Commercial Locations



PEV Mid-Day Destinations	Commercial Destinations	Level 1	Level 2	DC
< 50	Regional Shopping Center	1 - 2	1 - 2	1 - 2
51 - 75	Retail Centers	3 - 7	3 - 7	3 - 7
> 75	Other Commercial	8 - 12	8 - 12	8 - 12

Figure 15. Top 25 Commercial Sites that do not Currently Host On-site Charging

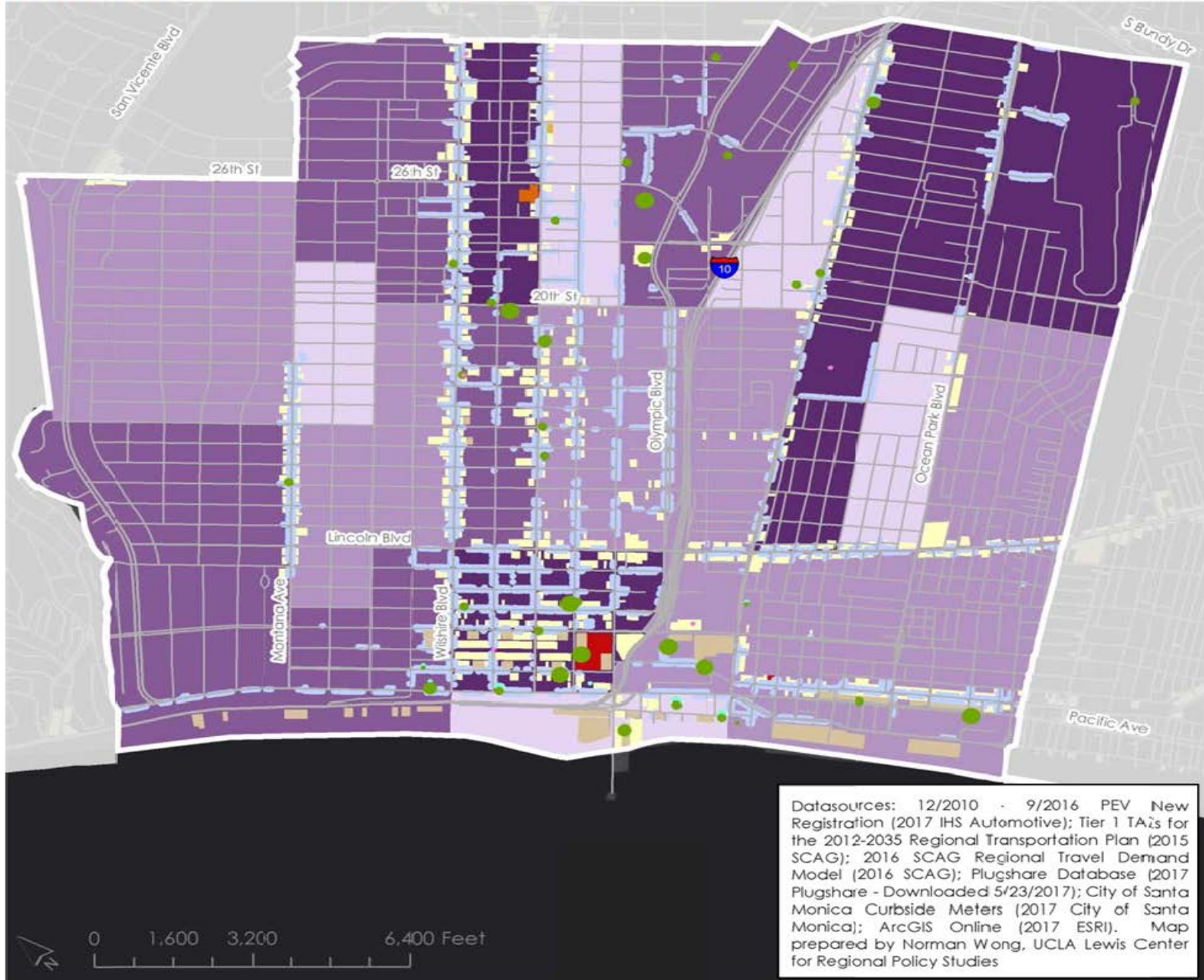


Top 25 Commercial Sites	Level 1	Level 2	DC
	1 - 2	1 - 2	1 - 2
	3 - 7	3 - 7	3 - 7
	8 - 10	8 - 10	8 - 10

Datasources: 9/2016 PEV New Registration (2017 IHS Automotive); Tier 1 TAZs for the 2012-2035 Regional Transportation Plan (2015 SCA3); 2014 SCAG Regional Travel Demand Model (2014 SCAG); 2012 SCAG Land Use (2017 SCAG); ArcGIS Online (2017 ESRI); Public Lots (City of Santa Monica Open Data Portal); Top sites generated by the Luskin Center. Map prepared by Norman

# Targeting Curbside Charging

Figure 16. Meter Locations across the City of Santa Monica



PEV Mid-Day Destinations	Commercial Destinations	Meters	Level 1	Level 2	DC
< 50	Regional Shopping Center	1 - 2	3 - 7	1 - 2	1 - 2
51 - 75	Retail Centers	3 - 7	1 - 2	3 - 7	3 - 7



# Targeting Multi-unit Dwellings/Multi-family

Figure 17. Multi-Unit Residential Land Uses across the City of Santa Monica



**Multi-Unit Residential**

- Multi-Unit (General)
- Duplexes/Triplexes

- Low-Rise Apt/Condos/Townhomes
- Mixed Multi-Family

- Medium-Rise Apts/Condos
- High-Rise Apts/Condos

Figure 18. MUDs with the Highest Propensity to Purchase Scores in Santa Monica



**Propensity to Purchase**

- Top 5%
- Top 10%
- Top 15%

Datasources: Propensity rankings generated by Luskin Center using income and housing pricing information from the Census, CA PEV rebate data, and building units from the 2016 LA County Assessor's Office (2017 Luskin Center); ArcGIS Online (2017 ESRI). Map prepared by Norman W. [unreadable]