

# What is driving the U.S. electric vehicle market?

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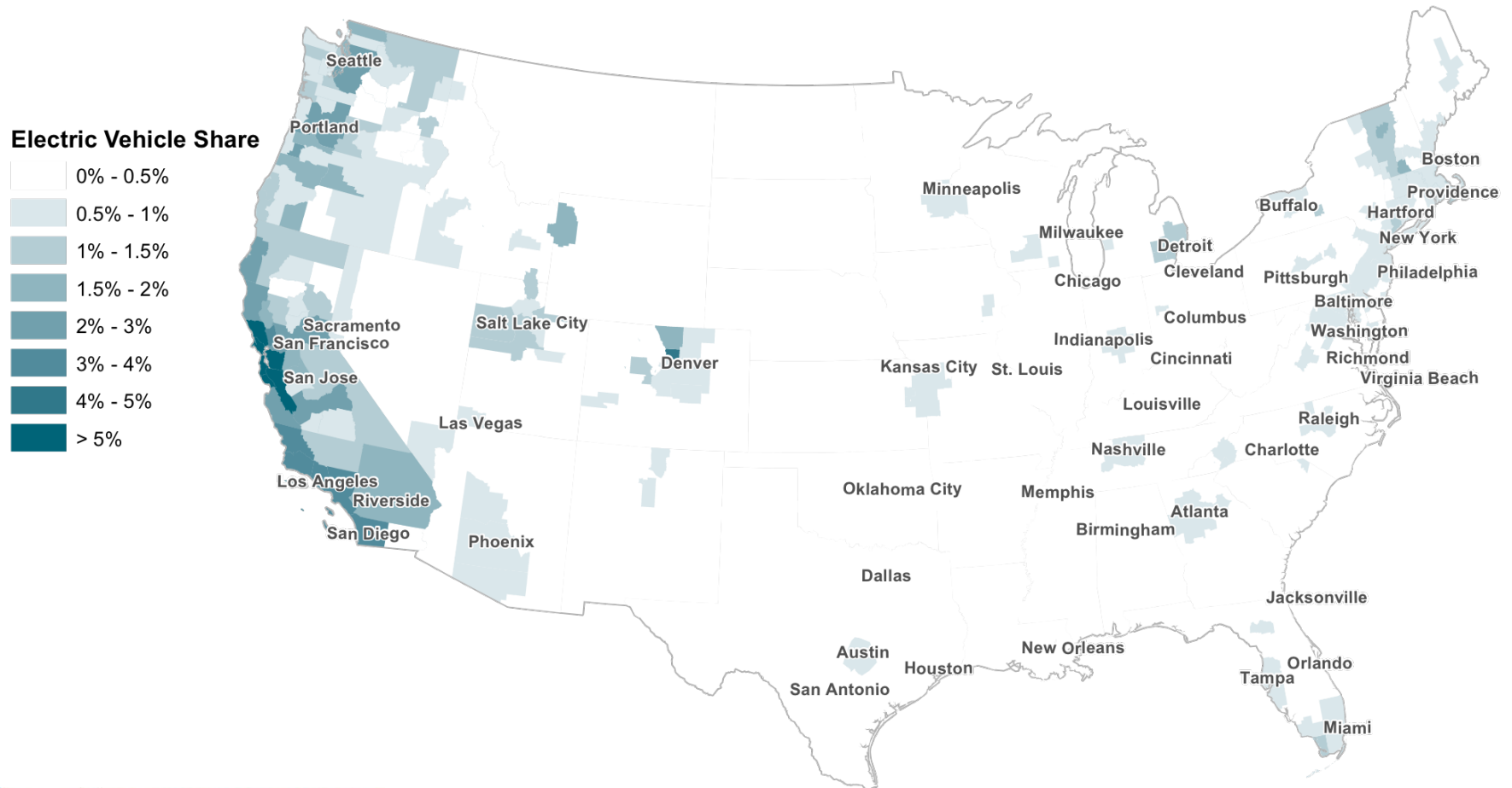
# U.S. city electric vehicle project scope

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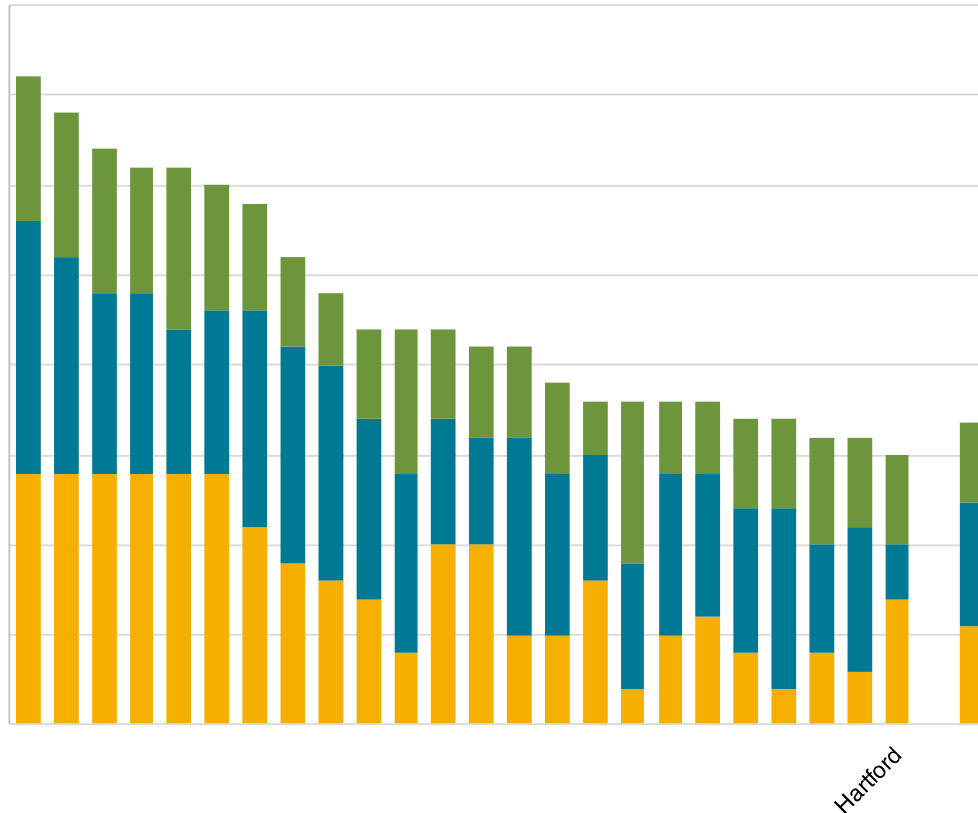
- Scope of analysis
  - Analyze U.S. metropolitan areas (focus on top 50 most populous)
  - Catalogue EV actions on many different dimensions (local policy, state policy, electric charging infrastructure, utility support)
  - Evaluate consumer benefits from EV policies
  - Analyze BEV and PHEV sales in 2016
  - Assess statistical connection between local action and EV sales

# U.S. metropolitan area electric vehicle uptake

- EV uptake across 50 metro areas: from 0.2% up to 10% of new vehicle sales
- What's driving U.S. city EV uptake? (local/state policy, incentives, charging, etc)



# Actions to promote electric vehicles across the U.S.



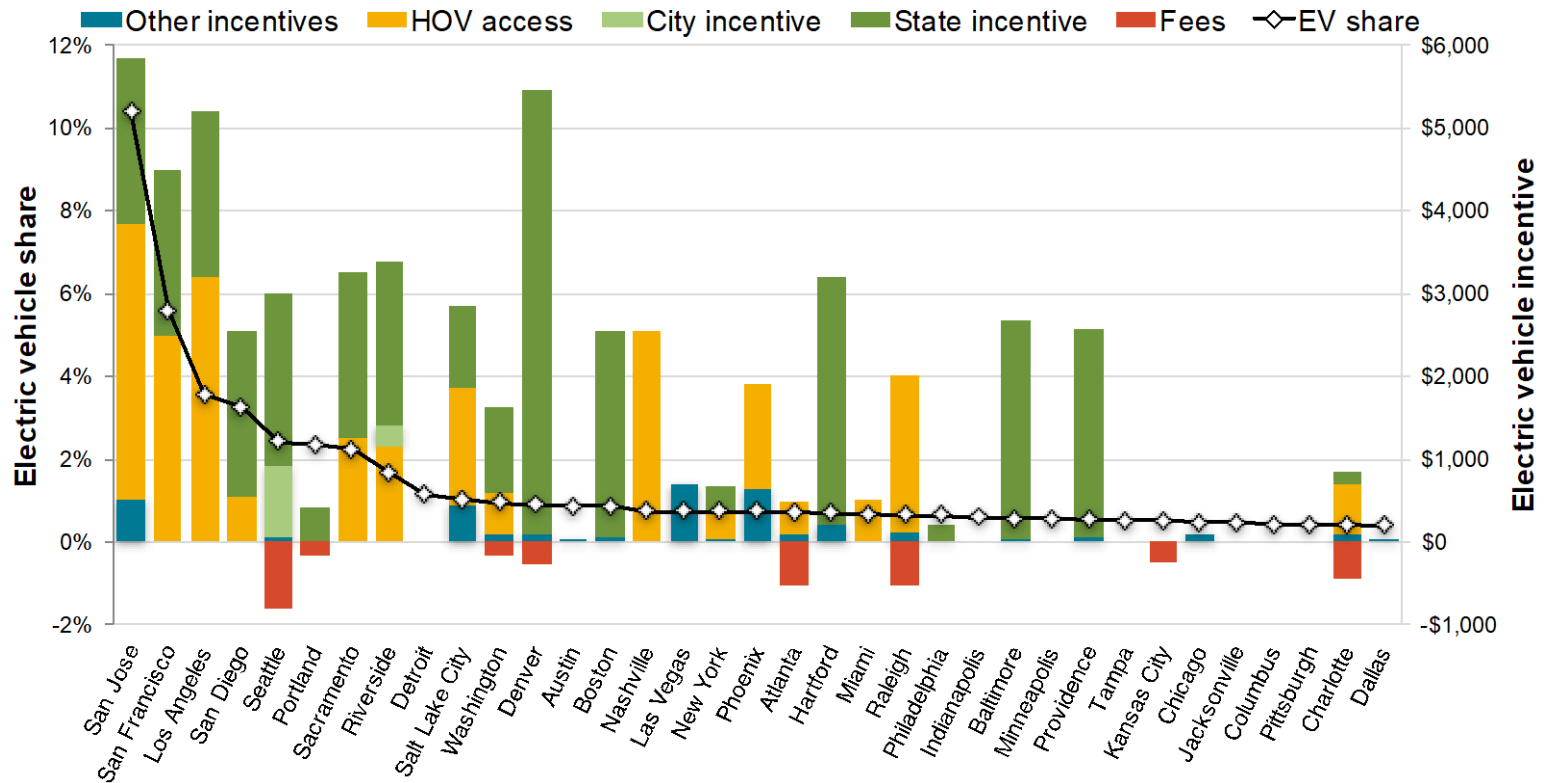
- Utility**
- Utility charging pilot or other research
  - Utility public charging infrastructure
  - Utility public charging infrastructure in low-income communities
  - Utility time of use rates offered
  - Utility preferential EV rates
  - Utility EV or EVSE incentive, support
  - Utility increased incentives for EVSE at multifamily properties
  - Utility info materials or outreach events
  - Utility EVSE informational materials for multifamily properties
  - Utility cost comparison tool
  - Utility electric vehicle fleet

- City**
- City electric vehicle strategy
  - Streamlined EVSE permitting process
  - EV-ready building code
  - City vehicle purchase subsidy
  - City parking benefit
  - City EVSE incentive, support
  - City carpool lane (HOV) access
  - City-owned EV chargers
  - US DOE EV Project key area
  - Workplace charging
  - City carsharing program link
  - City informational materials
  - City outreach events
  - City outreach events in low-income communities
  - City green fleet target
  - City electric vehicle fleet target
  - City electric buses in public transportation

- State**
- State ZEV program
  - State International ZEV Alliance participation
  - State low carbon fuel policy
  - State BEV purchase incentive
  - State PHEV purchase incentive
  - State increased BEV incentive for low-income
  - State increased PHEV incentive for low-income
  - State fee reduction or testing exemption
  - No state annual electric vehicle fee
  - State private charger incentive, support
  - State public charger promotion
  - State parking benefit
  - State fleet purchasing incentive
  - State manufacturing incentive
  - State allows direct sales to consumers

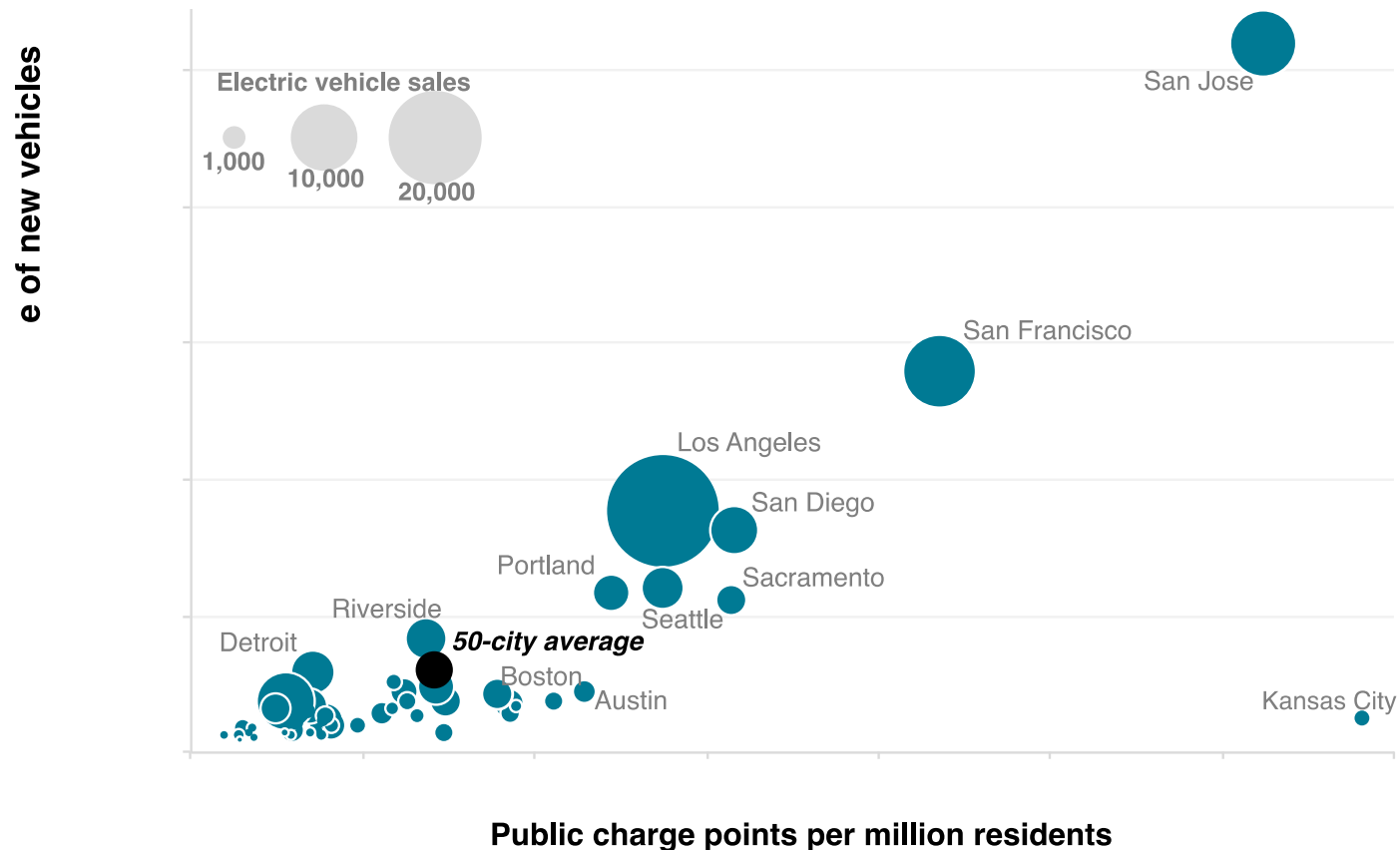
# Incentives in high electric vehicle-uptake markets

- Leading electric vehicle-adoption cities tend to have diverse mix of incentives



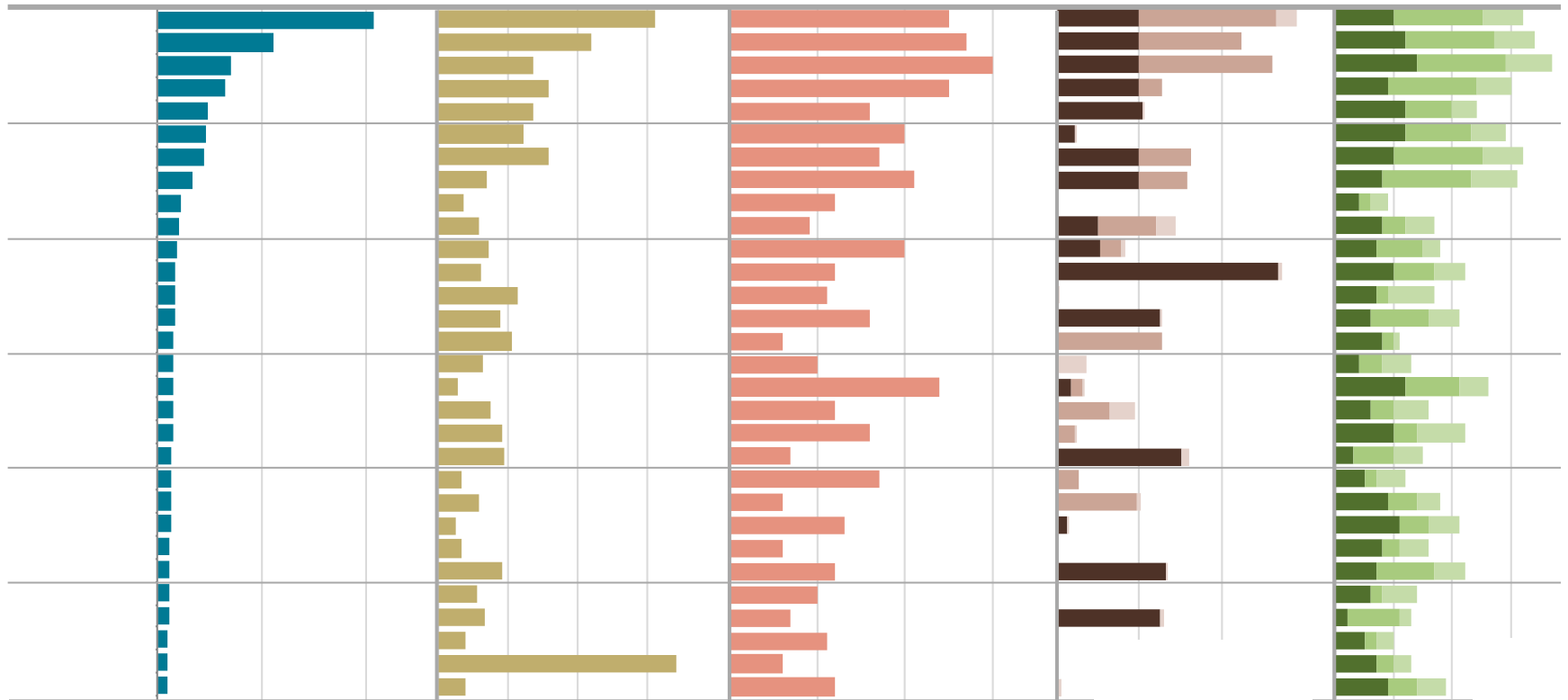
# Electric vehicle public charging infrastructure

- Electric vehicle uptake is linked with public charging infrastructure
  - Leading U.S. EV markets: 2-6 times more public charging per capita than average



# Electric vehicle uptake and underlying factors

- Leading markets tend to have more extensive public charging, more EV models, greater consumer incentives, and more local promotion actions



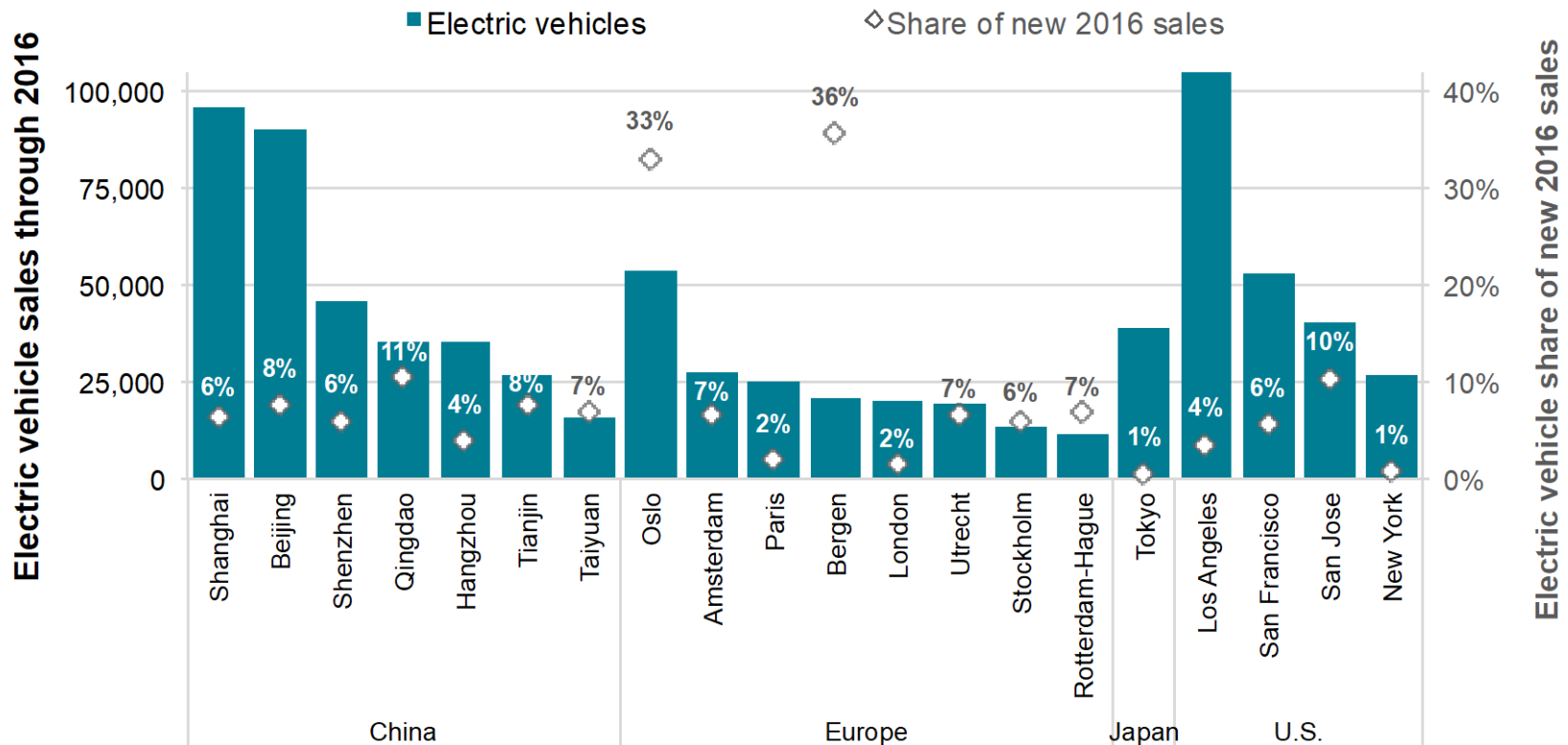
# Statistical regression for EV uptake in the U.S.

- Multiple linear regression for electric vehicle uptake
  - Metro area level (n=200, n=50), p-value <0.05, separately for BEV and PHEV
  - EV uptake statistically linked with model availability, consumer incentive, public charging (regular and DC fast), workplace charging, local promotion actions

Independent variable	200 U.S. metro areas		50 U.S. metro areas	
	BEV	PHEV	BEV	PHEV
Model availability, BEV	X		X	
Model availability, PHEV		X		X
BEV consumer incentive	X			
PHEV consumer incentive		X		
Public charging per capita (Level 2)	X	X		
Public charging per capita (DC fast)	X	X	X	
Workplace charging per capita			X	X
High occupancy vehicle lane incentive				X
City electric vehicle promotion actions				X
<i>Regression adjusted R-squared</i>	<i>0.61</i>	<i>0.63</i>	<i>0.92</i>	<i>0.89</i>

# Where are the top global EV markets?

- Just 20 metropolitan areas represent 40% of the world's electric vehicles
  - The leaders: Several over 10% EV sales share, several over 10,000 EV sales per year
  - Driven by national regulation; city policy; incentives; infrastructure; consumer campaigns



# Concluding reflections

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- Actions by many players prime the market
  - Cities, states, utilities, partnerships, non-profit consumer groups
- Top markets show the keys to address barriers, grow market
  - Availability: CO<sub>2</sub> regulations plus ZEV requirements
  - Cost: Consumer incentives
  - Convenience: Charging infrastructure
  - Awareness: Ride-and-drive events, fleets, car-sharing
  - Access: HOV lane, city parking/charging

## Contact

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International Council on Clean Transportation: *<http://theicct.org>*

ICCT electric vehicle page: *<http://theicct.org/electric-vehicles>*

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# U.S. metro areas state, city, utility EV actions

Metropolitan area	State										Local										Utility						Total actions																			
	State ZEV program	State international ZEV Alliance participation	State low carbon fuel policy	State BEV purchase incentive	State PHEV purchase incentive	State increased BEV incentive for low-income	State increased PHEV incentive for low-income	State fee reduction or testing exemption	No state annual electric vehicle fee	State private charger incentive, support	State public charger promotion	State parking benefit	State fleet purchasing incentive	State manufacturing incentive	State allows direct sales to consumers	City electric vehicle strategy	Streamlined EVSE permitting process	EV-ready building code	City vehicle purchase subsidy	City parking benefit	City EVSE incentive, support	City carpool lane (HOV) access	City-owned EV chargers	US DOE EV Project key area	Workplace charging	City car sharing program link		City informational materials	City outreach events	City outreach events in low-income communities	City green fleet target	City electric vehicle fleet target	City electric buses in public transportation	Utility charging pilot or other research	Utility public charging infrastructure	Utility public charging in low-income communities	Utility time of use rates offered	Utility preferential EV rates	Utility EV or EVSE incentive, support	Utility incentives for EVSE at multifamily properties	Utility info materials or outreach events	Utility EVSE info materials for multifamily properties	Utility cost comparison tool	Utility electric vehicle fleet		
Los Angeles	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	36		
San Francisco	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	34		
San Jose	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	32		
Sacramento	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	31		
Riverside	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	31		
San Diego	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	30		
Portland	X	X	X	X	X		X	X	X	X		X		X	X	X							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29		
New York	X	X		X			X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	26		
Seattle				X	X		X		X	X	X	X	X	X	X	X		X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	24		
Denver				X	X		X		X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22		
Atlanta							X			X		X	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22		
Baltimore	X	X		X	X		X	X	X	X		X		X								X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	
Boston	X	X		X	X		X	X	X	X		X		X								X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	21	
Philadelphia				X			X			X		X	X	X	X	X					X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	21	
Chicago							X	X			X	X	X	X	X	X					X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	19	
Austin							X	X						X					X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	18	
Washington				X	X		X	X	X	X	X		X	X	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	18
Raleigh							X		X	X	X		X	X	X						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	18