

# *Best practices to promote electric-drive vehicles*

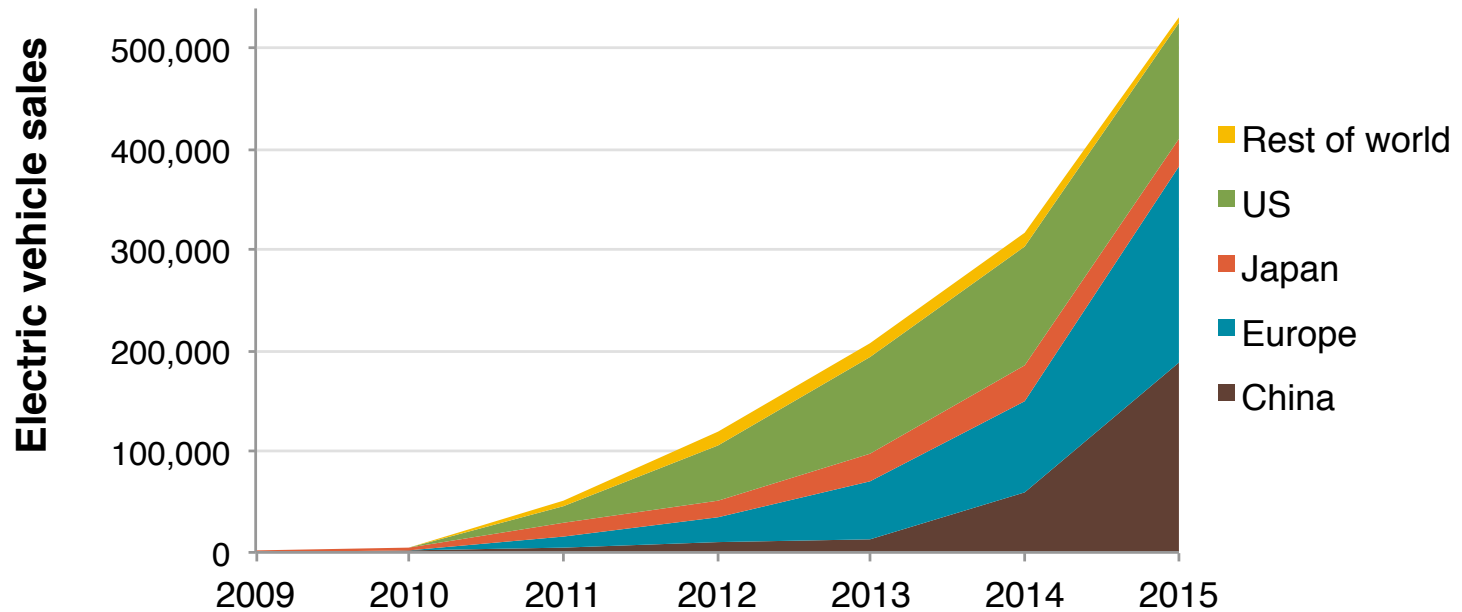
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*Hydrogen and Fuel Cell Technical Advisory Committee Meeting  
Livermore, California  
April 6, 2016*



# Global electric vehicle sales since 2009

- Sales of electric vehicles through 2015
  - There were approximately 530,000 electric vehicle sales in 2015
  - The 1 millionth electric vehicle was sold in September 2015
  - Sales mostly in China, Europe, the U.S. (and concentrated in particular markets)

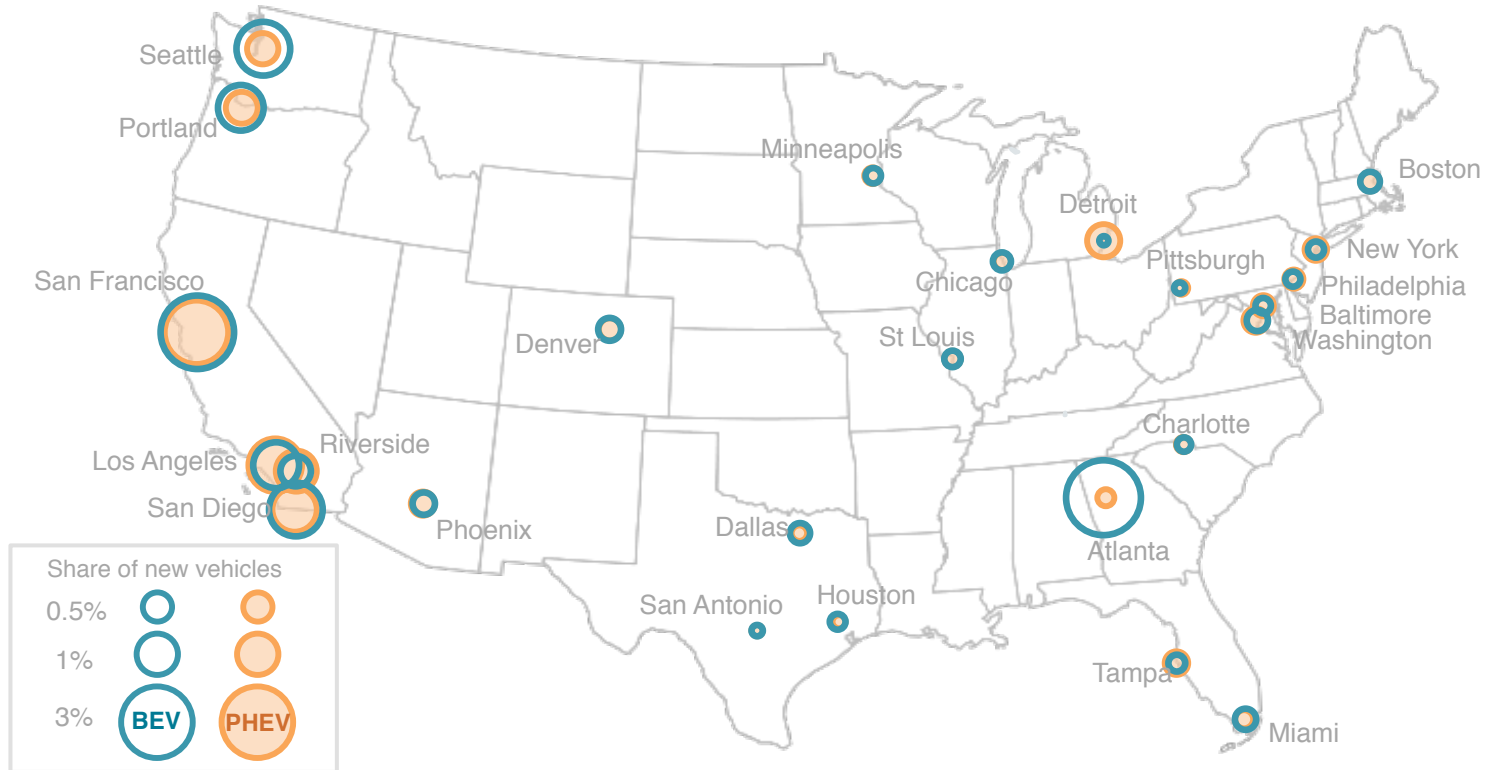


# US city electric vehicle project overview

- Approach/scope
  - Include top 25 most populous US metropolitan areas
  - Catalogue EV actions on many different dimensions (local, state, electric charging infrastructure, utility support)
  - Evaluate consumer benefits from EV policies
  - Analyze EV sales of various types (BEV, PHEV)
  - Assess statistical connection between local action and EV sales
- Report, based on 2014 EV uptake and city/state policies
  - <http://theicct.org/leading-us-city-electric-vehicle-activities>
  - We continue to update the results

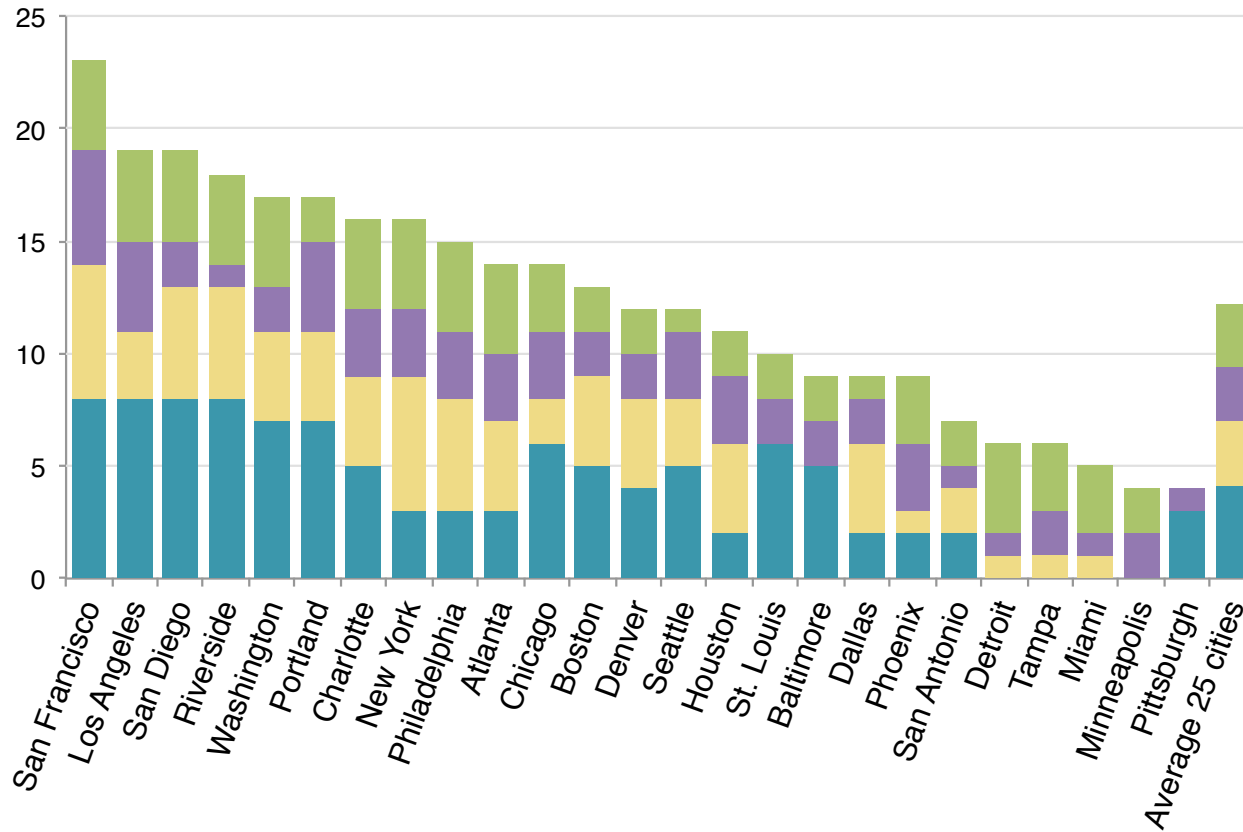
# Electric vehicle (EV) activity across major US cities

- The top-25 metropolitan areas in 2014 in the US represent....
  - 42% of the population, 46% of auto sales, 67% of EV sales
  - 53% of public electric vehicle charging infrastructure
  - Diverse mix of incentive, market factors, and percent EV uptake



# Actions to promote EVs across US cities are diverse

Electric vehicle promotion actions



## Utility

- Preferential charging rate
- Home charger support
- Website, inform. materials
- Cost comparison tool
- Other utility outreach

## Infrastructure

- EV supply equipment financing
- City-owned EV chargers
- US DOE EV Project area
- Streamlined EVSE permit process
- PEV-ready building code
- Workplace charging

## City

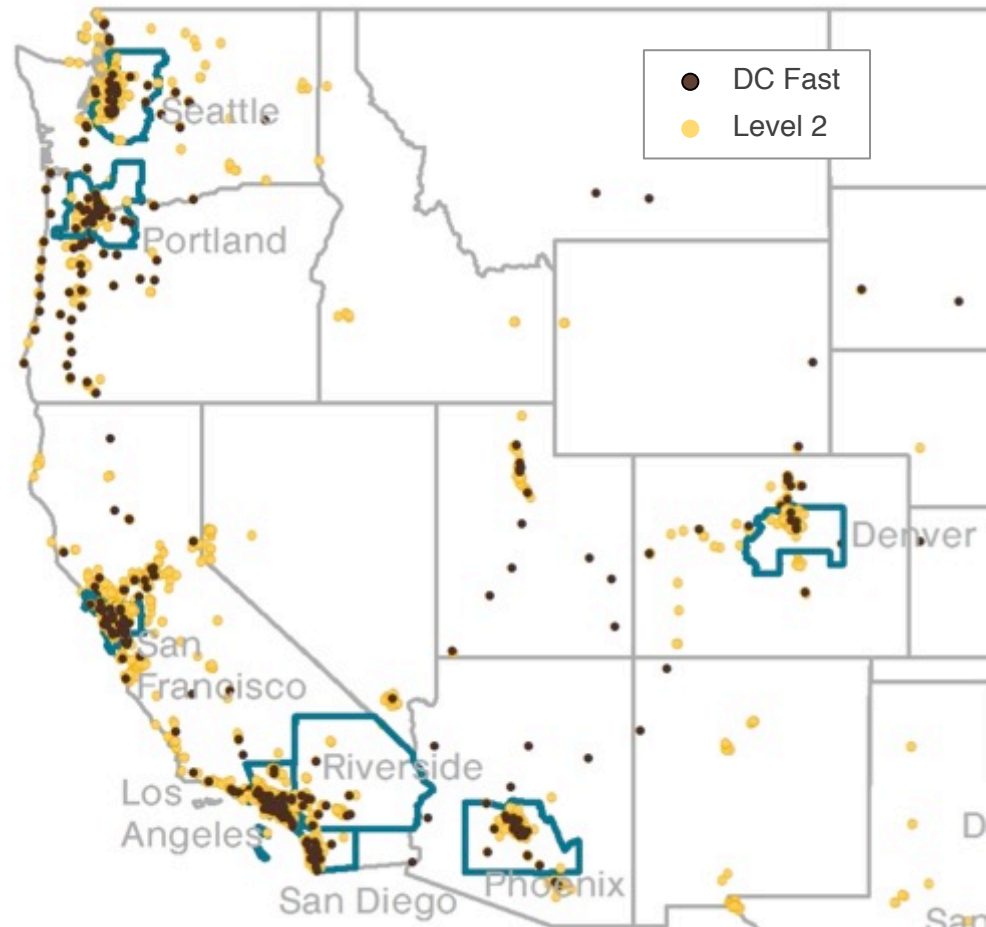
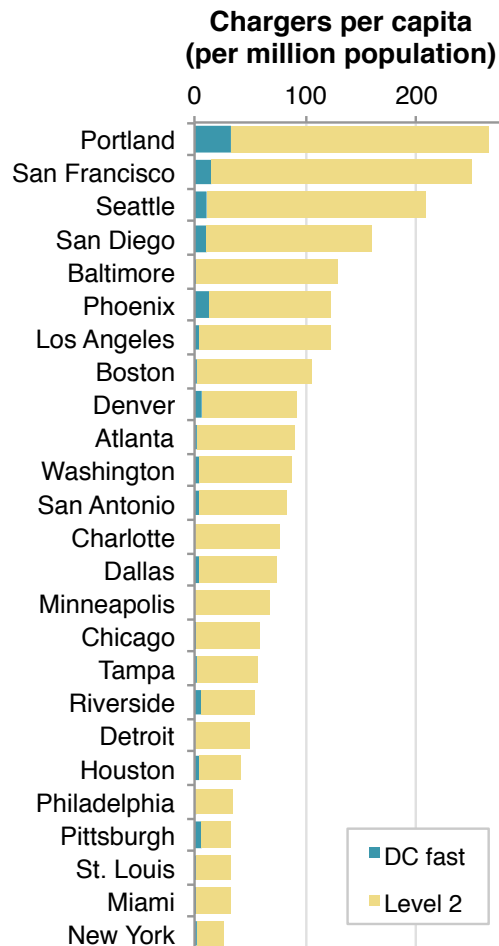
- Vehicle purchase support
- Parking support
- Fleet purchasing
- Carpool lane (HOV) access
- Car sharing program link
- Electric vehicle strategy
- Website or inform. materials
- Outreach or education events

## State

- ZEV program
- BEV purchase subsidy
- PHEV purchase subsidy
- Fee exemption or exemption
- Home charger support
- Public charging support
- Parking benefit
- Fleet purchasing incentive
- Manufacturing incentives
- Low carbon fuel policy

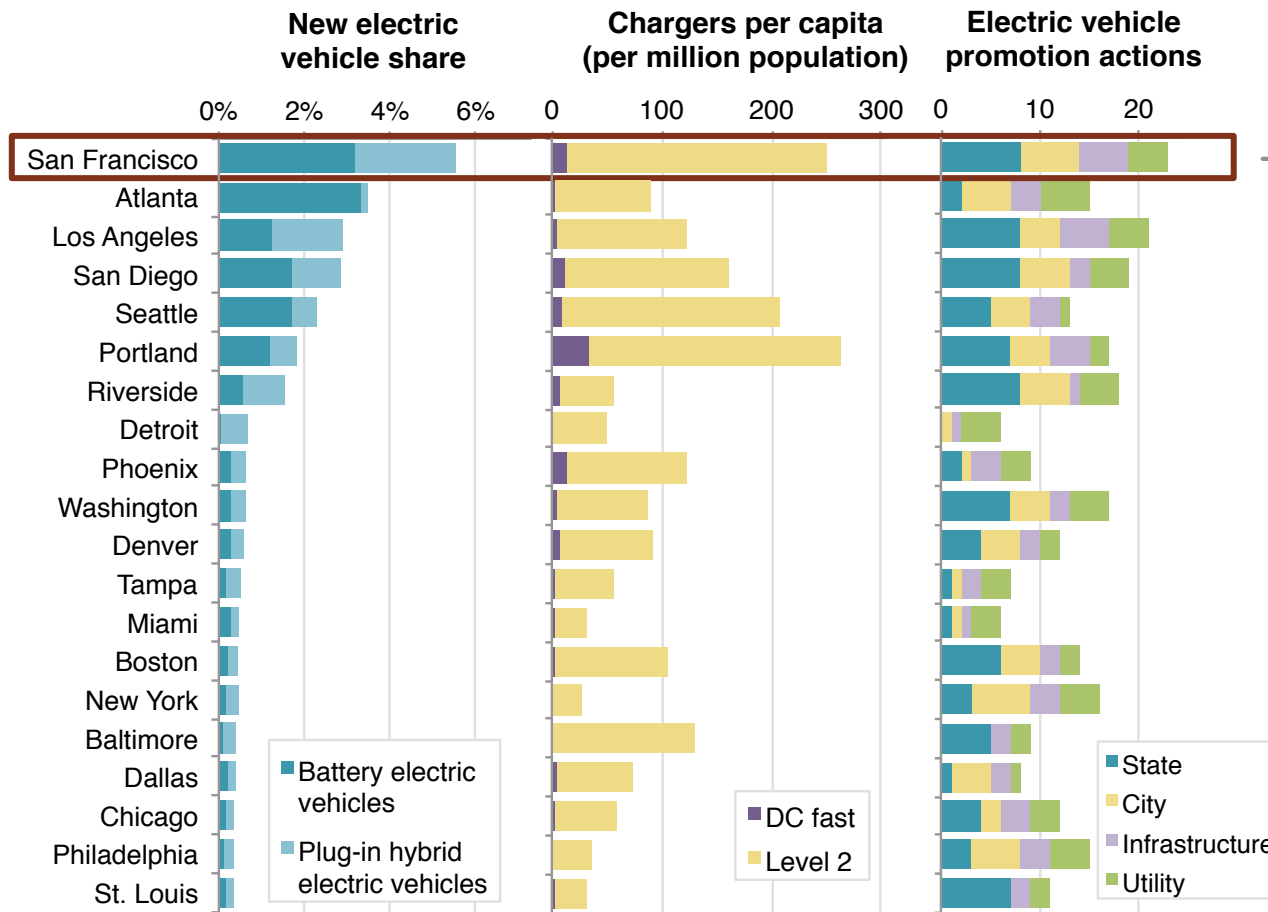
# Charging infrastructure varies greatly

- Leading three cities have over 7-10 times the bottom-five cities' charging network -



# Example: San Francisco metro area EV activity

- The San Francisco area has had a steady mix of consumer incentives, utility actions, and charging infrastructure support – and has 7x the US average EV uptake



## San Francisco:

- Highest new electric-vehicle sales share
- 2nd most extensive public electric charging infrastructure
- 23 of the 30 electric-vehicle promotion actions

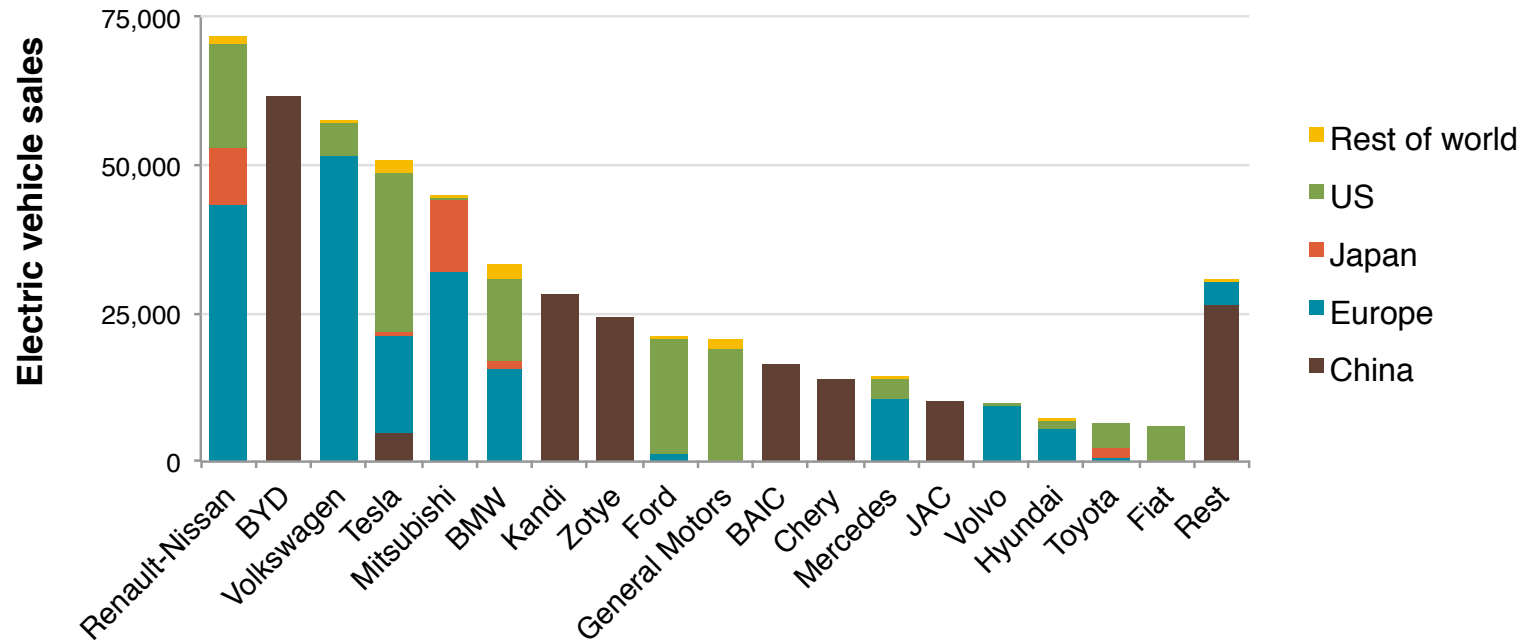
# Findings: Various EV actions are accelerating uptake

- EV promotion actions are accelerating EV adoption
  - Strong and modest correlations from the U.S. state/city study: Consumer incentives, charging infrastructure, model availability, city non-monetary benefits
  - Our emerging Europe work indicates the same: Financial incentives, complementary local policy/incentives, charging infrastructure, etc.
- Analysis confirms importance of “ecosystem approach”
  - Public charging and consumer incentives work, but more diverse action needed
  - Engagement from cities, states, utilities, automakers, consumers, local businesses in each city is important



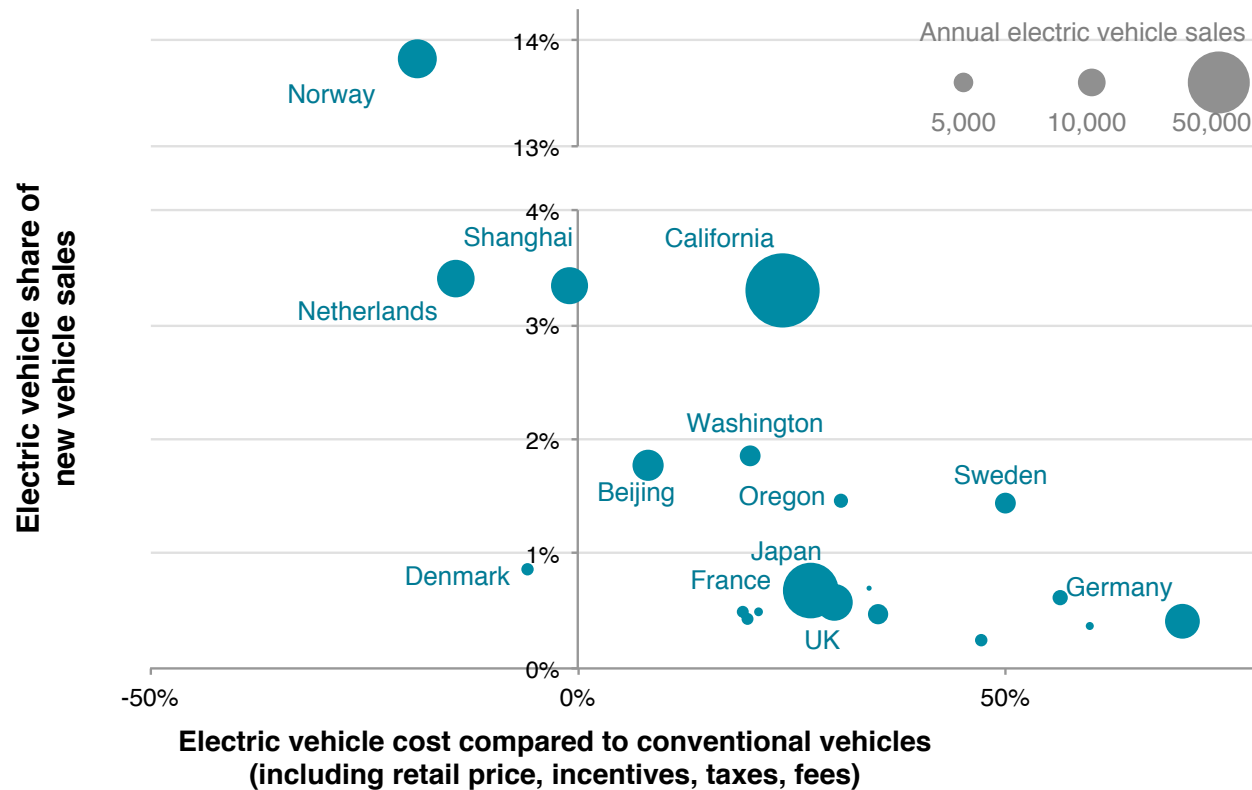
# Global electric vehicle sales in 2015

- Most (i.e., 93%) of 2015 electric vehicle sales were in China, Europe, U.S.
  - 14 automaker groups at over 10,000 annual global sales
  - Deployment by automaker and by region:



# EV uptake higher where incentives higher (generally)

- Preliminary findings on analysis of electric vehicle incentives
  - Ongoing analysis of electric vehicle sales (circle size) and shares in 2014 (vertical axis) versus the relative cost of electric vehicle as compared to comparable conventional gasoline vehicles after incentives (rebates, credits, tax exemptions) (horizontal axis)

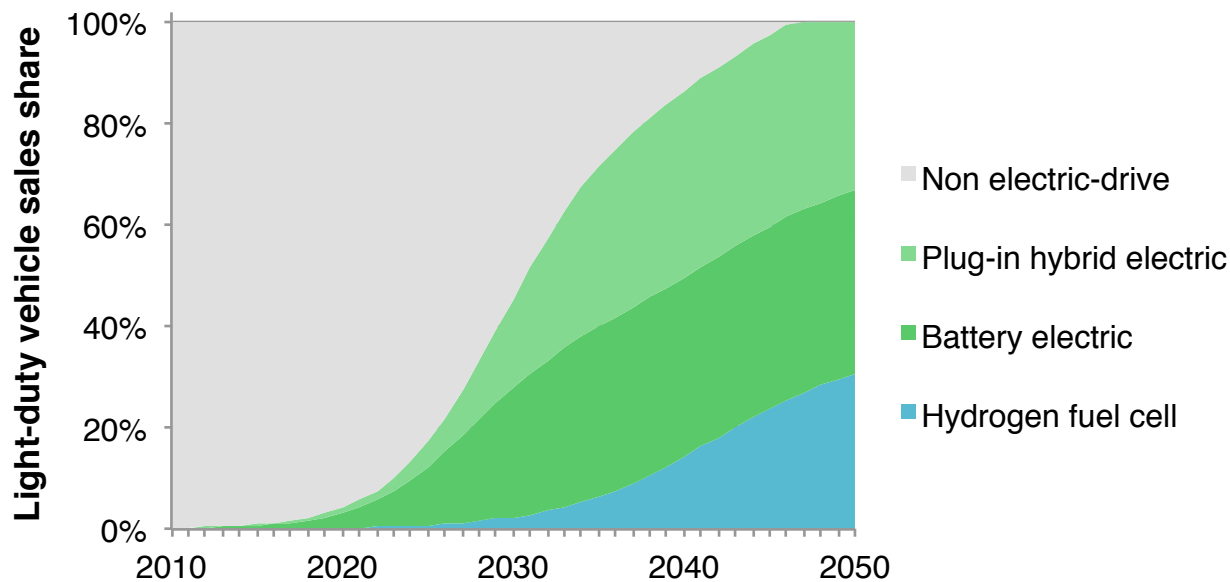


# Electric vehicle sales tend to be highest where combination of national and regional support policies are in place

Area	Action	China	France	Germany	Japan	Netherlands	Norway	United Kingdom	US (excl. California)	California
		<b>Percent of 2014 global electric vehicle sales</b>	19%	5%	4%	11%	5%	6%	5%	19%
<b>Vehicle manufacturer</b>	Research and development support	X	X	X	X	X	X	X	X	X
	Long-term efficiency standards	X	X	X	X	X	X	X	X	X
	Incentive provisions within efficiency regulations	X	X	X		X	X	X	X	
	Cumulative sales goal	X	X	X		X	X	X	X	X
<b>Consumer purchasing</b>	Vehicle purchase subsidy (tax credit, rebate, purchase tax exemption, feebate)	X	X		X	X	X	X	X	X
	Government fleet vehicle purchasing preferences	X	X		X			X	X	X
<b>Consumer use</b>	Annual vehicle fee exemption			X	X	X	X	/	/	
	Discounted/free electric charging				X	X	X		/	X
	Preferential lane (e.g., bus, carpool lane) access, parking, reduced road tolls/taxes	/	/	/	X	X	X	X	/	X
<b>Fuel provider, infrastructure</b>	Carbon pricing scheme	X	X	X	X	X	X	X	/	X
	Public charging network funding, incentives	X	X	X	X	X	X	X	X	X
<b>Consumer awareness</b>	Public outreach activities to educate on consumer benefits	X	X	X	X	X	X	X	X	X

# Collaboration: International ZEV Alliance

- Collaborate on best-practice policies, action plans
- Set electric-drive vehicle target: All electric by 2050
  - To achieve climate stabilization goals
  - To set clear signal for policy and investment



- British Columbia
- California
- Connecticut
- Germany
- Maryland
- Massachusetts
- Netherlands
- New York
- Norway
- Oregon
- Québec
- Rhode Island
- United Kingdom
- Vermont

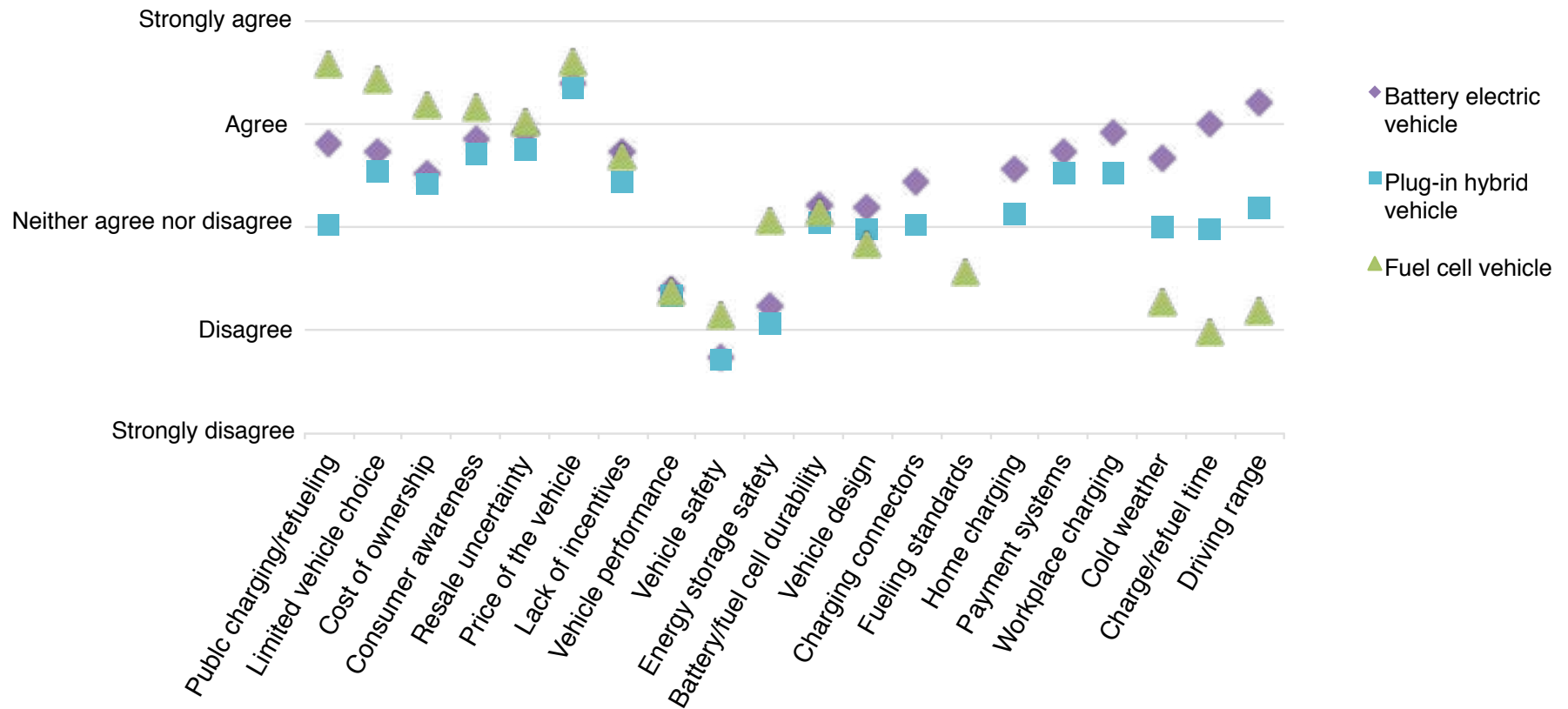
International ZEV Alliance: <http://zevalliance.org>

COP21 announcement: <http://zevalliance.org/content/cop21-2050-announcement>

Mitigation potential: <http://zevalliance.org/content/global-ev-2050-qhg-mitigation-potential>

# Discussion: Obstacles for electric drive vehicles

- Survey: “The following are significant obstacles to the uptake of [electric-drive vehicles]”



- ICCT resources

- US city/state electric vehicle incentive analysis

- <http://theicct.org/info-tools/us-city-electric-vehicle-profile> (Dec 2015)
    - <http://theicct.org/leading-us-city-electric-vehicle-activities> (July 2015)
    - <http://theicct.org/supporting-electric-vehicles-US-city-total-cost> (October 2015)
    - <http://theicct.org/evaluation-state-level-us-electric-vehicle-incentives> (Oct 2014)

- International electric vehicle sales and incentives

- <http://theicct.org/global-ev-2050-ghg-mitigation-potential> (Dec 2015)
    - <http://theicct.org/transition-global-zero-emission-vehicle-fleet-collaborative-agenda-governments> (Sept 2015)
    - <http://theicct.org/driving-electrification-global-comparison-fiscal-policy-electric-vehicles> (May 2014)

- International Zero Emission Vehicle Alliance

- <http://zevalliance.org>
  - <http://zevalliance.org/content/cop21-2050-announcement>