

Electric vehicle charging infrastructure and incentive design best practices

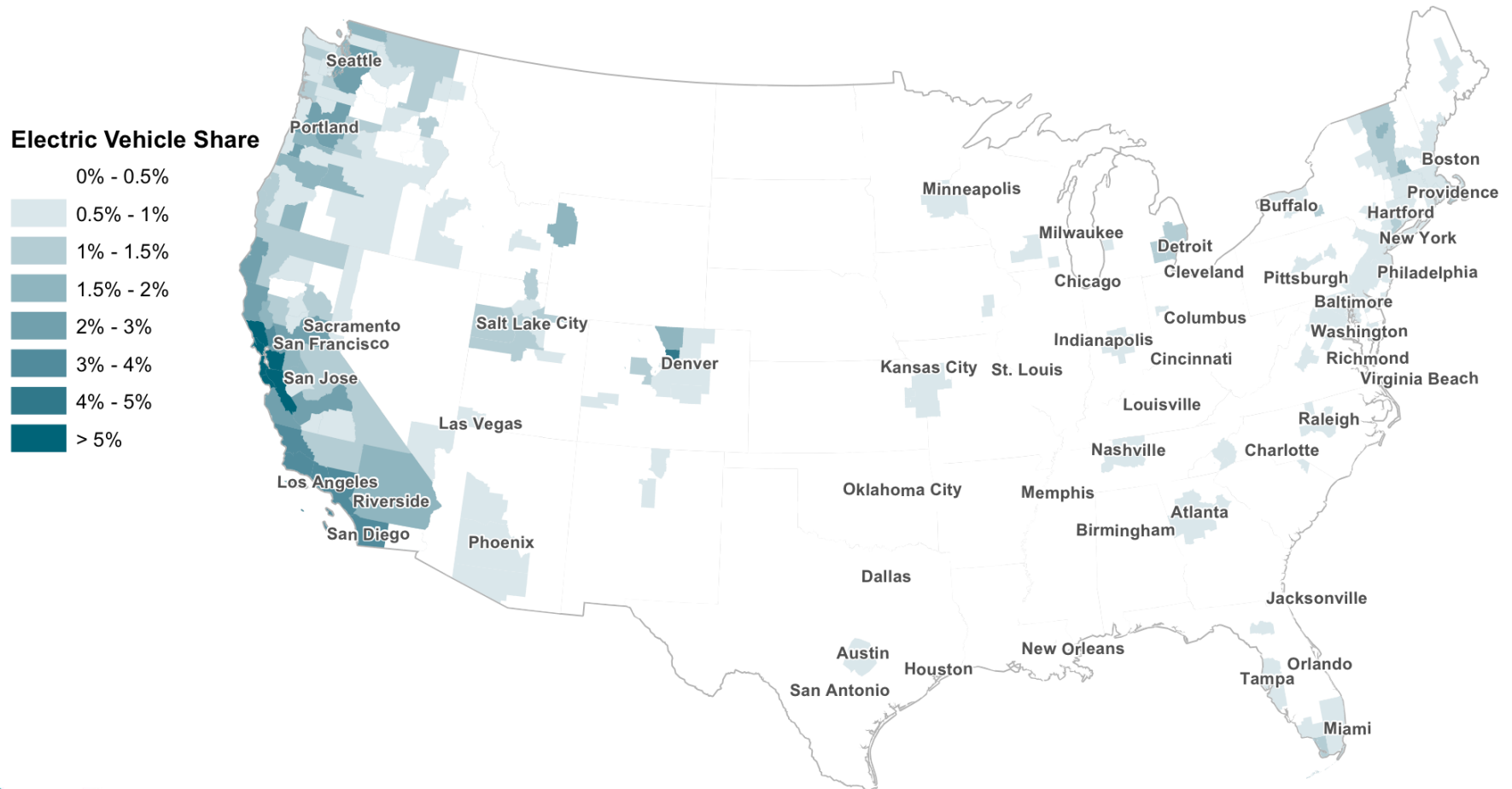
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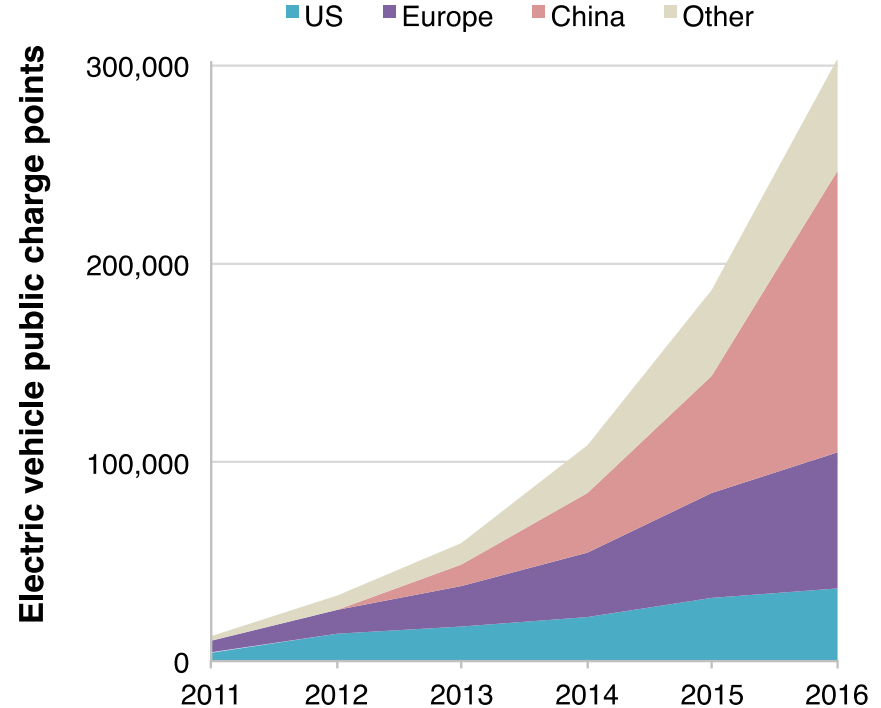
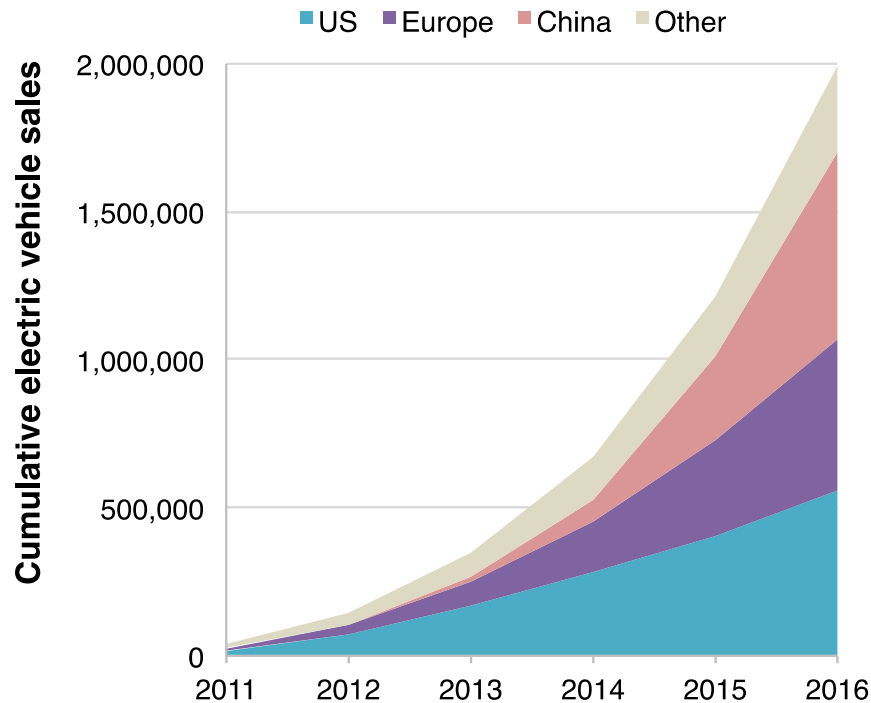
U.S. metropolitan area electric vehicle uptake

- EV uptake across 50 metro areas: from 0.2% up to 13% of new vehicle sales
- What's driving U.S. city EV uptake? (local/state policy, incentives, charging, etc)



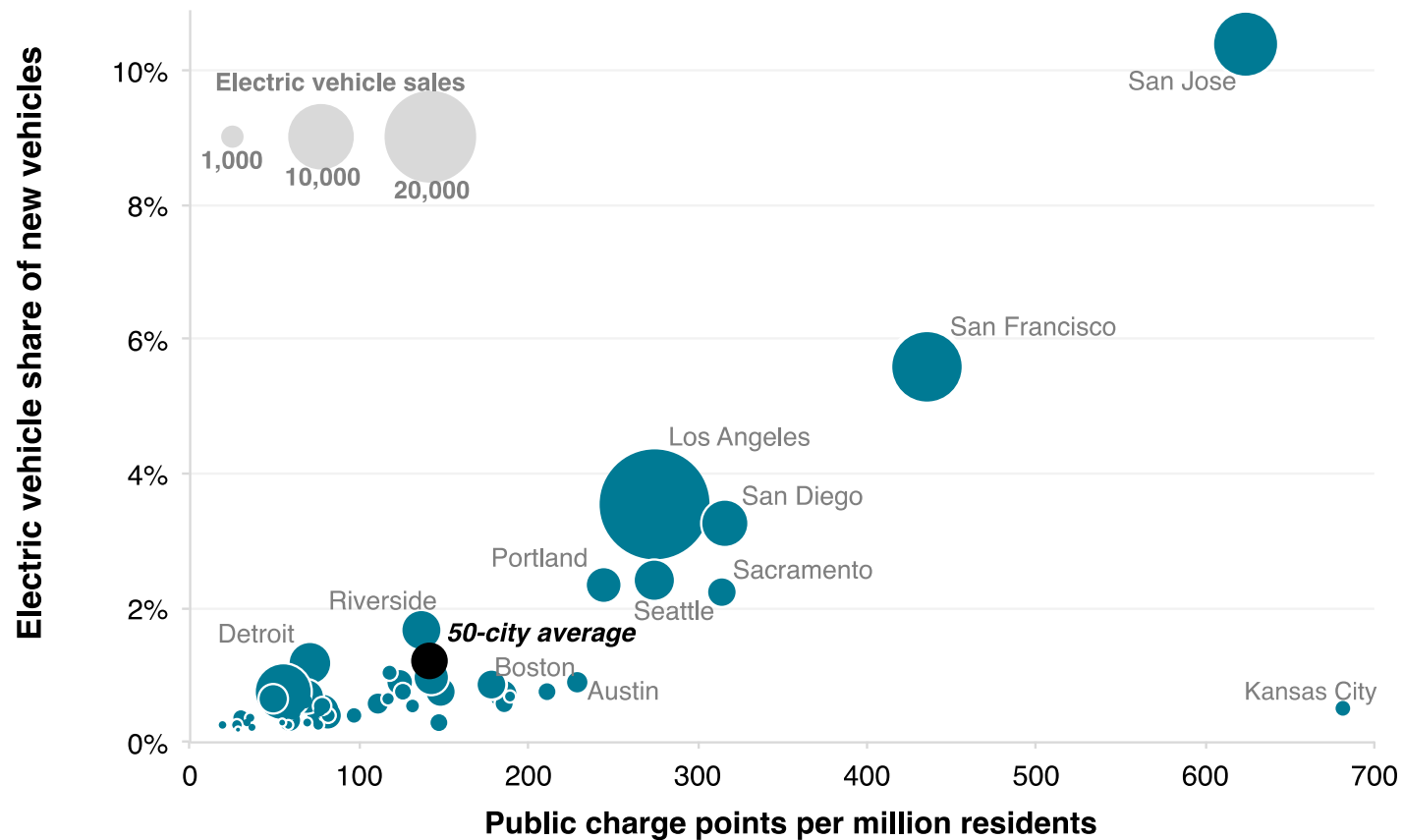
Electric vehicles and public charging have grown together

- At end of 2016: About 2 million electric cars and 300,000 public charge points



Results: EV uptake and public charging infrastructure

- Electric vehicle uptake is linked with public charging infrastructure
- No global benchmark, but trends emerge within markets – 25-30 EVs/charger in leading US metro areas



Challenges (and solutions) for charging

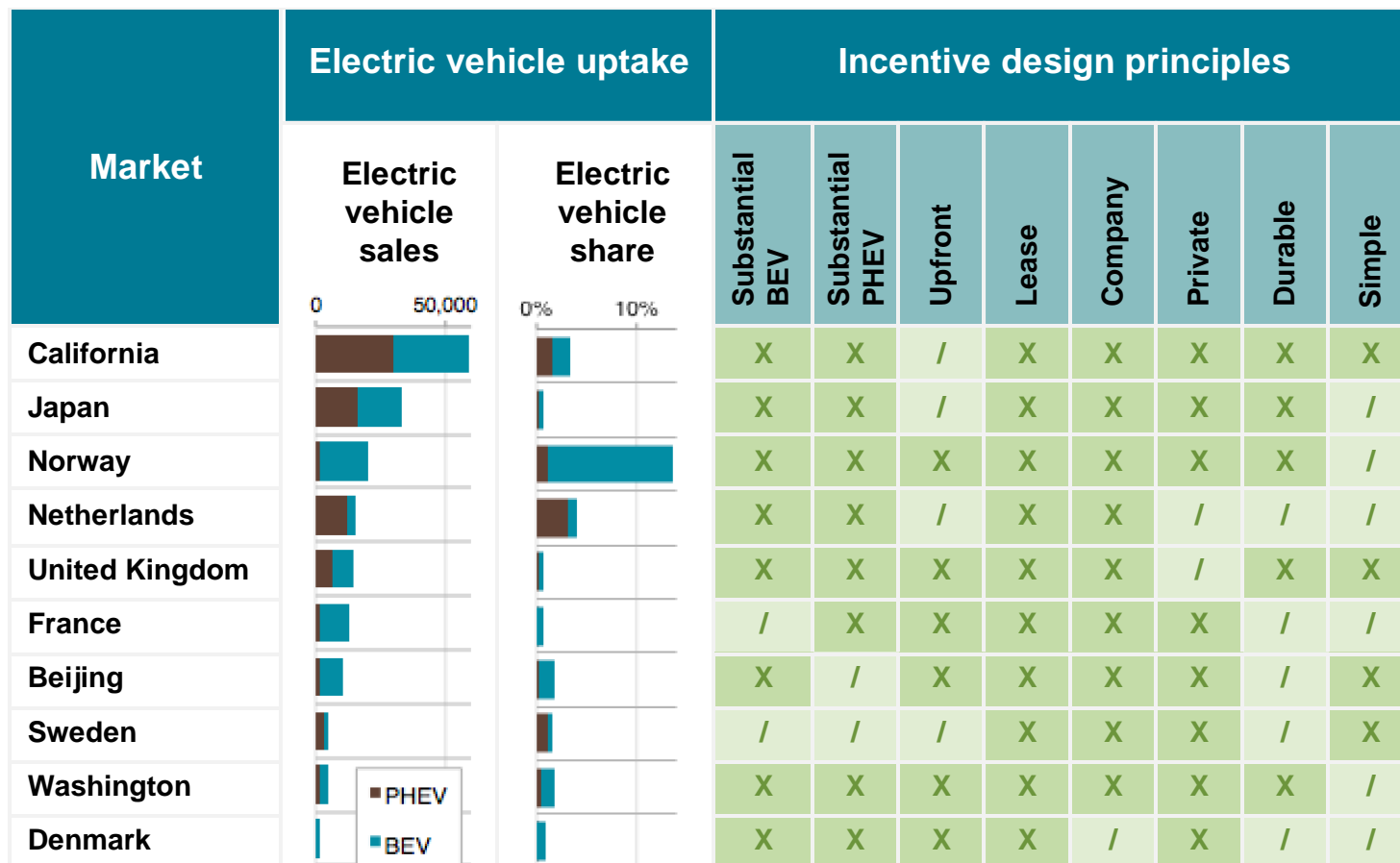
- Engage utilities
 - Rate-based charging station buildout: Massachusetts, California, Washington
 - Incentives: Utah, Georgia, many others
- Support multi-unit dwellings
 - EV-ready building codes: California, Denver, many cities
 - Curbside stations: Seattle, Philadelphia
- Plan for grid stability
 - Time-of-use rates (PSE&G)
 - Careful siting of fast charging (PG&E California tool)
- Charging addresses convenience issues, but full suite of policy needed to address other barriers (cost, model availability) and spur EV growth

Electric vehicle incentive design

- Incentives are important in driving EV sales in major auto markets
 - Although there are of course many other key factors (e.g., charging infrastructure, consumer awareness, regulations, etc.)
- Incentive design elements:
 - Magnitude (e.g., \$100s up to \$10,000+ per vehicle)
 - Timing (e.g., point of sale tax exemption/rebate vs. end of year credit)
 - Eligibility by technology type (e.g., BEV, PHEV; by range or battery size)
 - Eligibility by ownership type (e.g., owning/leasing, fleets)
 - Complexity (clarity on incentive value for dealers, consumers)
 - Durability (reliable availability of incentive for multiple years)

Results: Effective EV incentive design

- Markets with highest EV sales and EV shares have generally adopted most of the principles for effective incentive design



Findings on incentives

- Incentive design matters
 - Incentives are important in making electric vehicle prices competitive
 - Well-designed incentives are driving electric vehicle sales in major auto markets
- Optimal incentive design
 - Move incentives up front to the vehicle purchase and make their value visible and clear
 - Ensure the incentives are available to the mainstream (lower cost vehicles)
 - Set incentive eligibility based on ability to displace more fuel (less incentive for PHEVs)
 - Commit to durable incentives that allow manufacturers, dealers, public outreach campaigns, and consumers to rely on them for at least several years

Concluding reflections

- 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
 - Model availability: CO₂ regulations plus ZEV requirements
 - Convenience: Charging infrastructure
 - Cost: Consumer incentives
 - Awareness: Ride-and-drive events, fleets, car-sharing
 - Access: HOV lane, city parking/charging

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ICCT U.S. city electric vehicle report:

<https://www.theicct.org/publications/expanding-electric-vehicle-market-us-cities>

ICCT charging infrastructure practices:

<https://www.theicct.org/publications/emerging-best-practices-electric-vehicle-charging-infrastructure>

ICCT incentive design best practices:

<https://www.theicct.org/publications/principles-effective-electric-vehicle-incentive-design>

Acknowledgements

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