Learning from early fast charging deployments

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EVS32

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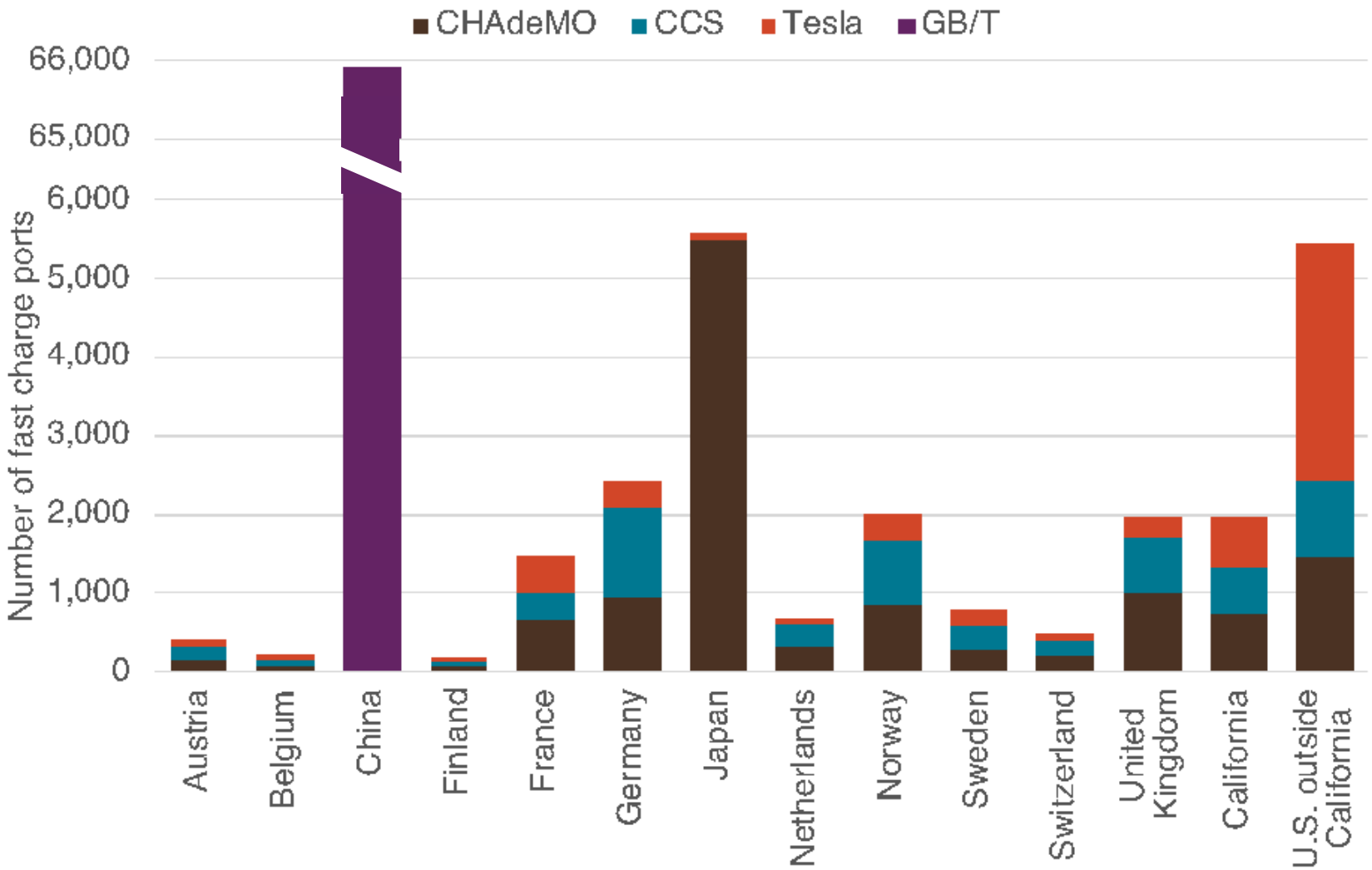
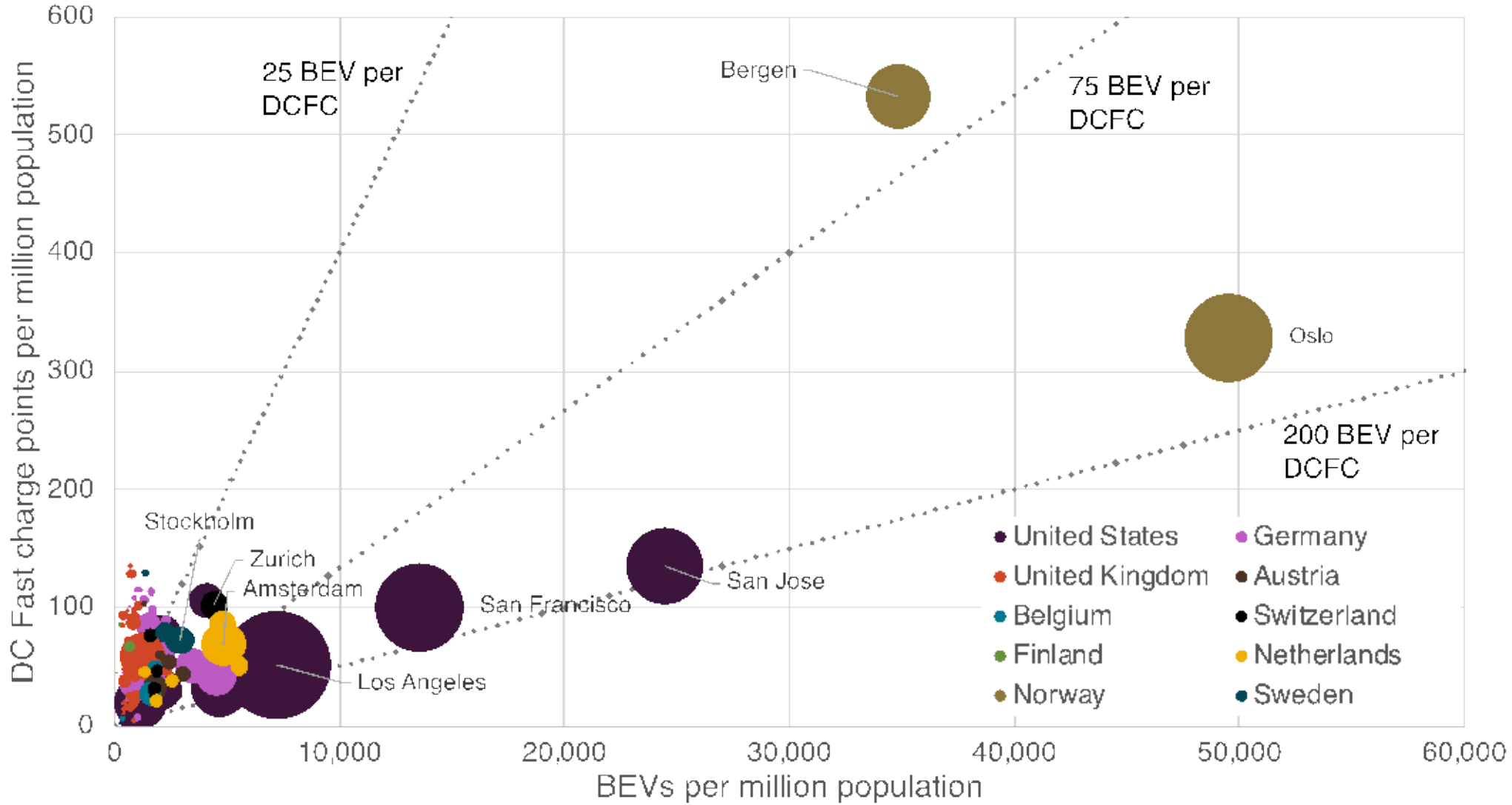
Fast charging is important, but there are many uncertainties in a quickly changing market

- Previous research established statistical link between fast charging and electric vehicle uptake
- Governments, companies are spending billions to build networks
- Our research for the ZEV Alliance investigated:
  - How much fast charging exists?
  - Who is using fast charging? (and why?)
  - How much does fast charging cost?
  - Can the electric grid support charging?
  - How much fast charging will be needed?

China dominates fast charging stock; other countries have mix of standards

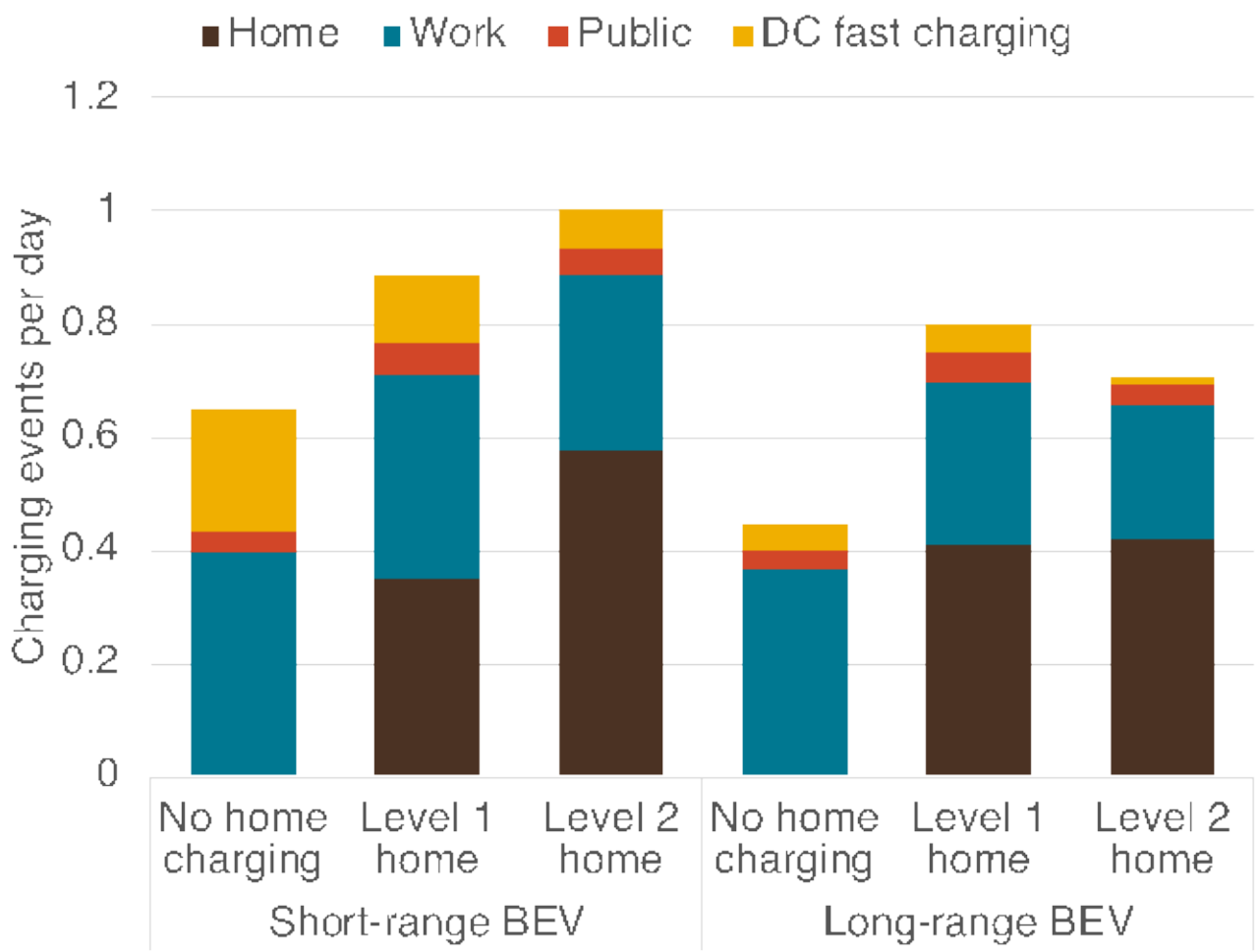


Charging varies widely even among leading cities



Dot size indicates 2018 BEV sales volume

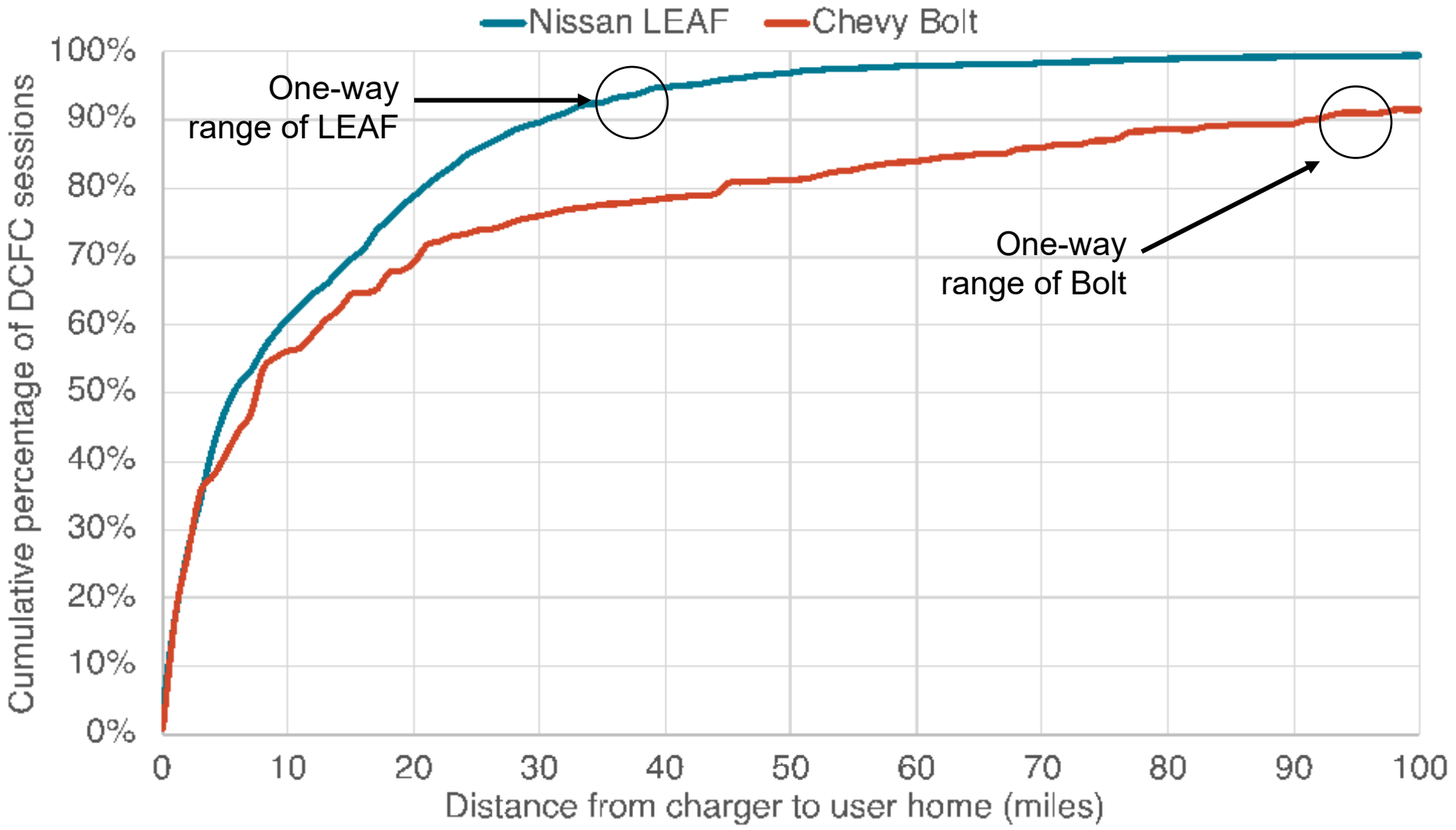
A key driver of fast charging: home access is far from universal



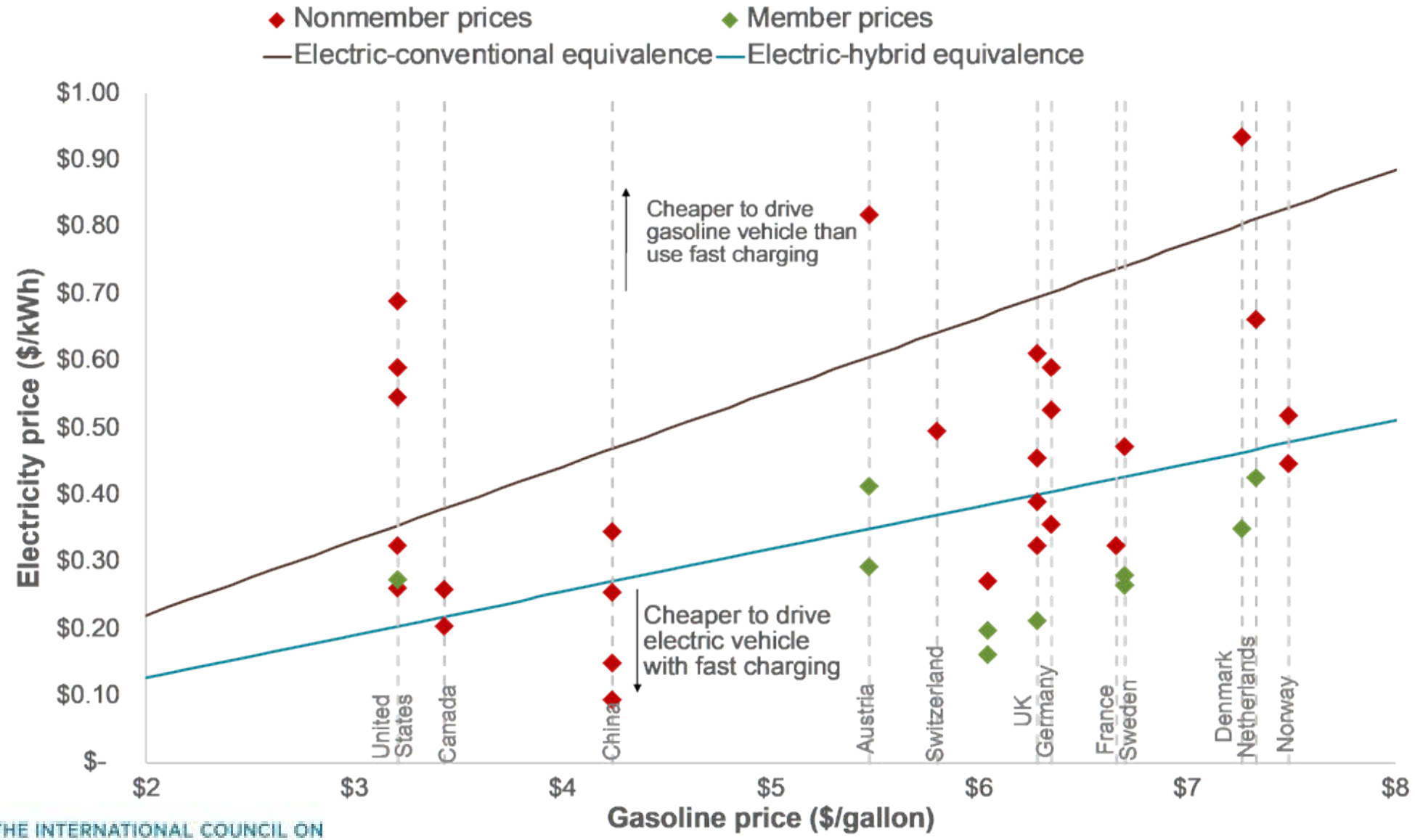
- U.S. drivers without home charging use 2x DC fast than those with Level 2 home charging
- Only 47% of U.S. car-owners have wiring within 20 feet of where car is parked
  - Expected to be somewhat lower in many parts of Europe; much lower in China

Nicholas, M., Hall, D., & Lutsey, N. (2019, January). *Quantifying the electric charging infrastructure gap across U.S. markets.* The International Council on Clean Transportation. https://www.theicct.org/publications/charging-gap-US

Most fast charging is done close to home, not on long trips

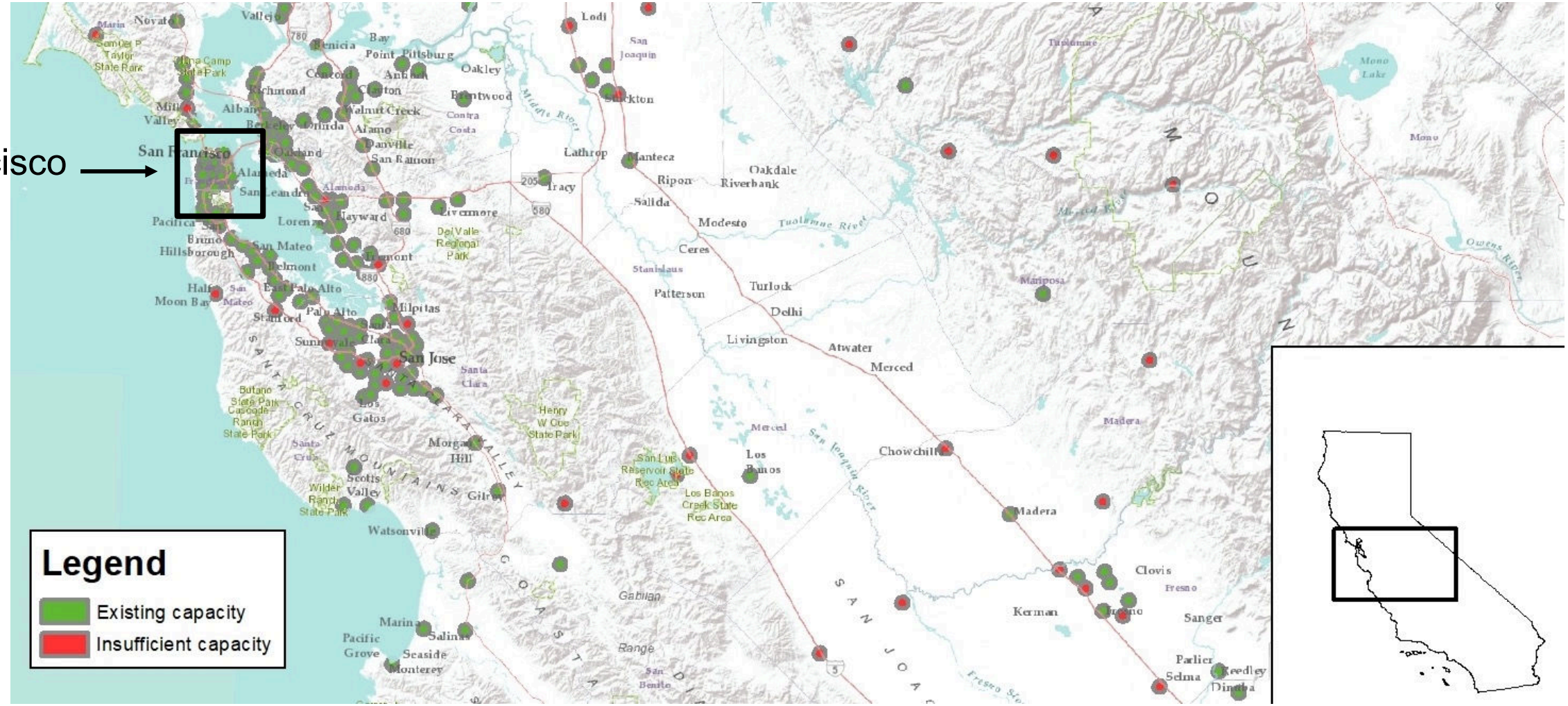


Fast charging is more expensive than charging at home (and sometimes more expensive than driving on gas)



Can the electric grid support fast charging?
In cities, yes, but rural areas face challenges

San Francisco →



Metcalf, M.D et al.., Direct Current (DC) Fast Charging Mapping, in Secondary Direct Current (DC) Fast Charging Mapping, Secondary Metcalf, M.D., Editor. 2016. https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/EPIC-1.25.pdf

EV market evolution impacts charging needs

- **Market diversification**: more drivers without home charging
  - Increases public, workplace charging needs
- **Faster fast charging**: Up to 350kW
  - Reduces number of new fast charge points needed
- **Longer range**: More options with >200 miles
  - Reduces public charging needs
- **Higher utilization**: Shift from “coverage” to “capacity”
  - Reduces number of new fast charge points needed
- **PHEV to BEV shift**: Many markets encouraging BEVs
  - Increases fast charging needs

Thank you for attending.

Full report available at:
www.theicct.org/publications/fast-charging-lessons-learned

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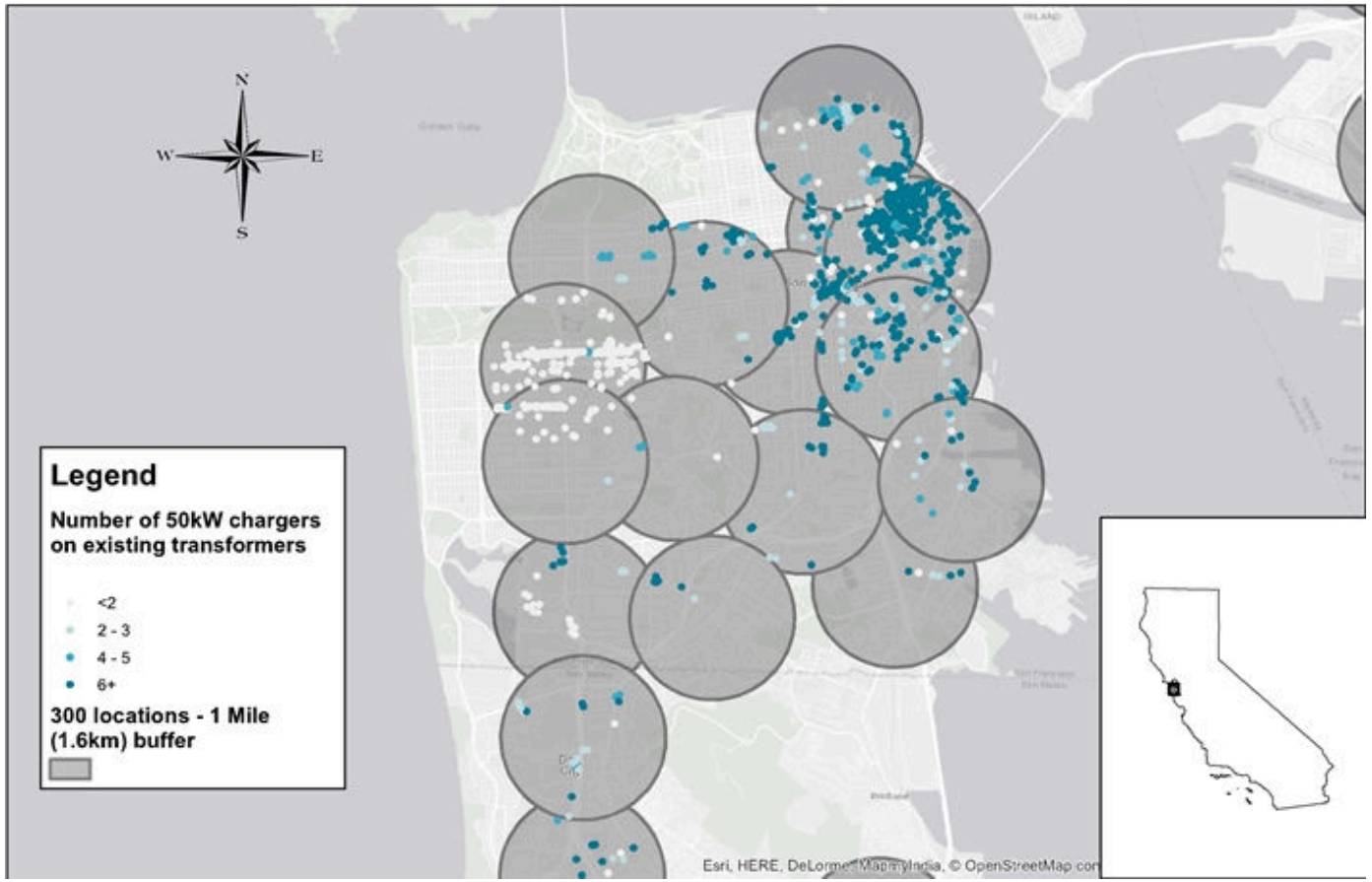
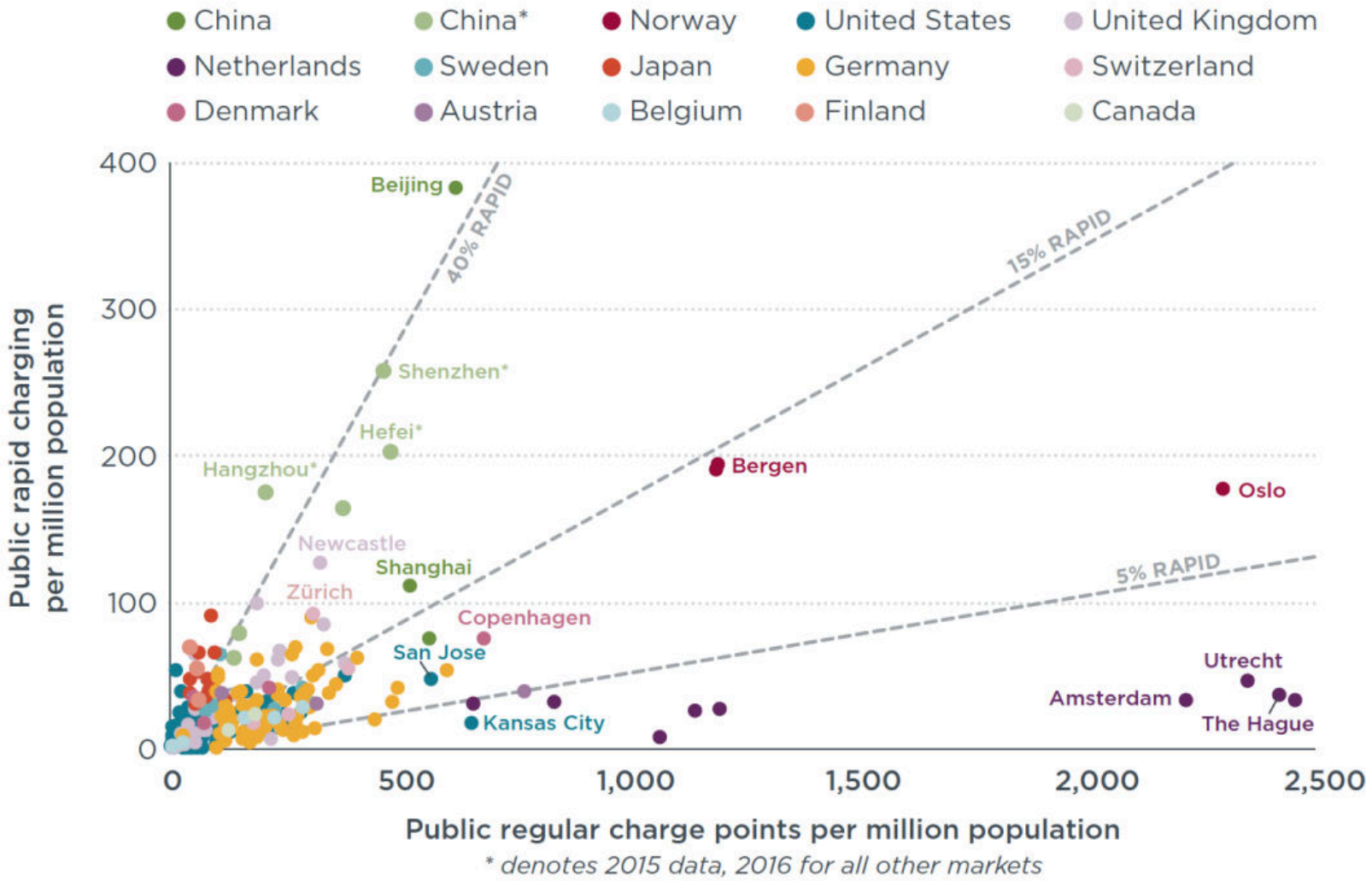
Additional slides

Can the grid support fast charging? In many cases, there's no problem



Blue dots indicate location with capacity for fast charging station in San Francisco, California. Data from Pacific Gas & Electric

What percent of public charging is fast charging?



How much more charging is needed by 2025?