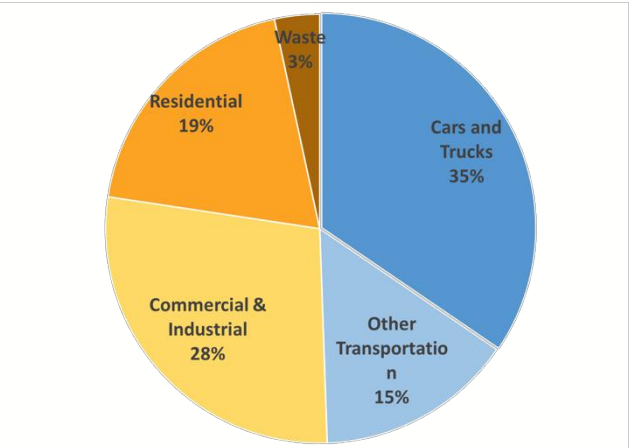
San Francisco Electric Vehicle Ready Ordinance

Staff Report

Updated: December 16, 2016

Plug-in electric vehicles (PEVs) benefit public health, the Bay Area's economy, and environmental sustainability. The American Lung Association estimates EV adoption can save Californians $13 billion in health care per year by 2030.[1] Cars and trucks contribute 41% of communitywide greenhouse gas emissions in San Francisco, and PEVs fueled with renewable electricity are essential to the City's goal to reduce greenhouse gas emissions 80% by 2050. Using the grid for transport provides considerable emissions reduction today, and the benefit will increase as California's Renewable Portfolio Standard increases to 50% by 2030 (up from 28% today). PEVs alone – including electric taxis and car share – can reduce communitywide emissions 20%.[2]

San Francisco GHG Emissions Sources (2012)



To foster PEV adoption, drivers must be able to fuel their vehicles. In most existing buildings, adding wiring to deliver electricity to a parking stall represents over half of the cost of installing an electric vehicle charger.[3] Since existing buildings were not designed for EV charging, a large number of chargers can require upgrading major electrical components – which can be cost-prohibitive.

However, including electrical infrastructure for EV charging in new construction can reduce those costs by 75% or more.[4] Given a prudent amount of capacity, innovative charging management systems can maximize the number of PEVs that can be served without electrical upgrades.

Market

Buildings last decades and the PEV market is growing. Governor Brown's goal is 1.5 million EVs on California roads by 2025, and we are on track to exceed this goal. By November 2016, more than 250,000 PEVs have been sold statewide.

Nearly 5% of new vehicle registrations in the Bay Area are PEVs.[5] Demand for charging is growing accordingly, and is on track to greatly exceed the minimum EV preparedness required by California's Green Building Standards (CALGreen).

[1] American Lung Association (2016) *Health and Climate Benefits of Zero Emission Vehicles*
[2] Siemens (2016) *Reaching 80x50: Technology Pathways to a Sustainable Future in San Francisco.*
[3] Interviews with ARUP, CB Engineers, Stok Engineers, IBEW, and ChargePoint.
[4] Energy Solutions (2016) *Plug-In Electric Vehicle Infrastructure Cost-Effectiveness Report for San Francisco.*
[5] California Department of Motor Vehicles data, analysis by Department of Environment.

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San Francisco vs. CALGreen – EV Readiness Requirements

	Non-Residential		Multifamily	
	CALGreen (January 1, 2017)	**San Francisco Proposal**	**CALGreen**	**San Francisco Proposal**
Minimum threshold	10 parking spaces	1 parking space	1-2 or 17+ units	1+ units
Spaces designed to serve PEVs	6%	100%	3%	100%

Proposed Applicability

New residential, commercial and municipal buildings, as well as major alterations to commercial and residential buildings. (B, I, M, A and R occupancies)

The San Francisco Green Building Code defines major alterations as a project scope including >25,000 square feet project area; and significant structural improvement; and significant mechanical, electrical, or plumbing work. Such projects are colloquially, "gut rehabs", which afford comparable opportunities to new construction.

Objective

Cost-effectively support the transition to electric vehicles by ensuring new buildings and certain major renovations are prepared for today's electric vehicle market, and have flexibility to support charging as the EV market grows over the life of the building.

Recommendation

Require new buildings to be ready to deliver electricity for EV charging to any parking space by:

- **Turnkey EV Readiness in 10% of parking spaces:** Support today's EV market by installing full circuits to enable simple installation and activation of standard Level 2 chargers.
- **Flexible EV Readiness in an additional 10% of spaces:** Install conduit from electrical panel(s) to each parking space, enabling easy installation of Level 2 chargers and flexibility to upgrade.
- **All remaining spaces - EV Capable:** To maximize opportunity for expansion, require project plans to indicate the path of future wiring to each parking space. Install conduit only in locations that are far more economical to access in new construction.
- **Overall:** Size electrical infrastructure (electrical service, panels, transformers, etc.) to simultaneously charge vehicles in 20% of parking spaces. With this capacity, innovative load management systems afford the option to install an EV charger in every parking space.
- **Flexibility:** Allow upgrading to "fast chargers" if desired.

Benefits

- Prepares building for EV market growth; reduces cost and hassle to provide EV chargers.
- Not requiring chargers avoids locking in current technologies, and ensures flexibility to add chargers as needed.
- Does not change parking requirements or create new parking.

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Cost

Electric vehicle charging can pose two categories electric infrastructure costs in new construction:

- Building electrical systems (Starting from electric meter, including wiring and all components)
- Local network (Upgrades to the electric grid, such as utility-owned transformers and other nearby infrastructure)

Building Electrical Systems

The report *Plug-In Electric Vehicle Infrastructure Cost-Effectiveness Report for San Francisco* found the ordinance as proposed poses minimal increase in the total cost of new construction, and considerable cost savings as chargers are installed. See: *http://bit.ly/evreadysfcosteffectiveness*

Summary: Cost of EV Readiness

Total Parking Area	Number of Turnkey EV Ready Spaces	Cost Per Turnkey EV Ready Parking Space	Added Cost to Entire Building	Estimated Increase in Cost Per Parking Space
10 Parking Spaces	2	$920	$1,840	$184
60 Parking Spaces	12	$860	$10,320	$172

Cost of EV Ready New Construction & Major Renovation vs. Retrofit

Local Network Cost (Utility Grid)

Cost borne by the developer for establishing new utility service are variable, and there is no consistent relationship to building size, use, or type. Therefore, generally consistent with CALGreen, the proposal caps the incremental cost of local network upgrades at $400 per parking space or housing unit, whichever is greater.