



City of Palo Alto

City Council Staff Report

(ID # 4823)

Report Type: Action Items

Meeting Date: 6/16/2014

Summary Title: EVSE Ordinance City Council

Title: Public Hearing: Recommend Adoption of an Ordinance Requiring All New Multi-Family Residential and Non-Residential Construction to Provide for Current or Future Installation of EV Chargers

From: City Manager

Lead Department: Planning and Community Environment

Recommendation

Staff recommends that the City Council adopt the attached local amendments to the California Green Building Standards Code requiring that all new Multi-Family Residential and Non-Residential construction provide for the current or future installation of Electric Vehicle chargers.

Executive Summary

On December 9, 2013, the Palo Alto City Council, in its regular City Council meeting, adopted an ordinance requiring all new single-family residential construction to provide the necessary circuitry for EV chargers. **At its December 9, 2013 meeting, the City Council also directed staff to bring back to them for their review an ordinance that would create EV-friendly requirements for all new construction of multi-family residential and non-residential structures.**

Staff convened the EVSE Task Force to develop recommendations for the current or future provision of EV chargers in the following circumstances:

- (1) New multi-family residential construction;
- (2) New multi-family residential construction, with individual attached parking;
- (3) New non-residential structures other than hotels;
- (4) New hotels

There are two attachments to this report. "Attachment A" is a draft ordinance that illustrates how the Task Force's recommendations may be implemented as a local amendment to the California Green Building Standards Code. "Attachment B" provides a detailed estimate of costs for a typical construction project which could incur as a result of the Task Force's recommendations.

On May 13th, 2014, the Policy and Services Committee met for a special meeting to review the recommendations of the EVSE Task Force. The Committee directed staff to proceed with the vast majority of the EVSE Task Force recommendations, with minor modifications. With one exception discussed below, the Committee's direction has been incorporated into the attached ordinance.

Background

In response to City Council direction, staff convened the EVSE Task Force to develop recommendations for new multi-family, non-residential, and hotel parking requirements that will make Palo Alto a leader in promotion of electric vehicles.

Mobile sources account for well over half of the emissions that contribute to ozone and particulate matter and nearly 40% of the greenhouse gas emissions in California. In order to help meet California's health-based air quality standards and greenhouse gas emission reduction goals, significant gains are needed in the transportation sector in terms of reduced petroleum usage.

Governor Brown's Executive Order of March 2012, directs state government to support and facilitate the rapid commercialization of zero-emission vehicles (ZEVs), with a target of having 1.5 million ZEVs on California roadways by 2025. In order to meet this goal and in order for electric vehicles to proliferate, it is important that early consumers have a positive experience and that facilities be readily available to provide convenient charging stations for the electric vehicles.

According to a 2012 study completed by the California Center for Sustainable Energy in coordination with the Air Resources Board, approximately 1,000 new plug-in vehicles are being sold in the state every month and, at that time, Californians owned more than 12,000 plug-in electric vehicles (roughly 35% of all plug-in vehicles in the United States).

These recommendations are developed in response to numerous requests by stakeholders to provide building standards that will meet current and future demands for Electric Vehicle Supply Equipment (EVSE) in multi-family dwellings and commercial (non-residential) buildings. These recommendations will encourage and support use of electric vehicles as an alternate means of transportation. The provisions for EVSE for multi-family construction are intended to provide low-cost strategies that offer choice and savings in design for multi-family unit homeowners and multi-family tenants wishing to purchase an electric vehicle without necessitating retroactive installation of higher capacity electrical wiring and supply equipment for charging electrical vehicles. The provisions for EVSE for commercial construction are intended to provide sufficient access to electric vehicle charging capabilities.

Staff has met multiple times with a group of stakeholders including EV owners, EVSE installers, contractors, and other related parties to review the recommendations brought before the

Policy and Services for review and the City Council for potential adoption. The recommendations before you were vetted with the Development Center Advisory Group (DCAG). During the first part of 2014, staff has continued the meetings with the EVSE Task Force to draft recommendations for new multi-family, non-residential, and hotel construction. In addition, staff has reviewed the EV permit fees and process to ensure it is cost neutral and EV friendly.

Discussion

By adopting the attached ordinance, the City of Palo Alto will require a three-tier combination of EVSE, EVSE ready outlets, and EVSE ready circuitry for new multi-family and commercial construction.

The highest tier requires an “EVSE” parking space that contains installed electric vehicle supply equipment capable of charging at 30A or higher at 208 or 240 volts. The second highest tier requires an “EVSE-ready outlet,” such that little or no additional work is required to install an EVSE. The third tier requires “conduit only” (also called “raceway only”) identical to the requirement the City Council adopted for new single-family construction. A requirement to provide conduit only may be met by providing an EVSE-ready outlet, and a requirement to provide an EVSE-ready outlet may be met by providing an installed EVSE.

In an effort to help illustrate to council the impact of these requirements to construction, staff has built two scenarios based on cost estimates for the purchase and installation of required supplies and equipment provided in Figure 1-1 in Attachment B.

New Multi-family residential requirements

The ordinance requires the following for new multi-family residential structures:

1. For new multi-family residential construction, the ordinance requires one EVSE-Outlet or EVSE Installed per unit.
2. For guest parking for new multi-family residential structures, the ordinance requires Conduit Only, EVSE-Outlet, or EVSE Installed for at least 25% of guest parking spaces. At least 5% of these spaces shall be EVSE Installed with a minimum of one EVSE Installed space. **A scenario has been provided in Figure 1-3 in Attachment B.**
3. For new multi-family construction with individual attached parking (i.e. tuck-under garages), the ordinance requires one attached space with Conduit Only, EVSE-ready, or EVSE Installed. This requirement is identical to the existing requirement for new single family residences.

New Non-residential requirements

The ordinance requires the following for new non-residential (i.e. commercial) structures:

1. For new non-residential construction, other than hotels, the ordinance requires Conduit Only, EVSE-Outlet, or EVSE Installed for at least 25% of parking spaces. At least 5% of

these spaces shall be EVSE Installed with a minimum of one EVSE Installed space. **A scenario has been provided in Figure 1-2 in Attachment B.**

2. For new hotels, the ordinance requires Conduit Only, EVSE-Outlet, or EVSE Installed for at least 30% of parking spaces. At least 10% of these spaces shall be EVSE Installed with a minimum of one EVSE Installed space.

General provisions

The ordinance further requires that:

1. Property owners provide minimum circuit capacity sufficient to ensure electrical service will be able to accommodate future installation of EV chargers in all spaces where an outlet or conduit are provided.
2. Conduit Only, EVSE-Outlet, or EVSE Installed be provided for accessible parking spaces, with the condition that parking will not be restricted to electric vehicles in accessible spaces with EV equipment or infrastructure.
3. The Conduit, Outlet or EVSE required by the ordinance be located to provide convenient access, subject to guidelines to be established by the City.

Policy and Services Committee Recommendations

At its May 13, 2014 meeting, the Policy and Services Committee approved the EVSE Task Force recommendations with three modifications.

First, the Committee directed staff to eliminate a distinction between multi-family residential structures developed with a condominium map and those developed without a condominium map. Upon implementing this change, staff found that an additional section dealing with mixed-use development was redundant and eliminated that section to further simplify the ordinance. In the event of mixed use development, the single-family and multi-family requirements will apply to those parking spaces reserved exclusively for residents, the residential guest parking requirements will apply to those spaces reserved exclusively for guests, and the non-residential requirements will apply to all remaining parking spaces.

Second, the Committee directed staff to reevaluate the ordinance with the Council in three years' time. This will provide an opportunity for the Council to assess EV market conditions, industry changes, and the practical impacts of the City's cutting edge EVSE requirements. Because the ordinance is structured as a local amendment to the Green Building Standards Code, the Council will automatically be required to revisit the issue in 2016, when all California Building Codes must be updated and adopted.

Third, the Committee directed staff to insert a requirement that the property owner bear the cost of electricity for actual EVSE installed in guest parking and commercial development. At this time, staff recommends returning the issue of payment to the Policy and Services Committee and moving forward with the remainder of the ordinance. In attempting to implement the Committee's direction on this issue, staff encountered a number of detailed

policy questions for which additional direction is required. In addition, staff is currently exploring opportunities with the electric utility to develop an incentive and rebate program to help offset the cost of installing and operating EVSE; staff hopes to bring these issues forward on a coordinated, City-wide basis. Finally, there is some question regarding the legal ability of the City to impose such a requirement. This is a developing area of the law, and there is a case pending in the California Supreme Court that may shed light on these issues. To allow further guidance on legal issues and additional policy direction from the Council, staff recommends addressing questions of payment for EV chargers at a later date.

Resource Impact

Resource impacts from the adoption of this ordinance will be the additional staff time in plan checking and inspections. As with the enforcement of all building standards by the City, these costs are recovered through Building Permit fees.

Environmental Review

This action is exempt from the California Environmental Quality Act (CEQA) under Sections 15061, 15303, and 15311 of the CEQA Guidelines.

Attachments:

- Attachment A: EVSE Ordinance for multi-family and commercial (PDF)
- Attachment B: Cost Analysis (PDF)

Ordinance No. _____

Ordinance of the Council of the City of Palo Alto Adopting Section 16.14.380 of the Palo Alto Municipal Code to Adopt Local Amendments to the California Green Building Standards Code and Related Findings

The Council of the City of Palo Alto does ORDAIN as follows:

SECTION 1. Findings and Declarations.

The adoption and amendment of Section A4.106.8 of the California Green Building Standards Code is justified on the basis of local topographical and geographical conditions. Failure to address and significantly reduce greenhouse gas emissions could result in rises to sea level, including in San Francisco Bay, that could put at risk Palo Alto homes and businesses, public facilities, and Highway 101 (Bayshore Freeway), particularly the mapped Flood Hazard areas of the City. The aforementioned conditions create hazardous conditions for which departure from California Green Building Standards Code is required.

SECTION 2. Section 16.14.370 of the Palo Alto Municipal Code is amended to read as follows:

16.14.370 Section A4.106.8 Electric Vehicle (EV) Charging.

Section A4.106.8 of the California Green Building Standards Code is added and amended to read:

A4.106.8 Electric Vehicle (EV) Charging for Residential Structures. Newly constructed single family and multifamily residential structures, including residential structures constructed as part of a mixed use development, shall comply with the following requirements for electric vehicle supply equipment (EVSE). All parking space calculations under this section shall be rounded up to the next full space. ~~New detached single family dwellings shall comply with the following requirements for electric vehicle supply equipment (EVSE):~~

A4.106.8.1 Definitions. For the purposes of this section, the following definitions shall apply:

- (a) Level 2 EVSE. "Level 2 EVSE" shall mean an EVSE capable of charging at 30 amperes or higher at 208 or 240 VAC. An EVSE capable of simultaneously charging at 30 amperes for each of two vehicles shall be counted as two Level 2 EVSE.
- (b) Conduit Only. "Conduit Only" shall mean, at minimum: (1) a panel capable to accommodate a dedicated branch circuit and service capacity to install a 208/240V, 50 amperes grounded AC outlet; and (2) raceway or wiring with capacity to accommodate a 100 ampere circuit; terminating in (3) a listed

cabinet, box, enclosure, or NEMA receptacle. The raceway shall be installed so that minimal removal of materials is necessary to complete the final installation.

- (c) EVSE-Ready Outlet. "EVSE-Ready Outlet" shall mean, at minimum: (1) a panel capable to accommodate a dedicated branch circuit and service capacity to install a 208/240V, 50 amperes grounded AC outlet; (2) a two-pole circuit breaker; (3) raceway with capacity to accommodate 100-ampere circuit; (4) 50 ampere wiring; terminating in (5) a 50 ampere NEMA receptacle in a covered outlet box.
- (d) EVSE Installed. "EVSE Installed" shall mean an installed Level 2 EVSE.

A4.106.8.2 Single Family Residences. The following standards apply to newly constructed detached and attached single family residences.

- (a) In general. The property owner shall provide Conduit Only, EVSE-Ready Outlet, or EVSE Installed for each residence. ~~as minimum a panel capable to accommodate a dedicated branch circuit and service capacity to install at least a 208/240V, 50 amperes grounded AC outlet. The raceway shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box, enclosure, or NEMA receptacle. The raceway shall be installed so that minimal removal of materials is necessary to complete the final installation. The raceway shall have capacity to accommodate a 100 ampere circuit.~~
- (b) Location. ~~Design.~~ The proposed location of a charging station may be internal or external to the dwelling, and shall be in close proximity to an on-site parking space consistent with City guidelines, rules, and regulations. ~~The proposed design must comply with all applicable design guidelines, setbacks and other code requirements.~~

A4.106.8.3 Multi-Family Residential Structures. The following standards apply to newly constructed residences in a multi-family residential structure, except as provided in section A4.106.8.4.

- (a) Resident parking. The property owner shall provide at least one EVSE-Ready Outlet or EVSE Installed for each residential unit in the structure.
- (b) Guest parking. The property owner shall provide Conduit Only, EVSE-Ready Outlet, or EVSE Installed, for at least 25% of guest parking spaces, among which at least 5% (and no fewer than one) shall be EVSE Installed.

- (c) Accessible spaces. The percentage calculations and substantive requirements imposed by this section shall be applied separately to accessible parking spaces. Parking at accessible spaces where an EVSE is installed shall not be limited to electric vehicles.
- (d) Minimum total circuit capacity. The property owner shall ensure sufficient circuit capacity, as determined by the Chief Building Official, to support a Level 2 EVSE in every location where Circuit Only, EVSE-Ready Outlet or EVSE Installed is required.
- (e) Location. The EVSE, receptacles, and/or raceway required by this section shall be placed in locations allowing convenient installation of and access to EVSE. In addition, if parking is deed-restricted to individual residential units, the EVSE or receptacles required by subsection (a) shall be located such that each unit has access to its own EVSE or receptacle. Location of EVSE or receptacles shall be consistent with all City guidelines, rules, and regulations.

A4.106.8.4 Exception – Multi-Family Residential Structures with Individual, Attached Parking. The property owner shall provide Conduit Only, EVSE-Ready Outlet, or EVSE Installed for each newly constructed residence in a multi-family residential structure featuring: (1) a parking space attached to the residence; and (2) a shared electrical panel between the residence and parking space (e.g., a multi-family structure with tuck-under garages).

SECTION 3. Section 16.14.380 of the Palo Alto Municipal Code is amended to read as follows:

16.14.380 Section A5.106.5.3 Electric Vehicle (EV) Charging for Non-Residential Structures.

Section A5.106.5.3 of the California Green Building Standards Code is added and amended to read:

A5.106.5.3 Electric Vehicle (EV) Charging for Non-Residential Structures. New non-residential structures shall comply with the following requirements for electric vehicle supply equipment (EVSE). All parking space calculations under this section shall be rounded up to the next full space.

A5.106.5.3.1 Definitions. For the purposes of this section, the following definitions shall apply:

- (a) Level 2 EVSE. “Level 2 EVSE” shall mean an EVSE capable of charging at 30 amperes or higher at 208 or 240 VAC. An EVSE capable of simultaneously

charging at 30 amperes for each of two vehicles shall be counted as two Level 2 EVSE.

- (b) Conduit Only. "Conduit Only" shall mean, at minimum: (1) a panel capable to accommodate a dedicated branch circuit and service capacity to install at least a 208/240V, 50 amperes grounded AC outlet; and (2) raceway or wiring with capacity to accommodate a 100 ampere circuit; terminating in (3) a listed cabinet, box, enclosure, or NEMA receptacle. The raceway shall be installed so that minimal removal of materials is necessary to complete the final installation.
- (c) EVSE-Ready Outlet. "EVSE-Ready Outlet" shall mean, at minimum: (1) a panel capable to accommodate a dedicated branch circuit and service capacity to install at least a 208/240V, 50 amperes grounded AC outlet; (2) a two-pole circuit breaker; (3) raceway with capacity to accommodate a 100-ampere circuit; (4) 50 ampere wiring; terminating in (5) a 50 ampere NEMA receptacle in a covered outlet box.
- (d) EVSE Installed. "EVSE Installed" shall mean an installed Level 2 EVSE.

A5.106.5.3.2 Non-Residential Structures Other than Hotels. The following standards apply newly constructed non-residential structures other than hotels.

- (a) In general. The property owner shall provide Conduit Only, EVSE-Ready Outlet, or EVSE Installed for at least 25% of parking spaces, among which at least 5% (and no fewer than one) shall be EVSE Installed.
- (b) Accessible spaces. The percentage calculations and substantive requirements imposed by this section shall be applied separately to accessible parking spaces. Parking at accessible spaces where an EVSE is installed shall not be limited to electric vehicles.
- (c) Minimum total circuit capacity. The property owner shall ensure sufficient circuit capacity, as determined by the Chief Building Official, to support a Level 2 EVSE in every location where Circuit Only, EVSE-Ready Outlet or EVSE Installed is required.
- (d) Location. The EVSE, receptacles, and/or raceway required by this section shall be placed in locations allowing convenient installation of and access to EVSE. Location of EVSE or receptacles shall be consistent with all City guidelines, rules, and regulations.

A5.106.5.3.3 Hotels. The following standards apply newly constructed hotels.

- (a) In general. The property owner shall provide Conduit Only, EVSE-Ready Outlet, or EVSE Installed for at least 30% of parking spaces, among which at least 10% (and no fewer than one) shall be EVSE Installed.
- (b) Accessible spaces. The percentage calculations and substantive requirements imposed by this section shall be applied separately to accessible parking spaces. Parking at accessible spaces where an EVSE is installed shall not be limited to electric vehicles.
- (c) Minimum total circuit capacity. The property owner shall ensure sufficient circuit capacity, as determined by the Chief Building Official, to support a Level 2 EVSE in every location where Circuit Only, EVSE-Ready Outlet or EVSE Installed is required.
- (d) Location. The EVSE, receptacles, and/or raceway required by this section shall be placed in locations allowing convenient installation of and access to EVSE. Location of EVSE or receptacles shall be consistent with all City guidelines, rules, and regulations.

SECTION 4. If any section, subsection, clause or phrase of this Ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portion or sections of the Ordinance. The Council hereby declares that it should have adopted the Ordinance and each section, subsection, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared invalid.

SECTION 5. The Council finds that this project is exempt from the provisions of the California Environmental Quality Act ("CEQA"), pursuant to Section 15061 of the CEQA Guidelines, because it can be seen with certainty that there is no possibility that the ordinance will have a significant effect on the environment.

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ATTACHMENT A
NOT YET ADOPTED

SECTION 6. This ordinance shall be effective on the thirty-first day after the date of its adoption.

INTRODUCED:

PASSED:

AYES:

NOES:

ABSENT:

ABSTENTIONS:

ATTEST:

City Clerk

Mayor

APPROVED AS TO FORM:

APPROVED:

City Attorney

City Manager

Director of Development Services

Director of Administrative Services

Attachment B: EVSE Cost Analysis

The EVSE Task Force has developed a cost analysis and assumptions for the application of the proposed ordinance. The cost assumptions include basic materials and installation cost as provided by industry experts and advocates in the EVSE Task Force. The estimated costs for typical construction activities related to EVSE installation are listed in Figure 1-1. The costs listed address the following items; conduit material (also called “raceway”), wiring material, electric panel circuits, protective circuit materials, and charger technology. The cost estimates also include the labor associated with installation.

Figure 1-1: EVSE Cost Analysis

Item	A. Estimated costs			B. Economies-of-scale for co-located parking (Percent Reduction By # of Installations)		
	Ave.	Low	High	2	5	20
Basic Materials						
100' of raceway for one parking spot - materials	\$214	\$170	\$235	0%	10%	20%
Installation of 100' of raceway only	\$646	\$515	\$710	0%	0%	0%
100' of 240V/ 50A wiring for one parking spot - materials only	\$186	\$170	\$205	0%	10%	20%
Installation of 100' of wiring only	\$450	\$360	\$495	0%	0%	0%
Installation of 100' of raceway & wiring- (material and install)	\$1,557	\$1,401	\$1,713	0%	10%	15%
Panel capacity supporting one 240V/50A circuit (per circuit)	\$400	\$390	\$440	0%	10%	20%
Protective requirements per 240V/50A circuit (disconnect)	\$450	\$360	\$500	0%	10%	20%
EVSE Equipment						
Basic single-head Level 2 charger (Non-network EVSE single head)	\$1,000	\$800	\$1,500			
Fully featured single-head Level 2 charger (Networked EVSE single head)	\$6,000	\$5,000	\$8,000			
Basic dual-head Level 2 charger (Non-network EVSE Double Head)	\$2,000	\$1,500	\$3,000			
Fully featured dual-head Level 2 charger (Networked EVSE Double Head)	\$7,500	\$5,500	\$8,000			

The cost estimation from Figure 1-1 has been applied to a typical commercial construction scenario and is illustrated in Figure 1-2. The numbers highlighted with a bold box have been used to populate the cost scenario.

The example new commercial office building is shown in Figure 1-2. This scenario assumes a 30,000 square-foot construction scope. For this scope, the electric vehicle requirement includes 5 fully functional EVSE spaces and 20 conduit-only spaces. The estimate also includes the city permit fees for installation.

The overall new construction cost for Figure 1-2 is estimated at \$250 per square foot totaling \$7,500,000. This estimate was obtained from Reed Construction Data, an industry standard source for cost estimating. The estimated EV cost for the commercial scenario is \$57,817. The estimated EV cost would increase the overall cost to the project by 0.8%.

Figure 1-2 New Commercial Construction EVSE Cost Analysis Scenario

Scenario assumptions: A 30,000 square-foot commercial building, requiring 6 fully functional EVSE (5 parking spaces and 1 ADA parking space) and 21 conduit-only parking spots (20 parking spaces and 1 ADA parking space).

Total Required

EVSE = 6 spaces
 Conduit Only = 21

120' of average distance to 5 parking spots that have chargers or are EVSE-ready

240V/50A conduit & wiring for 6 parking spots	\$8,408
Panel capacity for 6 parking spots	\$2,160
Protective requirements per 240V/50A circuit (disconnect)	\$2,430
Three fully featured dual-head Level 2 chargers serving 6 parking spots	\$22,500
City permits for the installation of 3 chargers	\$648
Subtotal	\$36,145
150' of average distance to the 21 parking spots that have conduit-only	
Conduit for 21 parking spots	\$5,393
Installation for 21 parking spots	\$16,279
Subtotal	\$21,672
Total	\$57,817

The cost estimation from Figure 1-1 has been applied to typical multi-family construction project and is illustrated in Figure 1-3. This scenario assumes a 30-unit, 30,000 square-foot, new construction project with 55 resident parking spaces and 10 guest parking spaces. The estimate also includes the city permit fees for installation.

The overall new construction cost for Figure 1-3 is estimated at \$300 per square foot totaling \$9,000,000. This estimate was obtained from Reed Construction Data, an industry standard source for cost estimating. The estimated EV cost for the new multi-family scenario is \$81,008. The estimated EV cost would increase the overall cost to the project by 0.9%.

Figure 1-3 New Multi-Family Residential - EVSE Cost Analysis Scenario

Scenario assumptions: A 30-unit, 30,000 square-foot multi-family residential building, with 55 resident parking spaces and 10 spaces dedicated to guest parking. This scenario requires 30 EVSE Ready spaces for residents. For guests, 1 EVSE and 2 conduit-only parking spots are required. For ADA, 1 EVSE and 1 conduit only will be required.

Total Required
 EVSE = 2 spaces
 EVSE Ready = 30 spaces
 Conduit Only = 3

120' of average distance to 33 parking spots that have chargers or are EVSE-ready

240V/50A conduit & wiring for 32 parking spots	\$44,842
Panel capacity for 32 parking spots	\$12,240
Protective requirements per 240V/50A circuit (disconnect)	\$12,960
One fully featured dual-head Level 2 chargers serving 2 parking spots	\$7,500
City permits for the installation of 1 charger	\$370
Subtotal	\$77,912
150' of average distance to the 3 parking spots that have conduit-only	
Conduit for 3 parking spots	\$770
Installation for 3 parking spots	\$2,326
Subtotal	\$3,096
Total	\$81,008

The EV Task force has also discussed the revenue generation associated with the installation of EVSE. In the case of EVSE with simple technology, the charging station only allows for no-cost charging by the EVSE owner. In the case of more advanced EVSE technology, the equipment owner may elect to require a fee for use of the charging station. In either condition, the potential revenue created from EVSE owners should be considered when analyzing the cost analysis and payback period of EVSE.