

**Memorandum**

**To:** City of Los Angeles City Council

**From:** David Peterson, Graduate Student Researcher, UCLA Luskin Center for Innovation

**RE:** Executive Summary: Electric Vehicles and Subsidized Parking

**Date:** November 2010

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The City of Los Angeles has the potential to be a worldwide leader in EV adoption, and it is considering policies that can increase the total number of EVs registered and/or operating within the City. Widespread EV adoption could substantially reduce Los Angeles' dependence on petroleum products (e.g. oil, gasoline and diesel), and lead to the emergence of a "clean energy" sector where power is generated from renewable resources.

Fixed costs, operating costs and any additional perks are considered by consumers when deciding whether or not to purchase an EV. One perk being considered by the City of Los Angeles City Council is offering free, or subsidized, parking on city-owned property (curbside and off-street parking).

The availability of EV charging stations, or Electric Vehicle Supply Equipment (EVSE) as they are commonly referred to in the industry, will affect the success of EV adoption. EVs require a completely new fueling infrastructure, and this poses significant challenges. In the initial stages of EV adoption, the availability of a reliable public EVSE infrastructure will be crucial to dampening "range anxiety." Range anxiety is the driver's fear that she will be unable to locate available EVSEs away from home, and that she will be stranded with an empty battery. The City of Los Angeles is confronted with the challenge of developing appropriate pricing schemes for EV charging in order to encourage EV adoption and minimize stress on the electricity grid, without compromising broader transportation and environmental goals.

Merging charging with parking requires the development of an entirely new infrastructure to address the refueling needs of EVs. Different refueling models exist, but plug-in refueling seems to be the most likely model given the variety of EVs coming to market in 2010-2011 that will all use a standard plug-in socket known as SAE J1772. Only stand-alone plug-in charging stations (i.e. EVSEs) are analyzed herein, given industry-wide standardization of plug-in sockets. A Level 2 charge (faster charge at 240 Volts) is the most likely charge level to be publicly provided on city owned parking spaces in the near term.

In order to continue supporting broader transportation goals of smarter trip planning and environmental goals of minimizing the transportation sectors' locally generated emissions, the following policy alternatives were considered (Table 1):

**Table 1. EV Parking Price Alternatives for EVSE Spaces**

	Alternative	Charging	Not Charging	Encouraging Adoption / Discouraging Overuse	
				SR	LR
Parking Price	1	Subsidized	Subsidized	Ineffective	Ineffective
	2	Full Price	Subsidized	Ineffective	Ineffective
	3	Full Price	Full Price	Ineffective	Somewhat effective
	4	Subsidized	Full Price	Effective	Somewhat effective
	5	Full Price	Impose Time Limits	Ineffective	Effective
	6	Subsidized	Impose Time Limits	Somewhat effective	Effective

The SR (short-run) and LR (long-run) scenarios are synonymous with the initial EV adoption period with a few vehicles, and widespread adoption of EVs with many vehicles, respectively. “Full Price” assumes the maximum possible price is charged. “Subsidized” assumes the price is significantly reduced, or free.

Alternative 4 is recommended for the introductory stages of EVs, and Alternatives 5 and 6 should be considered when EVs become more widespread. The moment to transition from a short-run to a long-run policy (i.e. from Alternative 4 to Alternative 5 or 6) will be signaled by overuse of EVSE parking spaces, resulting in excessive peak-period charging, and demand for public EVSEs greatly exceeding the supply. The City of Los Angeles should closely monitor the use of EVSE spaces to understand EV driver charging and parking behavior.

Alternative 4 recognizes that driving an EV is a learning experience for both the driver and the City. Subsidized parking while charging does not penalize drivers for charging at public spaces, contributing to reduced anxiety about vehicle and battery range. Given the initially small number of EVs, it is anticipated that peak period charging will have a minimal impact on the electricity grid. Fully-priced parking after a charge sends the signal to EV drivers that they must be attentive to the time it takes to charge their vehicles, but the policy is forgiving by not requiring the vehicle to vacate the EVSE space after charging. Furthermore, this policy maintains City parking revenue (except the lost parking revenue during charging periods), supports broader transportation and environmental goals, and encourages EV adoption.

A supportive parking policy is one way to support EV adoption, but there are others. For example, streamlining the process of installing residential EVSEs -- from the initial application to the final inspection -- could significantly influence EV adoption since most charging will take place at people’s homes. The City could also provide rebates to Los Angeles residents who purchase an EV.

The UCLA Luskin Center for Innovation is currently sponsoring two research projects to examine EV policy issues in the City of Los Angeles. One project will forecast EV penetration rates in order to better inform the City about where EVSEs should be located and when they need to be provided. A second project is analyzing what appropriate public EVSE policies should be, with special attention paid to multifamily residential charging, EVSE financing and business models, streamlining EVSE installation processes, electricity prices and parking.