Plugging in For Electric Cars

By Mary S. Smith

There has been a lot of press about the coming of plug-in electric vehicles, leaving parking facility owners wondering what they should do regarding electric vehicle recharging. A few models are already being sold in limited quantities and a half a dozen more are expected to be sold in the U.S. in the next year. The economic stimulus package signed in February 2009 provides tax credits for purchase of plug-ins of $2,500 to $7,500, depending on the size of the battery. President Obama's goal was to have one million plug-ins on the road by 2015; however other sources have estimated that the stimulus funds are only enough for 600,000 vehicles. In either case, that only represents more or less one-half of one percent of the vehicles on the road in the U.S.

Although vehicles will be shipped with a cord and plug for standard household outlets in the US, most owners will want higher voltage charging (220v): the BMW Mini EV (now available in the US in limited quantities) reportedly takes 21 hours to recharge at a normal household outlet.

Details of the infrastructure requirements for plug-ins are also not quite ready for prime time. The Society of Automotive Engineers has not yet issued its standard for recharging couplers, which would be a coupler that would extend from a fast-recharging station to plug into the vehicle. It must not only carry the power, but communicate data about the vehicle being recharged, and have safety features (i.e., shut itself off if somebody forgets to unplug it and starts to drive off.) In addition, devices are in development that would allow you to plug in the vehicle upon returning home from work, but not begin charging until 10 pm or later. Why? Because it

will be significantly less expensive (many estimate one half) the cost to recharge at home at night, when there is the most capacity in the grid for recharging.

Two recent studies paint a difficult road ahead for plug-in-hybrids. A recently completed report by the National Academy of Sciences[1] that concluded that unless gasoline prices rise and stay over four dollars per gallon, plug-ins are not cost-effective without massive government subsidies. There are also issues with the electrical grid in many areas not being able to handle daytime recharging, and the net reduction in greenhouse gases will not be that significant until our power generation industry "decarbonizes." The report's most optimistic projection for vehicles on the road by 2030 is only 13 percent, and its realistic estimate is half that.

A study by the Boston Consulting Group released in January 2010 was even more pessimistic, projecting that plug-ins will not be cost effective without significant subsidy until and unless there is a significant breakthrough in battery technology. For example, it projects the payback period for the Chevy Volt will be 19 years without subsidies/tax credits or significant increases in gasoline cost ($375/barrel vs $75-$100 now) or gasoline taxes.

Given that there will almost certainly have to be incentives to recharge vehicles at night, our recommendation to owners for new construction is to assure that there is adequate power **capacity** to "fast charge" vehicles at three percent of the stalls in commuter and transient parking facilities. An owner wishing to be as green as possible probably should only provide recharging stations for at most one percent of stalls. They can add more recharging units as needed. For residential parking, power capacity should be provided for 10 to 15 percent depending on how urban the setting is, but again with only a few charging stations to start. We recommend installing a commercial charging system such as Charge Point™ and charging customers for the

[1] "Transitions to Alternative Transportation Technologies – Plug-In Hybrid Electric Vehicles" available at http://www.nap.edu/catalog.php?record_id=12826

recharge, in order to encourage night-time recharging which is far more sustainable. Employers should consider adding subsidy of recharging subscriptions to alternative transportation programs (transit passes or car-van pooling.)

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