



CRITICAL ISSUES IN HOTEL ELECTRIC VEHICLE CHARGING STATIONS

John Kalb
EV Charging Pros
<http://www.evchargingpros.com>

After years of preparation, the electric vehicle industry is gathering real momentum. From multiple vehicle models for consumers to choose from to the growth of publically available charging stations, it is clear that the electric vehicle market is at the beginning of a significant growth curve. The Electric Vehicle Drive Association reports that over 69,000 plug in vehicles (both hybrids and all electric) have been sold in the United States in 2013, up from 52,000 for the entire 2012 model year. Since 2008 over 150,000 highway-capable plug-in electric cars have been sold in the US through October 2013.

Infrastructure Standards Are Available

With a worldwide plug standard (SAE J1772) now in place for both charging devices and cars, EVSE (the industry term for a “charging station”) is now being deployed commercially around the world. EVSE stands for Electric Vehicle Supply Equipment.

A major industry organization, Pike Research, projects that by 2015 close to 200,000 charging stations will be installed on commercial properties and in public spaces across the country—a more than tenfold increase from today. The Department of Energy states that as December 1, 2013 there are 19,413 electric fueling stations in the US.

Hotels have been installing electric fueling stations at an accelerated pace. By the end of 2012,

more than 50 Marriott properties offered EV Charging Stations with that number continuing to grow in 2013. Marriott now lists the properties with dedicated electric vehicle charging stations section on their website.

The Decision Process

Hotels are becoming aware of the competitive advantage they receive when they install and operate an EVSE in a competitive marketplace. The idea of adding a charging station to differentiate your property can be attractive if it attracts guests. It seems simple, install a charging station and guests will search out your property and stay at your hotel for an overnight charge. If you strike now, you set yourself apart from the competition, maximizing the benefits to your company both today and over time.

Yet the challenge in deploying EVSE infrastructure is not as simple as selecting a vendor, purchasing equipment and letting guests charge as necessary. Questions you will have to answer in the beginning are how many stations, where do you place them, do you charge guests for the service, which type of chargers to purchase or lease, and which promotional networks to join. You will also have to consider questions regarding installation, marking and promoting the stations, managing the availability of the stations, valet charging, capturing user experiences, codes and regulations, interfacing with PMS (Property Manage-



“Fairmont Hotel Electric Vehicle Charging Station”

ment System) and determining if outsourcing the entire program is the best way to go.

The decision about why and how to install charging stations is always organization and site specific. Any decision requires an understanding of a complex set of information required to effectively deploy and operate EV charging stations. This is a decision that is at once both strategic and tactical. The strategic aspects should be well considered by the CEO, senior

marketing executives, and/or director of sustainability. In too many companies, however, EVSE is seen as a short-term tactical decision, and so determined largely by facilities and operations managers, with a focus on price and technology issues rather than overall strategy. Once a company realizes that no one is addressing the bigger strategic questions, this can lead to stalled projects.

Businesses must first choose from three major competing charging and operational models, each touted by its proponents as “The Way”:

- In the owner-operator model, a business (the hotel) runs the EVSE, offering free charging services to tenants or customers and accruing profits through higher occupancy, increased foot traffic, and/or customer loyalty.
- In the networked service model, a business (the hotel) determines what to charge end users, splitting the income with an EVSE vendor that operates the networked-based transactional back-end.
- In the leasing model, the company outsources all EVSE installation and operations to an outside contractor, which leases the space for a set fee. The contractor handles everything from deployment and maintenance to pricing and advertising.

Other information is just as critical in the decision making process. Pursuing the EVSE opportunity means assembling a team of decision makers from across the company. Together, such a cross-functional team can research and evaluate multiple vendors and business models and then craft a comprehensive deployment plan.



Car receiving electrical charge



Parking lot with multiple charging stations

Major issues for consideration:

Are we installing a single charger or scalable infrastructure for multiple chargers over time? This goes to the heart of the existing power availability of a property, as the industry standard Level 2 charger requires a single dedicated 240v circuit and a 40a breaker for each charging station. Scalable infrastructure may require additional transformers and power panels. Power availability and load calculations are critical because the National Electric Code (NEC) Article 625 states that charging stations are continuous devices, meaning that for permitting considerations the stations are always drawing load.

Where to locate the charging stations? Frequently the “best” location is visible to the public and adds to a property’s curb appeal though often a long distance from the power room. The cost of installing a charging station is directly related to the length of the run of conduit and trenching, concrete and landscaping requirements.

Why ADA Compliant?

There is also the issue of accessibility to be considered. While charging stations are technically considered “alternative fueling stations” and are not covered by current ADA regulations, most cities require that the first station deployed be “accessible” to the ADA specification.

Three Levels of Charging Stations.

Modern charging equipment consists of the vehicle’s standard connector and receptacle based on the standard developed by the Society of Automotive Engineers (SAE J1772) International. Any vehicle with this plug receptacle should be able to use any J1772-compliant Level 1 or Level 2 EVSE. All major vehicle and charging system manufacturers support this standard in the U.S. This standard also eliminates drivers’ concerns about whether their vehicle is compatible with our nation’s infrastructure.

Level 1 or AC Level 1 EVSE provides charging through a 120 volt AC plug and requires electrical installation per the National Electrical Code. Most Level 1, if not all, will come with an AC Level 1 EVSE cord set so that no additional charging equipment is required. On one end of the cord is a standard, three-prong household plug (NEMA 5-15 connector). On the other end is a J1772 standard connector (see the Connectors and Plugs section below) which plugs into the vehicle.

AC Level 1 is typically used for charging when there is only a 120 V outlet available or when the vehicles are going to be parked for a stretch of time, such as overnight parking at airports and hotels. Based on the charging capabilities of most vehicles today, AC Level 1 charging adds about 5 miles of range per hour of charging time.

Level 2 equipment uses the same connector on the vehicle that Level 1 equipment uses and seems to be the preferred choice of many drivers who use public charging stations.

Level 2 charging uses 240 V or 208 V electrical service for commercial and residential applica-

tions. Level 2 EVSE requires installation of a dedicated circuit of 20 to 80 amps, depending on the EVSE requirements. Level 2 charging is offered by almost all equipment vendors and frequently is integrated with charging network software, which allows site hosts to set access policies, transaction or session fees as well as collect and reconcile payment by drivers. A discussion of network features will be in the next article. Based on the charging capabilities of most vehicles today Level 2 charging adds about 20 miles of range per hour of charging time. Link to more info at:

www.afdc.energy.gov/electrical_charging

DC Fast Charging (DCFC) equipment, typically requires typically 480 V AC input. These chargers enable rapid charging along heavy traffic corridors and at public stations. There is a lot of focus in the industry at creating a network of DCFC along highways to service the needs of drives requiring a fast charge for a fee. Not all vehicles can use DCFC due to the requirement to have a completely different plug than the J1772. In the future resolving plug compatibility will be a key to the evolution of the EV industry.



The standard J1772 receptacle can receive charge from Level 1 or Level 2 equipment.



An electric car charging station for underground garage.

Charging Time

How long does it take to charge a vehicle? Each car using a charging station will require a different time to charge. Charging a vehicle is actually dependent on three intersecting concerns,

1. How much power is the charging station receiving (110v/15a or 240v/40a.),
2. What is the capability of the on-board vehicle charger to draw that energy and convert it to use by the battery (usually 3.3 kWh or 6.6 kWh) and ,
3. What is the size and state of charge of the battery (15kWh up to 30 kWh 10% to 100% required). A good rule of thumb is that a vehicle using a standard Level II charging station will be able to put up to 20 miles of range in the battery in an hour.

Charging Times per Level

(from completely empty to completely full):

1. Level 1: Standard charge time: 12-16 hours
2. Level 2: Standard charge time 4-8 hours
3. Level 3: Standard charge is less than 30 minutes (also known as fast-charge)

Hotels have a unique opportunity to differentiate their property both for short-term uses (such as meetings and events) and with increasing daily occupancy rates for overnight guests. Planning, designing and deploying charging EVSE infrastructure may seem complex but, it is no more complex than any other capital improvement project. And, unlike other amenities a property might invest in, offering electric vehicle charging can create a clear marketing benefit to an attractive demographic looking for locations to visit on a regular basis.

A Growing Market

The electric vehicle movement is rapidly becoming a reality. Canada now has a “Green Highway” of charging stations conveniently located across the country enabling EV owners to drive from the Atlantic to the Pacific Ocean without “range anxiety”. In the U.S., states are taking the initiative; North Carolina is developing their own “Green Highways” with charging stations at rest areas and exits along its highways, New York’s Governor Cuomo announced Charge NY, a new \$50 million initiative to promote EVs by installing 3,000 public charging stations by 2018 to service 40,000 EVs which is expected to grow to one million by 2025 and Illinois is offering a 50% rebate to hotels to encourage installation of EVSE in 2013. (<http://www.afdc.energy.gov>)

As the demand for EVSE grows, hotels are busy investigating how to link the EVSE to room reservations and yes, charge an additional fee. This ensures the EV guest is guaranteed a space and charger for their stay and the EVSE becomes a profit center. The increase in EV’s is leading hotels, communities and rental car agencies into partnerships to ensure the EV driver has access to a charging station during their stay.

These and many other considerations will be addressed in future issues of *Lodging Engineer* magazine. Visit our website Resource Center for more information at <http://www.nahle.org>.

John Kalb of EV Charging Pros guides commercial property owners and managers through the EV charging process—from strategy to tactical deployment and operation. His team has deployed over 300 charging stations since 2010. John Kalb can be reached at johnk@evcharging-pros.com or (415) 209-6585.