

What are the best venues for publicly accessible EVSE units? (A first look) May, 2013

When fully deployed, The EV Project will collect usage data on approximately 5,000 non-residential alternating current (AC) Level 2 Electric Vehicle Supply Equipment (EVSE) units. While some are deployed in workplace or fleet applications, one of the primary goals of The EV Project is to study the location and use of publicly accessible infrastructure. Consequently, the vast majority of these non-residential EVSE units are installed near shopping malls, business offices, retail locations and other sites commonly accessed by Plug-in Electric Vehicle (PEV) drivers. This paper concentrates on how utilization of these EVSE units varies by the venue associated with the EVSE units.

Why is this important?

Publicly accessible EVSE infrastructure is in its infancy in this developing market. New habits are being formed by PEV drivers in charging their EV away from home. Retail business owners and public officials desire to support this new market but want to see that there can be a return on their investment. Will the EVSE be used if installed here?

Consequently, many are asking whether The EV Project can identify the best locations for publicly accessible EVSE units.

What is meant by “best” location?

The EV Project has found that there can be many definitions for “best” because there are many reasons why charging site hosts desire to provide charging infrastructure at their facility. For example, some may be supporting this industry for its greenhouse gas (GHG) reductions, the reduction in petroleum usage, or public image may be important. Others may be looking for the business advantages that may occur in attracting the PEV drivers, or maybe they just want to be providing leading edge technology.

In this review of the early deployment, there are no poor choices for sites for publicly accessible infrastructure because every installation tells a story and we learn from its use, or lack thereof. In the long run, there are no poor locations, unless or until there are data to refute the reason for the choice of that location.

Nevertheless, those seeking guidance for the installation of publicly accessible EVSE units will probably desire locations that will be frequently used by PEV drivers.

Consequently, a metric is needed that characterizes frequent utilization. However, we need to refine this focus further. Public infrastructure installed at multi-family dwellings or park-and-ride locations may have high utilization in terms of hours connected, but few users.

The EV Project is an infrastructure study to consider the interaction of PEV drivers with publicly accessible EVSE units. An important objective in The EV Project is to also evaluate revenue models. Thus, access control and access fees are a feature of most of the Blink EVSE units installed by The EV Project. Access to public charging is for the convenience of the PEV driver, and thus, fees are based upon the number of hours connected rather than energy dispensed (See also Electric Vehicle Public charging – Time vs. Energy Lessons Learned report). The fee structure also provides for revenue sharing with the charging site host.

Using this fee structure, drivers are encouraged to obtain the charge they need at a low cost, but not linger at the station longer than is necessary. Thus, turnover is encouraged so others can use the EVSE units as well. Therefore, this paper will consider the “best” location for public EVSE as the locations with high utilization with high turnover.

Metric Selection

Utilization of the public EVSE unit is still developing as PEV drivers explore their vehicle range boundaries. Some EVSE units are used on a regular basis and others less frequently. A metric based on a current weeks use is not sufficient, since the EVSE unit that is used extensively one week may not be used the next. The time period over which the analysis is based is also important. For this initial look, the metric selected was the average number of connect events per week since each EVSE’s installation (The first 4 weeks of data are not included as a grace period to allow drivers to become aware of the EVSE’s existence). A “connect event” is defined as the insertion of the EVSE connector into the PEV charge port, after which time some power transfer actually occurred (We are not interested in the number of times someone may show a friend how to connect their PEV for a charge).

Venue Classification

Because we are interested in the venue associated with publicly accessible EVSE units, we are excluding workplace and fleet locations for this first look, unless the host also provides the EVSE unit for public use. For these publicly accessible EVSE units, The EV Project classifies host venues into the following categories:

1. **Arts and Entertainment:** The EVSE unit is located at a theater, gallery, or museum, for example.
2. **Auto Dealer:** The EVSE unit is located at a retail car dealership, but not at a manufacturing plant.
3. **Business Office:** The EVSE unit is located at a company’s place of business, manufacturing plant or warehouse servicing visitors primarily, but may include employees.
4. **Educational Service:** The EVSE unit is located at a school or college parking lot.
5. **Government/Public Administration:** The EVSE unit is located at a city, state or federal building, public library or other publicly-owned facility.
6. **Healthcare/Medical:** The EVSE unit is located at a hospital or medical center, but not a doctor’s office or pharmacy.
7. **Hotel:** The EVSE unit is located at a hotel.
8. **Transportation Hub:** The EVSE unit is located for users at airports, cruise ship ports, bus stations, park-n-rides, or train stations.
9. **Mall:** The EVSE unit is located in a strip mall, large shopping mall, or outlet serving several stores and venues and not particularly tied to a single big box or theater.
10. **Military Installation:** The EVSE unit is located on a military installation, but not a fleet application.
11. **Multi-Family:** The EVSE unit is located in a multi-family dwelling area.
12. **Non-Profit:** The EVSE unit is located at a church, temple, labor union, Red Cross, etc.
13. **Parking Lot or Garage:** The EVSE unit is located in a parking lot or street-side serving many businesses and offices, and not directly related to one type of venue. It can be public or privately owned.
14. **Parks and Recreation:** The location of the EVSE unit is in a parking area of a National, State or Local park; e.g. Balboa Park, or a sporting venue; e.g. Chase Field.
15. **Professional and Technical Services:** The EVSE unit is located at a business that offers professional services; i.e. doctor’s office, lawyer’s office, accountant, real estate, architects, laboratories, consultants, etc.
16. **Restaurant:** The EVSE unit is located at a food service facility, including fast food.
17. **Retail, Big Box, National:** The EVSE unit is located at a large retail location, e.g. Best Buy, IKEA, standalone Sears, Kohl’s or Macy’s.
18. **Retail, Local, Small Business:** The EVSE unit is located at a local retail business, e.g. electronics, flowers, hairdresser, clothing, grocery, rental car facility, pharmacy, gas stations, etc., but not a big box business.
19. **Image:** The EVSE unit is placed as an image maker for the host, who is more concerned about presenting the green image than any potential utilization or usage metrics or revenue.
20. **Utilities:** The EVSE unit location is at the offices of water, gas or electric utility.

EV Project Region

For this initial look, all regions of The EV Project were included. Later reviews will consider individual regions.

Conclusion

Fleet and workplace EVSE units were not considered for this evaluation. Most public locations in The EV Project installed more than one EVSE unit to allow for demand growth. Because all installed EVSE units contribute to the site’s utilization, the connect events for all site units were summed.

Table 1 identifies the total number of sites in each category for all EV Project regions. For example, there are a total of 122 sites which are classified in the Retail, Small Business, and Local category. For each of these sites, the average number of connect events per week was calculated. All the site values then were averaged for input to Table 1 as “Average events per week” in that category. The sites with the lowest and the highest weekly averages are also identified. The quantity of sites is indicated for clarity and to show the wide variety of venues served by the Blink EVSE in The EV Project.

Table 1. Average Connect Events per Week by Venue

Venue	Number of Sites	Lowest Events per Week	Highest Events per Week	Average of Events/ Week
Arts & Entertainment	42	0.02	189.25	7.10
Business Office	54	0.01	130.45	6.41
Retail, Big Box, National Accounts	61	0.20	63.04	4.60
Malls	18	0.03	32.40	4.43
Utilities	35	0.05	65.97	4.26
Parking lots & Garages	147	0.03	63.96	3.88
Healthcare/Medical	39	0.04	11.27	3.02
Retail, Small Business, Local	122	0.01	36.02	2.85
Educational Services	74	0.05	15.83	2.63
Hospitality/Travel	114	0.04	66.65	2.36
Govt/Public Admin	92	0.04	36.15	2.33
Non-profit	19	0.10	14.06	2.17
Automotive	20	0.06	12.50	2.04
Professional & Technical Services	19	0.08	6.09	1.94
Restaurants	82	0.01	38.14	1.83
Multi-family	19	0.08	11.52	1.74
Parks & Recreation	11	0.16	3.65	0.87
Military	1	0.12	0.12	0.12
Total Sites	1048			
Fleet	35	0.02	138.44	6.89
Workplace	44	0.03	74.09	8.03

It could well be that while the Arts and Entertainment venues show the highest number of connect events per week for all markets in The EV Project, it may not be the highest in each of the markets.

It is of interest to note that all venues have sites with low utilization. This suggests that venue is not the only factor in determining the best locations for publicly accessible EVSE units.

Because this is a first look and this paper sets the foundation for later reviews, we present this initial information with few observations. It is noteworthy to reiterate that a venue which appears low on this list does not mean that the venue is a poor choice. High utilization with high turnover may not have been the host selection criteria.

We also note that the venue is not the only factor important in selecting optimal locations for publicly accessible EVSE units. Other factors will be explored in other papers.

About The EV Project

The EV Project is the largest electric vehicle infrastructure demonstration project in the world; designed and managed by ECOTality North America (ECOTality), with a budget of over \$230 million USD, equally funded by the U.S. Department of Energy through the American Recovery and Reinvestment Act and ECOTality and its partners. The EV Project will deploy and study approximately 13,000 Level 2 EVSE charging stations for residential and commercial use, as well as 200 dual-port DC Fast Chargers in conjunction with the usage data from 8,000 Nissan LEAF™, Chevrolet Volts. This project will collect and analyze data, and publish lessons learned on vehicle and EVSE use, and driver behavior. This material is based upon work supported by the Department of Energy under Award Number DE-E0002194.

Company Profile

ECOTality, Inc. (NASDAQ: ECTY), headquartered in San Francisco, California, is a leader in clean electric transportation and storage technologies. Its subsidiary, Electric Transportation Engineering Corporation (eTec) dba ECOTality North America (ECOTality), is a leading installer and provider of charging infrastructure for PEVs. ECOTality has been involved in PEV initiatives since 1989 in North America and is currently working with major automotive manufacturers, utilities, the United States (U.S.) Department of Energy (DOE), state and municipal governments, and international research institutes to implement and expand the presence of this technology for a greener future.

For more information, visit www.theevproject.com

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