Categorizing EVSE Venues: Describing Publicly Accessible Charging Station Locations

September 2014

Introduction

Many stakeholders in the plug-in electric vehicle industry are interested in how non-residential electric vehicle supply equipment (EVSE) units are used at various types of locations. The EV Project, ChargePoint America, and West Coast Electric Highway project provided the opportunity to collect data from Blink, ChargePoint, and AeroVironment brand charging stations installed around the United States. Over 6,000 EVSE charge ports were installed at publicly accessible sites as part of these demonstrations.

In order to analyze EVSE usage by location, it was necessary to create a system for categorizing EVSE sites by location type or venue. A two-level classification system was selected, in which EVSE sites were assigned a primary venue and a sub-venue. The primary venue is a coarse classification that broadly defines the site location and provides a general perspective on why a plug-in electric vehicle driver would be parking at that location. Primary venue categories were chosen to be compatible with other plug-in electric vehicle charging infrastructure demonstrations [1]. A sub-venue subdivides the primary venue category to provide an additional level of detail.

Information provided about EVSE sites by The EV Project, ChargePoint America, and AeroVironment, as well as publicly available information, was used to classify EVSE sites into venue categories. The publicly available information sources that were used included Google Earth, Google Maps, Google Street View, PlugShare, ReCarGo, and various ESRI geographic layers. Geospatial data were visually inspected and cross-referenced with project data to classify each EVSE site.

The purpose of this document is to define each primary venue and sub-venue category. The results from the analysis of EVSE usage by venue will be presented in future papers.

Primary Venues

Education: Training facilities, universities, or schools.

Fleet: EVSE known to be used primarily by commercial or government fleet vehicles.

Hotels: Hotel parking lots provided for hotel patron use.

Leisure Destination: Parks and recreation facilities or areas, museums, sports arenas, or national parks or monuments.

Medical: Hospital campuses or medical office parks.

Multi-Family: Parking lots serving multi-family residential housing (also referred to as multi-unit dwellings).

Non-Profit Meeting Places: Churches or charitable organizations.

Parking Lots/Garages: Parking lots or garages that are operated by private parking management companies, property management companies, or municipalities that offers direct access to a variety of venues.

Public/Municipal: City, county, state, or federal government facilities.

Retail: Retail locations both large and small, such as shopping malls, strip malls, and individual stores.

Transportation Hub: Parking locations with direct pedestrian access to other forms of transportation, such as parking lots at airports, metro-rail stations, or ferry port parking lots.

Workplace: Business offices, office parks or campuses, or industrial facilities.

Sub-Venues

Arts and Entertainment: Museums, sports arenas, concert halls, or theaters.

Auto Dealer: A retail location that sells automobiles.

Business Office: Large office buildings and business office parks.

Church: Religious meeting houses or places of worship.

City: City buildings, facilities, or parking areas.

County: County buildings and facilities.

Educational Services: Education facilities, such as colleges, training facilities, and K-12 schools.

Fleet: EVSE known to be used primarily by commercial or government fleet vehicles.

Healthcare/Medical: Hospital campuses or medical office parks.

Hotels: Hotel parking lots provided for hotel patron use.

Mall/Shopping Center: Indoor or outdoor shopping areas containing multiple national chains and/or local retailers.

Multi-Family: Parking lots serving multi-family residential housing (also referred to as multi-unit dwellings).

Parking Lots/Garages: Parking lots or garages that are operated by private parking management companies, property management companies, or municipalities that offers direct access to a variety of venues.

Parks and Recreation: Parks or public recreation facilities, such as soccer complexes and tennis parks.

Professional/Technical: Establishments that provide intellectual services, such as law offices, architects, or consulting groups.

Restaurant: Restaurants, such as fast food establishments or fine dining facilities.

Retail-Big: Retail stores that occupy large amounts of physical space and offer a variety of products to their customers, such as Kohl's or Fred Meyers.

Retail-Small: Retailers operating in smaller storefronts, often specializing in niche products or services. Specific examples are hair salons, gas stations, wineries, and car rental facilities.

State: State buildings or facilities.

Transportation Hubs: Parking locations with direct pedestrian access to other forms of transportation, such as parking lots at airports, metro-rail stations, or ferry port parking lots.

Utility: Organizations that maintain energy-related infrastructure for a public service, such as power plants or natural gas lines.

Relationship of This Paper to Prior Works

This document builds on a previous publication entitled, "What are the best venues for publicly accessible EVSE units? (A first look)" that was published in May 2013 [2]. The venue category definitions provided in this document supersede the definitions presented in the May 2013 paper.

About The EV Project

The EV Project was the largest plug-in electric vehicle infrastructure demonstration project in the world and it was equally funded by the United States Department of Energy (DOE) through the American Recovery and Reinvestment Act and private sector partners. The EV Project deployed over 12,000 AC Level 2 charging stations for residential and commercial use, as well as over 100 dual-port DC fast chargers. Approximately 8,300 Nissan LEAF™, Chevrolet Volts, and Smart ForTwo Electric Drive vehicles were enrolled in the project.

Project participants gave written consent for EV Project researchers to collect and analyze data from their vehicles and/or charging units. Data collected from the vehicles and charging infrastructure represented almost 125 million miles of driving and 4 million charging events. The data collection phase of The EV Project ran from January 1, 2011, through December 31, 2013. Idaho National Laboratory is responsible for analyzing the data and publishing summary reports, technical papers, and lessons learned on vehicle and charging unit use.

Company Profile

Idaho National Laboratory is one of DOE's 10 multi-program national laboratories. The laboratory performs work in each of DOE's strategic goal areas: energy, national security, science, and the environment. Idaho National Laboratory is the nation's leading center for nuclear energy research and development. Day-to-day management and operation of the laboratory is the responsibility of Battelle Energy Alliance.

For more information, visit avt.inl.gov/evproject.shtml.

References

[1] EVSE Cluster Analysis Electric Vehicle Supply Equipment Support Study, http://www.transportationandclimate.org/sites/default/files/EVSE_Cluster_Analysis.pdf

[2] http://avt.inl.gov/pdf/EVProj/111608-673919.vu-rev-a.pdf