PUBLIC CHARGING NETWORK DATABASE

Overview

C2ES is building the Public Charging Network Database to assist in evaluating the current state of electric vehicle (EV) charging in Washington State (Task 1). It will present an up-to-date view of EV deployment and charging infrastructure, and will be geographically disaggregated to represent local conditions throughout Washington. In addition to the database, C2ES will produce a white paper, interactive maps, and a presentation that includes all of the principal findings.

In order to bring together a comprehensive view of charging, C2ES called upon the leading infrastructure stakeholders, including Washington DOT, ChargePoint, and Idaho National Laboratory. (Idaho National Laboratory is the main entity responsible for the U.S. Department of Energy's EV Project.) C2ES additionally collected EV deployment and EV shares of total vehicles across the state, and matched this with demographic data as well as data on federal and state-level policies and incentives.

The Public Charging Network Database aims to organize much of the relevant data on charging and vehicle deployment in Washington State to assist in evaluating the status of the state's EV charging network. To assemble the database, C2ES is:

- Gathering the latest and most comprehensive data on EV ownership and publically-accessible EV charging infrastructure in Washington.
- Combining the data on EVs and charging infrastructure at a geographically relevant level, such as the 5-digit ZIP code level.

C2ES is building the database to inform decision-makers and to be easily updated and maintained in light of evolving EV and charging infrastructure deployment.

Analysis Approach

Based on its collected data and analysis, C2ES will glean insights from the current state of the EV market in Washington State, utilization rates of charging stations, and gaps in the EV charging network. C2ES will complete analysis using the following methods:

- **Temporal analysis**: C2ES will study the changes in EV registration and charging station deployment and utilization over time.
- **Travel analysis**: C2ES will use comparable data on households, commuting patterns, and traffic intensity to evaluate the existing charging infrastructure against basic criteria of connectivity and service to major population and commuting corridors. By comparing the existing charging network to typical mileage ranges for EVs, C2ES can see the extent that existing charging stations serve the existing fleet.

- **Market growth analysis**: C2ES will also examine the potential for existing infrastructure to meet growth in EV deployment. In identifying the neighborhood characteristics of high-utilization charging stations we can identify the charging services that high-utilization stations could provide for a growing fleet of EV vehicles, and what a more dense charging network could accomplish in terms of serving growth in EV ownership.

The scope of any analysis C2ES completes is dependent on data accessibility. For instance, if C2ES is unable to get sufficient data on the date of charging station installations or vehicle registrations, then temporal analysis will be limited.

Database Organization

The Public Charging Network Database is currently stored in multiple Microsoft Excel files on the C2ES SharePoint website. The following describes the contents of each file along with C2ES's intentions to use these data to complete Task 1. Hyperlinks are included below to the files on the SharePoint website and the original data sources.

Filename: wa.xlsx

Description: This file will contain a dashboard—a dashboard is a visual display of the most important information needed to achieve one or more objectives, which fits entirely on a single computer screen—to allow users to get a high-level overview of the state of EVs in Washington.
Source: currently no data, but will be linked to data files listed below.
Changes to source data: N/A
Additions to source data: N/A
Shortcomings in the data: N/A

Filename: wa-county.xlsx

Description: This file provides a county-level overview of key social-economic indicators, and the number of EVs.
Source: The census data is from the 2013 American Community Survey. The vehicle data comes from "by county" worksheet of the wa-vehicle.xlsx file.
Changes to source data: N/A
Additions to source data: N/A
Shortcomings in the data: This file does not contain charging station and port data at the county-level since the individual charging station data does not list county information. In addition, this file does not include county-level vehicle miles traveled (VMT) since C2ES does not have a suitable VMT metric yet.

Filename: wa-zip.xlsx

Description: This file provides a ZIP-code-level overview of key social-economic indicators, the number of EVs, and the number of charging stations and ports by ZIP code.
Source: The census data is from the 2013 American Community Survey. The vehicle data comes from "by zip" worksheet of the wa-vehicle.xlsx file. The charging station data is from U.S. Department of Energy's Alternative Fueling Data Center. Based on vehicle registration, and charging stations and ports, the spreadsheet determines whether each ZIP code has: registered vehicles and charging stations, registered vehicles and no charging stations, no registered vehicles and charging stations, and no registered vehicles and no charging stations. The results of this analysis is displayed as a pivot table in the "By cars&stations" worksheet.
Changes to source data: N/A

Additions to source data: N/A
Shortcomings in the data: This file does not include ZIP-code-level VMT since C2ES does not have a suitable VMT metric yet.

Filename: wa-charging.xlsx

Description: This source file contains a list of charging stations in Washington, as of June 2014.
Source: The charging station data is from the U.S. Department of Energy's Alternative Fueling Data Center.
Changes to source data: This source file contains an "Access Days Time" column which has been changed to uniformly code stations that are open 24 hours, 7 days a week.
Additions to source data: This source file contains a new column "Charger Type" denoting whether a station has: Level 2; DC Fast Charge; or Level 2 and DC Fast Charge at the station. This new column is demarcated in yellow.
Shortcomings in the data: This file does not include ZIP-code-level VMT since C2ES does not have a suitable VMT metric yet.

Filename: wa-vehicles.xlsx

Description: This file contains a list of EVs in Washington, as of January 2014. The combined listing of Washington EVs is displayed on the "Combined Data" worksheet. Based on this worksheet, C2ES has created several pivot charts to visually display the total number of registered vehicles, and vehicle registration by: date, county, ZIP code.
Source: The EV and PHEV vehicle registration data from the Washington Department of Licensing.
Changes to source data: N/A
Additions to source data: The registration data for EV and PHEV contains two columns. The first column classifies whether an EV is a battery electric vehicle (BEV), extended range electric vehicle (EREV), or a plug-in hybrid electric vehicle (PHEV). The second column checks for the earliest date provided by original title transfer, or vehicle registration. This new column is demarcated in yellow.
Shortcomings in the data: This file represents registration data, not vehicle sales.