

EV Charging Implementation in Grays Harbor

Issue Report

April 2019

The following report contains information relating our experience of siting EV charging stations in Grays Harbor. While this report is not meant to generalize, assumptions can be made as to the shared difficulties of funding/siting EV charge stations in most rural areas.

Connecting to existing EV corridors is the key to providing statewide EV accessibility. In Grays Harbor the goal is to seamlessly transition EV users from the I-5 Electric Highway, enabling them to reach coastal areas and connect to a northern US 101 peninsula loop as well as a southern loop (South Bend to Oregon border). Findings of the Joint Transportation Commission Study on EV Charging Business Models released by WSDOT (April 2017 presentation) identified the *“need to strengthen and expand the state highway DC fast charging network, fill infrastructure gaps, and encourage private investment through government intervention in the short-term”*. They went on to specifically identify EV travel to and within the City of Ocean Shores as part of the EV infrastructure gap.

Location

The rural nature of our county and communities in themselves is an issue. That being said issues related directly to EV charging station locations are itemized below:

- Who is funding the project?

If the City/county is funding the project then charging stations need to be placed in a publicly owned location. The issue here is these locations are often out of the way & not centralized. While they may be used by staff, it isn't convenient for the EV visitor/tourist.

If the project is grant funded then siting locations are generally a requirement of the grant i.e. charging station must be placed every 45 miles along the route. Grants often also require that charging stations be placed within a specific distance from the highway on a main route. (Our previous grant required no more than 3-4 blocks from highway on/off ramps.)

- Amenities

There are basic, common sense amenities that should be considered when siting charging locations. Things such as high visibility for safety, good lighting and restrooms are a given. Providing something for EV users to do while they are charging is an incentive to the local business community. If the project is grant funded amenities are a requirement and include:

- A 24-hour secure, well-lit space
- Available parking
- Expansion potential
- Wide turning radius

- 24-hour access to restroom facilities within close walking distance (2 blocks)
- 24-hour access to food & drink, sit down restaurants, coffee shops, grocery store, and gas stations within close walking distance

Due to the low population of rural communities, 24-hour establishments are rare as there is not enough financial support in the community. Since 24-hour access to businesses is rare in rural communities it goes without saying that there is no 24-hour restroom access. If a community is fortunate to have business located within 3-4 blocks from the highway how much empty/available space is there to support wide turning radii and potential expansion?

Equipment

To be market competitive combination level 2 & 3 charging stations are needed. It is also necessary to be part of a network. Currently there are 4 main companies that operate in our area; AeroVironment, EvGO, Blink and ChargePoint. The West Coast Green Highway is under a state contract with AeroVironment.

The past two grant funding rounds have required the installation of 1-DCFC- L3 (fast charge) to serve one driver either CCS or CHAdeMO and 1- dual port L2 EVSE serving two drivers. Because of the buffering requirements needed to handle this specific configuration specialized transformers are needed. Transformers in rural communities are usually older and not configured to handle this type of usage. Because EV technology is changing so rapidly, both chargers and transformers have to be able to handle current EV charging needs as well as anticipate on the horizon needs. This means supporting charging voltages ranging from 200 volts (V) to 1000 V including today's 400 V cars and 750 V buses, and 800 V cars of the future.

Unfortunately, we can't just pull power in from the nearest poll. The infrastructure has to be able to handle the load capacity. In the case of the Elma location (the anchor site of our grant) upgrading the transformer alone was approx. \$45,000. Once you include all of the conduits, wiring, integration into existing electrical systems, permits and labor the total cost was close to \$65,000 per unit. That cost is just for the transformer and electrical upgrades to handle the EV charge station equipment. It does not include the cost of the charging equipment.

Again, we can go back to who is funding the installation. If the local agency is funding the installation then a level 2 charger maybe all that is needed. However if grant funds are being anticipated the combo units will be expected.

Common misconception - Everyone wants to put in level 3 fast chargers, but most vehicles not equipped to use them, this is an extra add-on cost for the owner.

Investment

One of the toughest grant requirements to meet was that of investors. The last electric highway grant issued by the state required recipients to develop a business model to fund the chargers and show a return on investment. The business/funding model required local agency funding along with funding

from private investors. Primarily because data capture was part of the model (separate cost) and the state grant would not fund ongoing maintenance of the units. Therefore private investment would have to carry the cost of the chargers until they became profitable.

The grant required a 3-5 year investment model. However a report titled *Business Models for Financially Sustainable EV Charging Networks* developed by the Center for Climate Change and Energy Solutions for the WA State Joint Transportation Committee showed that in rural locations the ROI was a 7-10 expectation and in fact an ROI may never be attainable. To add even more difficulty, as a regional council working with transportation issues we don't interface with private enterprise as an economic development council or chamber of commerce would. This added an undue burden to project development. Is it any wonder that the top 2 grant funded projects were submitted by Energy Northwest!

As a rural county Grays Harbor ranks 22nd out of 39 total counties in the state in terms of assessed value. Lack of a proven, sustainable business model for owning and operating electric vehicle supply equipment (EVSE) in rural Washington is a significant market barrier to EV ownership and to installation of EVSE. Rural communities don't have the diversified income base or high taxing structure of large metropolitan communities. Rural Washington needs assistance to subsidize initial costs of public charging equipment. Public sector intervention with financial assistance would help the private sector expand the charging network in the near term. Public subsidies will no longer be needed once the market stabilizes, station utilization grows, and equipment costs decline.

Common misconception – EV charging stations make money. In reality charging stations should be considered as way to entice EV travelers, a courtesy, or a benefit from local businesses. They are not “money makers”. They are not cheap to own & operate and generally run between \$25,000 to \$50,000 just for the unit, depending on configuration. (Note this cost doesn't reflect needed infrastructure improvements.)

Food for Thought

- Traveling west from Elma towards Aberdeen, US12 typically carries over 8.5 million vehicles a year to the ocean beaches and north to the peninsula. Approximately 70% of those visitors originate in the Puget Sound Region. This is the densest ownership of EVs in Washington State with over 7,400 EVs in Peirce and Snohomish Counties and 23,662 in EVs registered in King County. Providing the “EV Corridor to the Coast” for these users would be a great tourism boost for GH.
- EV ownership in GH has grown from 32 vehicles in 2015 to 124 in 2018.
- The build out of reliable infrastructure will encourage future EV ownership. This will be a natural outfall of the reduction in anxiety due to limited infrastructure and vehicle range, access to reliable public EV charging equipment and lowered up-front costs as the first flood of PEVs hits the pre-owned car market.

- Most of the current fast charging infrastructure in Washington is CHAdeMO-compliant. But not all makes and models can use the same DC fast charging equipment.
 - CHAdeMO connectors charge vehicles such as the Nissan Leaf and Mitsubishi i-MiEV.
 - The SAE CCS Combo charging system is the standard for many American and European cars just entering the EV market, such as the BMW i-series and the Chevy Spark.
 - And of course Tesla chargers are proprietary.
 - Just for fun - the following graphic shows the differences in various plug in formations.



- In case you need a decision model on what EV charging equipment to install

