

Vehicle to Grid Potential

On August 11, PSE held a webinar on Distributed Energy Resources. Among the topics I expected to be mentioned was Vehicle-To-Grid (V2G) or Vehicle/Grid Integration (VGI). This is a technology that allows unused battery capacity in electric vehicles to provide electricity to the grid, especially during periods of peak demand or outage scenarios. Many utilities are now starting to include pilot programs in their IRPs. Although broad penetration of V2G may be some years away, it is likely to provide huge opportunities in the 20-year timeframe, especially as storage is needed to stabilize the contribution of variable renewable resources.

PSE's analysis of DERs is even longer than 20 years to plan for the CETA mandate of 100% clean electricity by 2045. For this reason, I was surprised when I asked about V2G technology, and PSE planners did not seem familiar with the term. Perhaps they know it as VGI instead, but neither term appeared in their long-range plans or sensitivities.

A quick Google of the terms V2G and IRP gives an overview of what is occurring in other states. For example, Austin Energy announced a partnership with Pecan Street 18 months ago to start a pilot project. The partners said, "**V2G/V2H/V2B should not be left out of utility integrated resource planning** (IRP), distribution resource planning (DRP) and/or energy procurement plans. Given the long planning horizon, it makes sense to start thinking about V2G soon."¹

Energy and Environmental Economics (E3), a consultant PSE has used for analysis of DERs and NWAs on several occasions, says, "The base case benefits of \$338 per vehicle per year are achieved with limited cycling to preserve battery health and without the expense and complication of providing ancillary services. Including ancillary services increases the value to \$407 per EV."² Also, the value of outage relief might be of significant value to residential customers.

Rocky Mountain Institute has a detailed paper titled "Electric Vehicles as Distributed Energy Resources," now more than three years old.³

Given the challenges of achieving CETA goals, it is almost inconceivable that PSE is not seriously contemplating V2G as a significant part of the puzzle. As the resource of idle car batteries continues to grow, it is likely to become the largest battery resource in PSE's service territory, if it hasn't already earned that crown. To integrate larger percentages of solar and wind resource without batteries of this capacity will be difficult, if not impossible, to achieve in a cost-effective manner. These batteries have already been purchased, and most are idle for 90% or more of their existence. PSE should become a leader in V2G adoption and show the rest of the country how clean, green, and technologically advanced the Puget Sound region is.

¹ <https://utilityanalytics.com/2019/05/austin-energy-and-others-moving-closer-to-v2g/>

² <https://www.linkedin.com/pulse/capacity-benefits-v2g-eric-cutter>

³ https://rmi.org/wp-content/uploads/2017/04/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf