

Pecan Street V2G University Challenge: Frequently Asked Questions

The questions below were submitted by Challenge participants on or before the question deadline on November 13, 2020. We are providing the full list of questions and answers to all Challenge participants in order to ensure that there is equal access to information for participants.

- **Do we have some information about the driving patterns of the people?**
 - No, all information will have to be gleaned from the charging patterns.
- **Do we have a lower limit regarding the SOC?**
 - That is up to the team's algorithms and what they would like to reserve for use.
- **Do we have access to Real Time LMPs? Specific date or specific point of interconnection?**
 - The vehicles are based in Austin, TX and Ithaca, NY. Any ties to LMP or interconnection should be created/simulated by the project team.
- **Do we need to consider any communication protocol?**
 - This is difficult to answer, since the charger communications standards vary. If the algorithm is dependent on particular latency/dropped packet issues you may want to have some allowance for that, or give examples of typical communications. Most EVSE that we have worked with are MODBUS/TCP based, so that gives a baseline for the speed/latency of that portion of the system.
- **Do we have access to frequency data?**
 - No, frequency in Texas is quite stable, we fully expect that teams accounting for frequency will have to demonstrate with simulated frequency data and show the types of frequency response services that are possible.
- **What is the meaning of dataid column? The value only increases with no resemblance to power or voltages.**
 - Dataid is the unique dataID representing the identity of the residential property, while maintaining owner privacy.
- **Can you provide a one line diagram?**
 - No, our agreements with the local utilities prevent that disclosure.
- **Since we do not have data for reactive power, what type of voltage regulation do you expect?**
 - That is determined by the submitting teams.

- **We have some empty columns on the files and local minute data that is confusing. Can you provide another version of the files?**
 - Data availability is never 100%, solutions will have to account for periods of missing data from individual homes.
- **Is the requested charge power fixed at 5kW, can it be changed?**
 - The charge power can be changed to whatever the simulated vehicle/charger supports.
- **What is flutter power? Why does it range between -50 to 50?**
 - In actual charging/discharging there is a small amount of variance up and down, this term simulates that variance to provide a more realistic charge/discharge curve. It is never a perfect flat power.
- **Who determines the charge type ('charge' and 'discharge')?**
 - That is up to the algorithm or vehicle user. In the behavioral model it can be changed by modifying the sample code.
- **Is the vehicle disconnected when the system wants to "discharge" but soc is lower than minimum?**
 - Typically, if the vehicle SOC is below the minimum for a discharge, the vehicle remains connected but issuing the command does nothing. The charger electronics will do a handshake with the vehicle, and whichever has the higher minimum limit will disallow the operation, and the charger goes back to idle.
- **For missing data values, can we assign zero value? Do they denote disconnections from the circuit (system)? Or are they mere measurement shortcomings?**
 - Data availability is never 100%, solutions will have to account for periods of missing data from individual homes.
- **What are the capacities of equipment? (EV battery, grid contractual rating, solar, etc...)**
 - This will vary by vehicle, home, etc. For US residential homes you can safely assume a 100A-150A 240V balanced connection. This means that there is Line 1, Line 2 and Neutral. Circuit breakers are put on both L1 and L2 to minimize the chance of overcurrent.
- **What is the accuracy of each measurement (sensor)?**
 - Typically, 1-2% above 50-100W. Below 5-10W I would not consider the data accurate at all, the analog noise in the front end is larger than the signal measured by the current transducer.

- **What are the units for the columns (car1, leg1v, leg2v, grid, solar)?**
 - CAR1, GRID, SOLAR are kW, so if grid is 1.24, the total grid load for the home is 1.24kW. Leg1V/2V are voltage. Solar production is positive, but grid can be negative during periods of reverse flow. If you want to calculate total use within the home when solar is present the formula is: Use = Grid + Solar. Solar can be negative small values at night and early morning if the electronics are on and there is no significant production.
- **What is the power factor assumption for the EV charging/discharging?**
 - For the vehicles present in the dataset the power factor is quite good, typically .97 or better for L1/L2 charging. V2G systems can have other power factors typically .8 leading to lagging, or .9 leading to lagging depending on brand.
- **Is any low-voltage network test feeder/topology available for the V2G simulation?**
 - No, we cannot disclose that information based on privacy/security agreements with the local utilities.
- **What kind of frequency control/services can those EVs provide? Primary or dynamic sub-second frequency responses?**
 - The vehicles themselves typically respond to charge rate changes using L1/L2 J1772 charging in under 1 second. The DC charging required for V2G type systems are direct battery connections. Justify charge rate/changes within your submission how you would like.
- **Is any local measurement of system frequency available?**
 - No, not at this time.
- **Can we use any software such as open DSS to verify our results, in terms of power losses in the network?**
 - Any software can be used, as long as Pecan Street can access it to validate results. If it is free/open source that is fine.