Overview of 1st Draft VGI Glossary: Terms and Definitions

Dean Taylor
Southern California Edison
May 30, 2017

SOUTHERN CALIFORNIA EDISON®

Overview

- Three industries and several regulators need to come together, understand each other and share a common customer
- Existing glossaries were used as much as possible, but could be missing several
- 1st Draft is a work-in-progress – sent to google-groups May 26
  - About 14 pages of terms and definitions
  - About 3 pages of terms without a definition
  - Some definitions especially need discussion (red font)
  - What terms are missing?
- Terms and definitions will be invented if needed
- Goal is to have 3rd draft by our June 12th Meeting in Sacramento – but glossary should be living document
- Send e-mail to Dean.Taylor@sce.com to join subgroup
- Future drafts to be posted on the google-groups site

Used Existing Glossaries

1. VGI White paper, CPUC Energy Division
2. California VGI Roadmap, Cal-ISO with CPUC & CEC
3. Modern Distribution Grid 2017, Vol 1, USDOE
4. Electrical Energy Storage, CPUC Planning and Policy Division report
5. 2020 Strategic Analysis of Energy Storage in CA, CEC
6. Energy Storage Phase 2 Interim Staff Report, CPUC Energy Division
7. Battery Storage Economics, Rocky Mountain Institute
8. Engaging Utilities in TE in the U.S., Europe and China, E3
9. Glossary of Definitions, North America Energy Reliability Council

Draft Glossary is Organized in Sections

- VGI Groupings of benefits
  - Needs review
- General terms and definitions
- EV charging industry terms and definitions
  - Needs review and a few missing definitions
- Utility industry terms and definitions
  - A few missing definitions
- Charging communication terms and definitions
  - Need help in this section
- Standards with explanations
  - Need help in this section

High level 1st draft terms and definitions

- VGI Vehicle Grid Integration
  - very broad term that encompasses the many ways in which an EV can provide benefits or services to the grid and bring benefit to society
  - optimizing EV interaction with the grid
- Technical solutions:
  - VGI solutions that need a communication protocol.
- Non-Technical solutions:
  - VGI solutions that do not need a communication protocol (e.g. rates, charging station rebates, allowances, fuel switching measurement)
- Market services:
  - TBD - probably means ISO wholesale market
- Non-market services and benefits:
  - TBD

"Use case" draft definition

- Use case: Defines a grid problem that can be solved with one or more solutions (technical and/or non-technical) and describes the solutions. Use cases are generally vision documents that help clarify a goal or vision of a project or a solution including its usefulness. Typically VGI use case questions include:
  - Is VGI operationally viable for this use?
  - What are the potential benefits of VGI in this use case? Can these benefits be monetized via existing market structure? If not, how should they be valued?
  - Is VGI cost-effective for this use?
  - What barriers or trade-offs are preventing or slowing deployment of VGI in this use?
  - What are the policy options to address the identified barriers or trade-offs encountered by VGI implementation?
  - Should procurement targets or other policies to encourage VGI be considered for this use?
  - *Note – above definition was modified from #6: Energy Storage Phase 2 staff report*

VGI types or groupings (draft)

- Charging level incentives
  - Tools include rebates for lower level charging, modifying current allowance policy, demand charge design
- TOU Rate Design and Adoption Policy
  - Tools include TOU rate design and policies to require or encourage TOU rate adoption for EVs
- V1G (or managed or controlled charging): Unidirectional power flow under central or customer control enabling vehicles to charge and provide wholesale market services. Includes varying the charge rate at the charging station, EV management system, parking lot EV Energy management system or building management system in order to provide demand response, ancillary services or other market services.
- V2G Similar to V1G but bidirectional power flow to the grid.

VGI Benefit Groupings – Draft Option 2

- Wholesale market services (ISO / RTO): 1) frequency regulation, 2) spinning, non-spinning and supplemental reserve, 3) load following / ramping support for renewables 4) capacity markets 5) Demand Response Auction Mechanism 6) real-time and day-ahead energy markets 7) energy arbitrage 8) black start, 9) voltage and/or reactive power support
- Distribution infrastructure benefits: 1) distribution upgrade deferral 2) local distributed generation support 3) peak load shedding: 4) resource adequacy?
- Customer facing benefits: 1) retail energy time shift with rates, 2) demand leveling with rates or controls, 3) power quality, 4) power reliability, 5) monetizing of GHG and air pollution reduction benefits, 6) maximizing customer use of renewable generation 7) demand leveling with BMS or parking lot EVEMS 8) back-up power
- Societal benefits: 1) adoption of EVs, 2) low-cost reductions in GHG and air pollutants, 3) low cost of EV ownership, 4) net jobs

1st Draft Terms and Definitions

- Charging station / device: The off-board-the-EV unit that contains a charging connector that is used to insert into the EV. This is a broad term that may include AC, DC, inductive (e.g. wireless) or conductive charging and may include or exclude the charger
- Charging plaza or center: is large collection of public-access charging stations
- Make-ready: refers to the behind-the-meter infrastructure up-to stub, but not including charging station or the utility side equipment. It typically the does not utility meter or charging station, but may include hardware (panel, trenching, wiring) and civil work (trenching, planning, installation)
- Traditional utility distribution service equipment or utility side-of-the meter infrastructure: includes the meter, overhead or underground service to the meter, transformer upgrade, etc.
- Charging infrastructure includes the make-ready and the utility-side-of the meter infrastructure, but not include charging station

1st Draft terms and definitions

- Charging station manufacturer: company that makes the charging station
- Charging station maintainer: company that provides repair and maintenance service to the charging stations and may only provide that service
- Charging station installer: company that provides installation service and may only provide that service
- Charging infrastructure provider: company or companies that provides the electrical and civil work associated with the make-ready and utility side infrastructure for the charging station
- Charging station services provider: provides services to the owner of the charging station but the number of services may depend on the package selected or vary between different companies in the market
- Charging Station Operator (CSO): the charging station operator installs, operates and maintains the EVSE to facilitate a reliable charging experience for PEV owners. (aka Charge Spot Operator or charge point operator) *(from glossary #8)*
- Charging network operator: provides services including ISO wholesale market services

Next Steps: Need Volunteers

- VGI Groupings of benefits
  - Needs review
- General terms and definitions
- EV charging industry terms and definitions
  - Needs review and a few missing definitions
- Utility industry terms and definitions
  - A few missing definitions
- Charging communication terms and definitions
  - Need help in this section
- Standards with explanations
  - Need help in this section

Thank you

SOUTHERN CALIFORNIA EDISON®

Appendix

Other Draft Options for Grouping VGI

- VGI Beneficiary groupings (option 3) by level
  - Site host / customer benefits - includes commercial and residential situations including homes
  - All utility customer benefits – TBD
  - ISO whole sale market benefits - TBD
  - Societal benefits – TBD
- VGI grouping (option 4)
  - Wholesale market solutions TBD
  - Non-market solutions – TBD
- VGI benefit grouping (option 5) by value category
  - Reducing energy generation cost - TBD
  - Reducing site hosts and EV driver's electric bills - TBD
  - Deferring distribution upgrades - TBD
  - Improving reliability - TBD
  - Aligning EV load with renewable integration - TBD
  - Measuring fuel switching – gasoline to EV (required by Low Carbon Fuel Standard for non-residential charging)

More 1st draft terms and definitions

- Short-dwell or opportunity charging locations: locations where a vehicle is parked for a few minutes or few hours and can charge. An EV may or may not need a charge at these locations. Examples include charging at restaurants, retail, rest-stops, gas stations, doctors, dentists and similar service providers
- Long-dwell charging locations: locations where vehicles are typically parked for more than four hours and can charge. Examples includes homes, workplaces, fleets, destination centers and mixed-use locations
- Fleet charging: charging stations for a business's own commercial EVs
- Workplace Charging: charging stations for a employees, staff, students, teachers, professors (but not visitors)
- Destination Center Charging: Charging stations located at sites that attract longer distance trips including, but not limited to, hotels, resorts, theme parks, major malls, parks, beaches, theaters, sports centers, concert halls, casinos
- Multi-unit dwelling charging: refers to charging stations in common areas of condos and apartments (usually a commercial account for a utility)
- Single family home charging: Charging stations in driveways, carports or garages in residences designed for individuals or a family. Includes both attached and detached homes, but excludes large apartment and condo complexes without individual garages or carports near the home.
- Urban DC fast charging plaza: large cluster of away-from-home, public-access, DC fast charge stations in urban and suburban areas (could be on a travel corridor or not)
- Corridor DC fast charging plaza: large cluster of away-from-home, public –access, DC fast charge stations away-from urban areas along travel corridors
- Restaurant, retail and rest-stop charging (can be level 1, 2 or DC) –includes small clusters of charging at those locations but excludes large scale charging plazas
- Mixed use charging: charging where multiple types of users typically charge. For example, city parking structures used by residents of MUDs, workplaces, city fleet vehicles and visitor to regional destination centers
- Street or curbside charging: Charging stations (AC or DC) on a curb