Vehicle-Grid Integration Communications Protocol Working Group Meeting

December 18, 2018
At
CPUC Auditorium
San Francisco, CA
Agenda

- Commissioner Remarks and appreciation of stakeholders
- Coffee and breakfast
- Presentation and discussion of definitions
- Summary of current proposal and review of outline of final report
- CEC presentation of next steps
- Lunch
- CARB presentation of next steps
- Discussion of Metering requirements
- Cybersecurity considerations
- Discussion of state agencies future plans on the VGI Roadmap and additional items for discussion during the Roadmap process
Coffee Break until 10:40
Presentation and discussion of definitions

• Dean Taylor, SCE
How does this all fit in?

- https://zevunit.kumu.io/vgi-next-steps
Current Proposal

- CPUC, ARB, CAISO, GO-Biz supported proposal for EVSE hardware functionalities
- Key changes since prior meeting
  - Additional explanation for not recommending a communications protocol(s) requirement
  - Explanation for scope of recommendation to focus on AC L2, multi-user
  - Reorganized hardware requirements table → Power Flow Entity to EVSE category
  - Other minor edits based on stakeholder comments
Discussion Questions on Current Proposal

• Do Tables 1 & 2 reflect stakeholder comments?
  – Any more detailed hardware requirements necessary?

• What type of documentation do IOUs need to ensure EVSE compliance with hardware requirements?
Draft Outline for Final Report

• Outline
Recommended Next Steps for VGI Communications Protocols Working Group

Reynaldo Gonzalez
Energy Research and Development Division
California Energy Commission
December 18, 2017
Overview

- CEC is recommending that the CPUC consider the following three attributes for the IOUs’ EV charging programs when formulating its requirements.
  1. Speed
  2. Metering
  3. Simplicity
- Research and Data Opportunities
Speed

• Electric vehicles (EVs) must communicate load controls within low-latency times that are consistent with CAISO’s existing grid management requirements

• A key attribute is reducing latency times consistent with FERC Order 794 –frequency response reliability standards

• Current markets for frequency regulation require responses within 4-second intervals

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- CAISO Frequency Response Issue Paper per FERC Order 794, Figure 1 and Table 3, https://www.caiso.com/Documents/IssuePaper_FrequencyResponsePhase2.pdf
Metering

- Metering will provide system visibility and control for all segments
- Capturing value (e.g. LCFS credit, EV-specific tariffs) requires proof of accuracy
- Pathways exist for both SEP 2.0 and ISO 15118 to satisfy auditing and accuracy needs

Department of Food and Agriculture, Division of Measurement Standards, Electric Vehicle Fueling Systems regulation
Simplicity

- Basic communication protocols of electric vehicles and electric vehicle service equipment already reside within J1772.

- All EVSE must have the ability to seamlessly send and receive EV driver-specific charging preferences and payments across all geographic regions regardless of utility or service provider.
• Future IOU projects providing data about EV aggregations will help further understand the 3 technical attributes:
  – Characterizing the EV aggregations across power system and geographic locations – e.g. regardless of whether the EV resources are dispersed across a territory, or clustered on utility circuits, are affecting loading within buildings
  – The different markets in which EV aggregations participate in (e.g. frequency regulation, demand response)
  – Rate of EV driver participation events in these aggregations / grid services
  – Other DERs besides EVs (e.g. stationary batteries, smart building loads) that are included in these resource aggregations
  – Performance of the aggregated resource and of the individual EVs/EVSEs, for audit, incentive attribution, and billing purposes
Conclusion

- CEC will continue to support our multi-agency efforts in Vehicle-Grid Integration and all areas surrounding this space
- CEC supports any solution that best addresses the fundamental 3 core attributes
- CEC will continue to invest in exploring and validating progressive attributes to support a robust, holistic, and simple Vehicle-Grid Integration system
Questions & Comments

Reynaldo Gonzalez
Energy Research & Development Division
California Energy Commission
Lunch

• We will be back at
Electric Vehicle Charging Station Open Access Act
Electric Vehicle Charging Stations
Open Access Act

• SB 454 (Statutes of 2013)
• California Health and Safety Code § 44268, 44268.2
• No membership requirement to use publically available EVSE
• Fees to use EVSE must be disclosed at point of sale
• Credit card/mobile technology for payment
• Location and payment info must be provided to NREL
• State may adopt interoperability billing standards
Process timeline

• Workgroup and individual meetings
• Public workshop March/April 2018
• Staff report released August 7, 2018
• Public Hearing scheduled September 27-28, 2018
VGI Interest Group
Proposed Meetings for 2018

• GoToWebniar

• Quarterly, First Tuesday
  • February 6, 2018
  • June 5, 2018
  • October 2, 2018
  • December 4, 2018
Topics to cover

• Value discussion take 2?
• What ancillary services could be cost effective for vehicles to provide?
• How many electric vehicles charging during the middle of the day would be necessary to absorb overgeneration and negative wholesale pricing?
• Any suggestions...
Contact information

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Applicability of Recommendation to IOU Proposals

• Applicable to current light-duty proposals?
  • Current feedback from stakeholders: No.

• Utility discussion of communications architecture for pending proposals:
  • SDG&E Residential Charging
  • PG&E DCFC

• Applicability to future light-duty proposals
  • Based on recommendation, would apply to any AC Level 2, multi-user, conductive EVSE IOU proposal
  • Should we re-evaluate recommendation in future?
Division of Measurement Standards
Workshop for
Electric Vehicle Charging Station Requirements

SERVING AND PROTECTING CALIFORNIA’S CONSUMERS,
BUSINESSES, ECONOMY AND ENVIRONMENT
Workshop Overview

- Scope of Workshop
- U.S. and California Weights and Measures Laws and Regulations
- Legislation and Regulatory Authority
- National Institute of Standards and Technology (NIST) Handbook 44
- Device Requirements
- Type Evaluation
- Regulatory Language
Workshop Scope

**This Workshop IS About**
- Early stakeholder communication
- Regulatory Authority over Commercial EVSE
- Measurement standards for commercial transactions
- Type Evaluation - National and California

**This Workshop is NOT About**
- Non-commercial Electric Vehicle Charging Stations (EVSE) or electric vehicle charging stations under CPUC authority
- Non-public access workplace charging
U.S. Weights and Measures Laws and Regulations

• No Federal Weights and Measures Law in the U.S.
• Federal Government provides technical assistance through National Institute of Standards and Technology (NIST)
• States can and do develop their own weights and measures laws
• However, most states rely on adoption of uniform laws developed by the National Conference on Weights and Measures (NCWM)
• NCWM members include California state and county officials and many industry sector members (EVSE manufacturers)
U.S. Weights and Measures Laws and Regulations

• Within the U.S. Department of Commerce is the NIST Office of Weights and Measures (OWM)
• NIST OWM provides technical guidance to NCWM and focused workgroups
• NCWM with input from members (federal, state, local, and industry) develops consensus standards
• NIST publishes handbooks containing NCWM Standards
• States may or may not adopt model laws/regulations
National Institute of Standards and Technology Handbook 44

- Specifications, Tolerances and Other Technical Requirements for Commercial Devices
- Used by CDFA DMS for Type Evaluation of new makes/models of devices, e.g., EVSE
- Used by counties as a field enforcement manual
- Used by manufacturers when designing new commercial weighing and measuring devices
CA Weights and Measures Laws and Regulations

• Law: California Business and Professions Code, Division 5
  http://leginfo.legislature.ca.gov/faces/codes.xhtml

• Regulations: California Code of Regulations, Title 4, Division 9
  http://www.oal.ca.gov/ccr.htm
Legislation

• Assembly Bill 808 (Ridley-Thomas, Chapter 591, Statutes of 2015)
  • Clearly establishes the Department’s authority over commercial sales of alternative automotive fuels including electricity
  • Includes Advertising Exemptions for EVSE

Other Rulemaking

• Handbook 130: Method of Sale for electricity to fuel light duty vehicles. (megajoule or kilowatt hour)
Adoption into Regulation: Two Methods

1. Business and Professions Code, Division 5, Section 12107 adopts NCWM Uniform Laws and Regulations by reference
   • Examples: gas pumps, grocery scales

2. Section 12107 also authorizes addition, modification, or rejection by regulation
   • Examples: electric watthour meters (utility submeters), hydrogen dispensers
CA Weights and Measures Laws and Regulations

• Who Enforces? The State and 55 County Offices of Weights and Measures covering all 58 counties
  • State: California Department of Food and Agriculture, Division of Measurement Standards (CDFA DMS)
  • State: Maintains standards (mass, length, volume, electric current, etc.), evaluates new types of measuring devices, oversees work performed by counties
  • Counties: Local departments of weights and measures perform the majority of all field inspections and enforce device compliance requirements
  • State and County Officials conduct routine field testing and complaint monitoring to ensure continued compliance with NIST Handbook 44
Commercial EVSE Device Requirements

• Type Evaluation performed by a laboratory authorized by the NCWM’s National Type Evaluation Program (NTEP) and issuance of a certificate of conformance for device or measuring system. (Provisional Cert)

• Alternatively, receipt a certificate of approval through the California Type Evaluation Program (CTEP). (California Specific)

• System conforms to NIST Handbook 44 Section 3.40 Requirements including, but not limited to: Accuracy; Repeatability; Suitability; Indications; Recorded Representations; Sealing Provisions; and prevents Facilitation of Fraud
Commercial EVSE Device Requirements

• Type evaluation is conducted by testing the *measuring system as whole*, not just the metering element.

• 1.0% Acceptance Tolerance is applied during type evaluation and during initial verification of newly installed EVSE.

• 2.0% Maintenance Tolerance is applied during periodic re-inspection of installed commercial EVSE.

• Communication protocols, data transmission, and power delivery upstream of the EVSE is not a consideration for type evaluation.

• EVSE must deliver within tolerances the quantity of energy displayed and charged to the customer. Customer must be informed of applicable charges prior to beginning of charge session.
Proposed Changes to CCR, Title 4, Division 9

Article 1, § 4001. Exceptions


Section 3.40. Electric Vehicle Fueling Systems—Tentative Code
This tentative code has a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code. Officials wanting to conduct an official examination of an Electric Vehicle Supply Equipment (EVSE) or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.
Next Steps:

- Publication of proposed regulation in Notice Registry.
- Feedback from Stakeholders to dms@cdfa.ca.gov ongoing through rulemaking process.
- California will formalize test procedure for type evaluation of EVSE
- State will provide an Examination Procedures Outline to counties
- Counties will begin registering commercial EVSE (Business and Professions Code Section 12240)
- Counties will begin examining and sealing commercial EVSE (Business and Professions Code Section 12210)
ULTIMATE GOAL

Successful Commercialization of EVSE
Thank You!

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Kevin Schnepp, Environmental Program Manager
Discussion of Metering Requirements

• Should the hardware recommendation include metering requirements?
  – No.
    • Handbook 44 will apply to commercial EVSE anyways
    • We need additional discussions on use cases and metering & telemetry requirements that meet Local Regulatory Authority (LRA) or CAISO requirements for grid services settlement
  – Yes, specify the Handbook 44 metering accuracy requirements.
    • Handbook 44 does not apply to transactions where there is no payment, so best to specify this
Open Questions

- What previous work is applicable for our considerations?
- How does using multiple protocols affect cybersecurity?
- Upon which devices should standards be applied?
- Which standards are needed to ensure cybersecurity?
- When and where should they be applied?
- Which parties are responsible?
Figure 3.5a: Common ET Architecture
Resource: EVSE Diagnostic Security Module

- Idaho National Lab, U.S. DOE Grid Modernization Lab Call
- CEC is Technical Advisor

Resources: CES-21 Cybersecurity Project

• Lawrence Livermore National Lab pursuant to D.14-03-029
• CPUC oversees project
• Objective: conduct research toward next generation cybersecurity techniques including Machine-to-Machine Automated Threat Response to protect grid stability, reliability, safety
  – Modeling & Simulation Platform
  – Physical Test Bed
  – Automated Response Research Package

Addressing our questions

- Better understand utility, EVSP, and OEM security requirements
- Independent expert assessing needs
  - Prior to and during deployment
- Workshops during 2018 VGI Roadmap Update
  - Presentations from National Laboratories
Questions & Comments

http://www.energy.ca.gov/transportation/

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Post-Working Group VGI Policy Issues

• What do stakeholders think are the highest priority pilots to better understand the value of VGI?
  • Technology demonstrations
  • Deployment pilots to understand economics & scalability

• To assess the value of use cases, what additional data or analysis do we need?
  • Will any ongoing pilots provide this info?

• How do we ensure ratepayer benefits from VGI deployment?

• How should we ensure the driver experience encourages EV adoption?