Vehicle-Grid Integration Forum: Interconnection and Distribution Engineering, Energy Division

Jose Aliaga-Caro

Utilities Engineer

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Contact: Jose.Aliaga-Caro@cpuc.ca.gov

V2G DC Interconnection (Ix): Where we are now

(1) <u>Unidirectional Mode</u> – Allowed

- Applicant must use an inverter/EVSE that meets certification requirements pursuant to Rule 21
- Switching to Bidirectional Mode: Upon request from the applicant, only the manufacturer or approved third-party installer may program or enable bidirectional operation.
- For details see: *Advice Letter 6500-E (Pacific Gas and Electric Company ID U 39 E), Advice Letter 3955-E (San Diego Gas & Electric Company ID U 902 E), Advice Letter 4718-E (Southern California Edison Company ID U 338 E)* dated February 11, 2022, submitted in response to Res. E-5165

(2) <u>Bidirectional Mode</u> – Allowed

- OP 39 of D.20-09-035 allows V2G DC bidirectional systems to use the existing Rule 21 interconnection process. (*See* Resolution E-5165, issued Nov. 4, 2021, disposing of SDG&E AL 3774-E, SCE AL 4510-E, and PG&E 6209-E and D.20-09-035 which states that Vehicle-to-grid (V2G) direct current (DC) EVSE may be interconnected under the existing Rule 21 tariff so long as it meets all Rule 21 requirements)
- An exemption for UL 1741 Supplement SA and SB certification exists for DC V2G Electric Vehicle Supply Equipment (EVSE) interconnecting for the purpose of participating in the Emergency Load Reduction Program

V2G AC IX: Where we are now

Only through the V2G AC Interconnection Pilot

- V2G AC Interconnection Pilot Allows:
  - Use of relays programmed with the applicable voltage and frequency settings, as required in Rule 21 Section H and other applicable settings, such as underpower and overcurrent, as may be specified in each Utility's Interconnection Handbook
  - Bilateral agreements between utilities and applicants
- See *Advice Letter 6500-E (Pacific Gas and Electric Company ID U 39 E), Advice Letter 3955-E (San Diego Gas & Electric Company ID U 902 E), Advice Letter 4718-E (Southern California Edison Company ID U 338 E)* dated February 11, 2022, submitted in response to Res. E-5165

V2G AC Interconnection: Going Forward

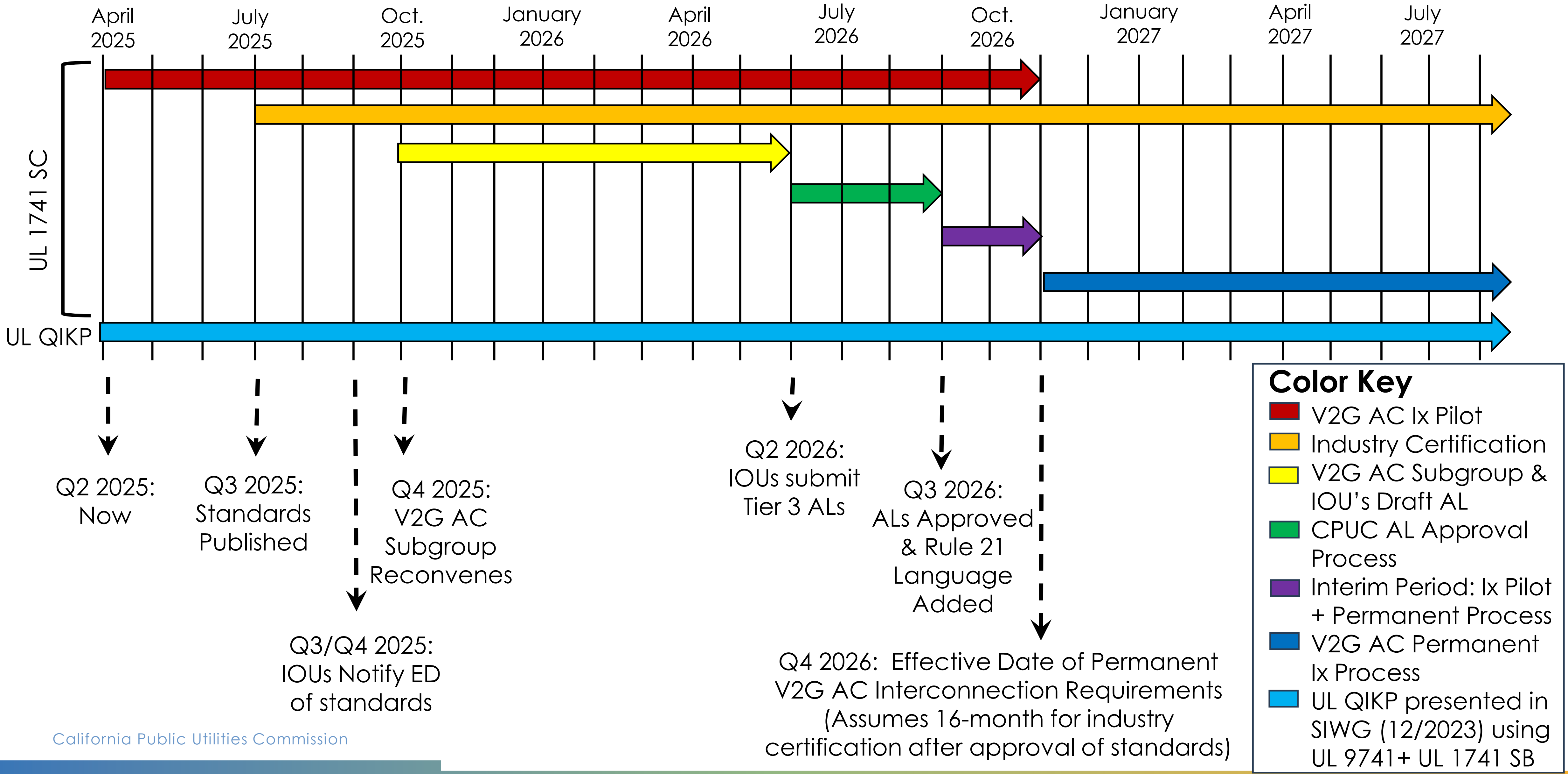
- **<u>Resolution E-5315 (August 2024)</u>**
  - (1) Reopens V2G AC Interconnection Pilot which ended December 2023 and extends it until tariff modifications or a permanent interconnection process for V2G AC systems are approved and added to, and become effective in, Rule 21. (2) Allows bilateral agreements for V2G AC systems interconnection
    - Avoids gaps in the interconnection process between the end of the V2G AC Interconnection Pilot and the time a permanent interconnection process for V2G AC systems is added to, and becomes effective in, Rule 21.
    - “become effective” -- allows time for V2G AC systems to be certified to industry standards in the event modifications to Rule 21 occur prior to industry being standards properly certified to those standards
- **<u>D.20-09-035 (September 2020)</u>:** “When [industry] standards have been approved, Utilities shall inform the Director of the Energy Division, who is authorized to reconvene the Vehicle to Grid Alternating Current Subgroup no later than 90 days from the issuance of approved updated standards.”
- **<u>V2G AC Subgroup Objectives</u>**
  - To review and assess the ability of approved industry standards to ensure safe interconnection of V2G AC systems,
  - (1) **If approved industry standards are sufficien**t for safe interconnection, to develop Rule 21 language to interconnect V2G AC systems outside of pilots. (2) **If approved industry standards are not sufficient**, identify the gaps to ensure a future pathway to safe interconnection and propose a method for interconnection on an interim basis until standards are sufficient for safe interconnection.
  - No later than sixty (60) days after completion of the discussions with the V2G AC Subgroup, and no later than eight months after the start of the subgroup the Large IOUs are directed to file Tier 3 ALs recommending: (1) Termination of the V2G AC Interconnection Pilot; and (2) Modifications to Rule 21 to incorporate language to allow V2G AC systems to interconnect if approved industry standards are sufficient for safe interconnection and if not sufficient, an a process for the interconnection of V2G AC systems on an interim basis until standards are sufficient for safe interconnection.

Industry Standards:
PG&E, SCE and SDG&E Update on March 26, 2025

1. ***UL 1741 SC – Standard for Interconnection System Equipment (ISE)/EVSE***
    - The Working Group is planning to send the draft to the UL Technical Committee in April 2025, with an expected publication of early Q3 2025.
2. ***SunSpec J3072-2030.5 SunSpec profile standard and certification***
    - Per SunSpec profile leads, SunSpec will convene the J3072-2030.5 SunSpec profile standard work group in April 2025, coincident with the starting of the IEEE 2030.5/CSIP test procedures update. The expected publication date is Q3 2025.
3. ***SAE J3072- V2G-AC EV standard (equivalent to 1547-2018 and UL 1741 SB)***
    - A revised version of SAE J3072 was published June 10, 2024. As such, no further update will be provided.

V2G AC Interconnection: Path Forward

Timelines are approximate and conservative



EVSE Interconnection: Relevant Documents

- **Working Group Three Final Report (June 14, 2019)**
  - Discussed Issue 23: Should the Commission consider issues related to the interconnection of electric vehicles and related charging infrastructure and devices and, if so, how?
- **Final Report of the Vehicle to Grid Alternating Current Interconnection Subgroup (Dec. 11, 2019)**
- **Decision 20-09-035: Decision Adopting Recommendations from Working Groups Two, Three, and Subgroup (Sept. 30, 2020):** Adopted Issue 23 proposals that had consensus
  - Decision D2101027 - Order Correcting Errors in Decision 20-09-035
- **PG&E AL 6209-E, SCE AL 4510-E and SDG&E AL 3774-E (May 28, 2021)***
  - Presents (1) the implementation plan which allows V2G DC EVSE that has connected as load-only to switch to bidirectional mode upon receiving PTO from the utility, and (2) proposed temporary pathway for V2G AC EVSE interconnection (V2G AC Interconnection Pilot)
- **Resolution E-5165 (November 5, 2021):** Approval, with Modifications, of Vehicle-to-Grid Implementation Plans and Technical Requirements in Compliance with Decision 20-09-035
- PG&E AL 6500-E, SCE AL 4718-E and SDG&E AL 3955-E (Feb. 11, 2022)
  - Submitted to incorporate Resolution E-5165's modifications on the V2G AC Interconnection Pilot
- **PG&E AL 7125-E, SCE AL 5185-E and SDG&E AL 4350-E (January 5, 2024)***
  - Recommends (1) extending the V2G AC Interconnection Pilot with the same requirements for an additional two years, and (2) further study of V2G AC interconnection pathways
- **Resolution E-5315 (August 22, 2024):** Approves with modifications reopening and extension of the V2G AC Interconnection Pilot

*Advice Letters can be found on the utilities' websites

California Public Utilities Commission

For additional information on EVSE Interconnection contact:

Jose.Aliaga-Caro@cpuc.ca.gov