

**PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

**ENERGY DIVISION**

**Agenda ID# 22775**

**RESOLUTION E-5315**

**August 22, 2024**

**R E S O L U T I O N**

Resolution E-5315. Approves with modification Pacific Gas and Electric Company's, Southern California Edison Company's, and San Diego Gas & Electric Company's recommendations to enable interconnection of vehicle-to-grid alternating current pilot project systems.

**PROPOSED OUTCOME:**

- This Resolution approves with modification Pacific Gas and Electric Company's (PG&E), Southern California Edison Company's (SCE), and San Diego Gas & Electric Company's (SDG&E) Advice Letters providing lessons learned during the vehicle-to-grid alternating current (V2G AC) Interconnection Pilot, and recommendations to extend the pilot timeline.
- This Resolution directs PG&E, SCE and SDG&E to participate in industry-led efforts to develop and implement an alternative certification process for interconnection of V2G AC pilot projects if industry standards to interconnect V2G AC systems are not adopted by the date of issuance of this Resolution.
- This Resolution directs PG&E, SCE and SDG&E to file Advice Letters proposing changes to the V2G AC Interconnection Pilot as discussed herein.
- This Resolution clarifies the requirements of Ordering Paragraph 54 of Decision 20-09-035 and directs PG&E, SCE and SDG&E to submit Advice Letters proposing modifications to Rule 21 to implement a permanent interconnection process for V2G AC systems if industry standards for V2G AC systems are sufficient for safe interconnection.

**SAFETY CONSIDERATIONS:**

- This Resolution has no direct impact on safety. The safety considerations associated with this Resolution are similar to the safety considerations associated with existing utility responsibilities in building new service and electrical distribution infrastructure. The utilities must continue to comply with existing utility and

California Public Utilities Commission policy on safety requirements and standards, as well as the Transportation Electrification Safety Requirements.

ESTIMATED COST:

- There are no costs associated with this Resolution.

By PG&E Advice Letter 7125-E, SCE Advice Letter 5185-E, and SDG&E Advice Letter 4350-E filed on January 5, 2024.

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**SUMMARY**

Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E); collectively the large investor-owned utilities (Large IOUs); submitted a Joint Tier 3 Advice Letter (Joint AL)<sup>1</sup> to comply with Ordering Paragraph (OP) 5 of Resolution E-5165. OP 5 required the Large IOUs to submit an AL no later than the completion of the vehicle-to-grid alternating current (V2G AC) interconnection pilot (V2G AC Interconnection Pilot)<sup>2,3</sup> period that includes lessons learned and recommendations for a permanent interconnection pathway for V2G AC systems.

This current Resolution finds the Joint AL complies with OP 5, and approves as modified herein, the Large IOUs' proposals in the ALs as discussed below.

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<sup>1</sup> *Lessons Learned from the Vehicle to Grid Alternating Current Pilot and Recommendations for A Pathway Forward*—PG&E AL 7125-E, SCE AL 5185-E, and SDG&E AL 4350-E (Joint AL), submitted to Energy Division on January 5, 2024.

<sup>2</sup> The V2G AC Interconnection Pilot is “a temporary [interconnection] pathway for pilots seeking vehicle-to-grid alternating current (V2G AC) interconnection.” It is designed to meet safety interconnection requirements, and account for the fact that plugin electric vehicles with onboard inverters are not currently certified to a national industry standard. The V2G AC Interconnection Pilot uses a relay to meet the safety requirement of interconnection and is only available to V2G AC pilot project systems. See PG&E AL 6209-E, SCE AL 4510-E and SDG&E 3774-E (Joint Advice Letter Proposing Interconnection Pathway for Vehicle-to-Grid Alternating Current Projects and Implementation Steps for Direct Current Electric Vehicle Supply Equipment Projects, Pursuant to Decision 20-09-035) submitted on May 28, 2021.

<sup>3</sup> The use of “pilot” in “V2G AC Interconnection Pilot” is distinct from the general use of the word “pilot” which is a process utilized for technology evaluation.

The Large IOUs are directed to: (1) reopen the V2G AC Interconnection Pilot and extend it until tariff modifications for a permanent interconnection process for V2G AC systems are approved and added to, and become effective in, Rule 21; (2) participate in industry-led efforts<sup>4</sup> to develop and implement an alternative certification process<sup>5</sup> for V2G AC pilot project systems, if standards from nationally-recognized testing laboratories or other nationally recognized industry, professional, technical associations or appropriate standards approving bodies (collectively “industry standards”) to enable V2G AC interconnection are not adopted by the date of issuance of this Resolution; and (3) provide updates on any alternative certification process for V2G AC pilot project systems using an e-mail notification process.

If industry-led efforts are held to develop and implement an alternative certification process for V2G AC pilot project systems, the Large IOUs are directed to submit, 20 calendar days after the last industry-led meeting, a Tier 2 AL discussing modifications to the V2G AC Interconnection Pilot to implement the process.

This Resolution clarifies OP 54 of Decision 20-09-035; the Large IOUs are directed to attend all the meetings of the Vehicle to Grid Alternating Current Subgroup (V2G AC Subgroup) and provide presentations as needed, once it reconvenes. As a result of the discussions in the V2G AC Subgroup, the Large IOUs are directed to file Tier 3 ALs recommending: (1) Termination of the V2G AC Interconnection Pilot (to be replaced with a permanent solution); 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, a process for the interconnection of V2G AC systems on an interim basis until standards are sufficient for safe interconnection.

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<sup>4</sup> “Industry-led efforts,” as used in this Resolution, is an effort by industry, and with participation from the Large IOUs, with the purpose of developing an alternative certification process for V2G AC pilot project systems using the V2G AC Interconnection Pilot. The alternative certification process would be an interim interconnection process, to be used before industry standards are approved, that would eliminate the use of relays. Once industry standards are approved, a permanent interconnection process for all V2G AC systems, pilots and non-pilots, may be developed.

<sup>5</sup> “Alternative certification process” as used in this Resolution means an alternate process to interconnect V2G AC pilot project systems through the V2G AC Interconnection Pilot. The alternative certification process would eliminate the requirement of the V2G AC Interconnection Pilot of using relays to interconnect.

## **BACKGROUND**

### **A. Rulemaking 17-07-007**

The California Public Utilities Commission (Commission) initiated Rulemaking (R.) 17-07-007 on July 13, 2017, to consider refinements and, if necessary, revise the rules and regulations governing the interconnection of generation, distributed energy resources (DERs), and storage facilities to the electric distribution systems of the Large IOUs. The Large IOUs' rules and regulations pertaining to the interconnection of generating facilities are set forth in Electric Rule 21 Tariff (Rule 21). As part of R.17-07-007, the Large IOUs and other stakeholders participated in four working groups. Decision (D.) 20-09-035 (Decision), issued on September 30, 2020, resolved issues from Working Group Three.<sup>6</sup> OP 44 of the Decision directed the Large IOUs to submit Tier 3 ALs for approval of a temporary interconnection pathway, referred to as "V2G AC Interconnection Pilot," for pilots seeking V2G AC interconnection that would help ensure necessary safety precautions.

On May 28, 2021, the Large IOUs jointly submitted PG&E AL 6209-E, SCE AL 4510-E, and SDG&E AL 3774-E to comply with OP 44 of the Decision. The Large IOUs presented the proposed temporary pathway for V2G AC interconnection (i.e., the V2G AC Interconnection Pilot) and the agreed upon terms of the pilot as follows: that the interconnection pilot will be limited to six projects per year per utility and that interconnection requests for this pathway will be accepted through December 31, 2022, with an automatic timeline extension to December 31, 2023, if industry standards and a permanent process for V2G AC interconnection have not yet been approved for inclusion in the Utilities' Rule 21 tariffs.

Resolution E-5165, issued on November 4, 2021, disposed of the May 28, 2021, ALs and approved the proposed temporary pathway (the V2G AC Interconnection Pilot) to interconnect for V2G AC pilot project systems.<sup>7</sup> OP 5 of Resolution E-5165 directed the

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<sup>6</sup> Working Group Three discussed issues regarding timelines, billing, construction upgrades, application portals, electric vehicle interconnection, and the use of smart inverters.

<sup>7</sup> On February 11, 2022, the Utilities filed a Joint Tier 1 Advice Letter, PG&E AL 6500-E, SDG&E AL 3955-E, and SCE AL 4718-E, to incorporate Resolution E-5165's modifications into the language of the May 20, 2021 ALs. A disposition accepting the February 11, 2022 Joint AL with an effective date of February 11, 2022, was issued on May 31, 2022.

Large IOUs to “submit an Advice Letter no later than the completion of the V2G AC [Interconnection] Pilot Period that includes lessons learned and recommendations for a permanent interconnection pathway for V2G AC EVSE [Electric Vehicle Supply Equipment].”<sup>8</sup> On January 5, 2024, the Large IOUs submitted a Joint AL to meet this requirement after extending the pilot through December 2023 per the agreed upon terms of the V2G AC Interconnection Pilot, which were developed in concert between the Large IOUs and stakeholders.<sup>9</sup>

**B. The Joint AL: PG&E AL 7125-E, SCE AL 5185-E, and SDG&E AL 4350-E**

The Joint AL was submitted on January 5, 2024, to comply with the requirements of OP 5 of Resolution E-5165. In the Joint AL, the Large IOUs discuss: (1) The temporary pathway for V2G AC pilot project system interconnection (i.e., the V2G AC Interconnection Pilot) adopted in Resolution E-5165;<sup>10</sup> (2) Utility implementation of the V2G AC Interconnection Pilot;<sup>11</sup> (3) Lessons Learned from the V2G AC Interconnection Pilot;<sup>12</sup> and recommended path forward for V2G AC Pilot Project System interconnection.

**NOTICE**

Notice of PG&E AL 7125-E, SCE AL 5185-E, and SDG&E AL 4350-E were made by publication in the Commission’s Daily Calendar. The Large IOUs state that they served copies of the Joint AL to the interested parties on the GO-96-B, R.11-09-011, and R.17-07-007 service lists.

**PROTESTS/RESPONSES**

There were no protests submitted to the Joint AL.

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<sup>8</sup> Resolution E-5165 at 13.

<sup>9</sup> See *Resolution E-5165* at 5, which states “There is also an automatic timeline extension to December 31, 2023, if standards and a permanent process for V2G AC EVSE interconnection have not yet been approved and included in the Utilities’ Rule 21 tariffs.”

<sup>10</sup> Joint AL at 3.

<sup>11</sup> Joint AL at 3.

<sup>12</sup> Joint AL at 3-4.

The Vehicle-Grid Integration Council (VGIC) filed a timely response on January 25, 2024. VGIC supports the Large IOUs' Joint AL and recommends approval of the AL without delay.

The Large IOUs did not submit a response.

## **DISCUSSION**

### **A. Summary of Joint AL Disposition**

The Joint AL's request is approved as modified herein.

We find the Joint AL complies with OP 5 of Resolution E-5165. The Large IOUs are directed to: (1) reopen the V2G AC Interconnection Pilot and extend it until tariff modifications for a permanent interconnection process for V2G AC systems are approved by the Commission and added to, and become effective in, Rule 21; (2) participate in industry-led efforts to develop and implement an alternative certification process for V2G AC pilot project systems, on an interim basis, if standards from nationally-recognized testing laboratories or other nationally recognized industry, professional, technical associations, or appropriate standards approving bodies (collectively, "industry standards") to enable V2G AC interconnection are not adopted by the date of issuance of this Resolution; and (3) provide updates on any alternative certification process for V2G AC pilot project systems using an e-mail notification process. We agree with VGIC that "the proposed extension would provide a temporary pathway for V2G AC interconnection in the [V2G AC Interconnection] Pilot while working with stakeholders to develop an interim alternative testing and certification process for V2G AC pilot projects, all while allowing time for industry standards to be set in place."<sup>13</sup>

We clarify OP 54 of Decision 20-09-035; the Large IOUs are directed to attend all the meetings of the Vehicle to Grid Alternating Current Subgroup (V2G AC Subgroup) and provide presentations as needed, once it reconvenes after industry standards are approved.

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<sup>13</sup> Response of the Vehicle-Grid Integration Council to Advice Letter 5185-E of Southern California Edison Company, Advice Letter 7125-E of Pacific Gas and Electric Company, Advice Letter 4350-E of San Diego Gas and Electric Company at 2.

We note that a distinction must be made between the “industry-led efforts” and the V2G AC Subgroup. The “industry-led efforts” are separate from the V2G AC Subgroup. The purpose of the “industry-led efforts,” as discussed in this Resolution, is to develop an alternative certification process using existing standards for V2G AC pilot project systems, which is an interim interconnection process before industry standards are approved. The purpose of the V2G AC Subgroup is to discuss approved industry standards and develop a permanent interconnection process for V2G AC systems, pilot and non-pilots.

The Large IOUs are directed to submit subsequent ALs as discussed below.

### **B. The Joint AL**

In the Joint AL, the Large IOUs report lessons learned to date on the interconnection of V2G AC project systems. We find the Large IOUs have met the requirements of Resolution E-5165 and acknowledge that the lessons are limited given that no V2G AC project systems have interconnected to the grid to date. PG&E received one V2G AC application, and SCE and SDG&E received no V2G Pilot applications during the V2G AC Pilot.

The Large IOUs also propose a path forward for V2G AC systems interconnection:

- 1) The Large IOUs recommend extending the V2G AC Interconnection Pilot with the same requirements for an additional two years (i.e., January 1, 2024 to December 31, 2025). VGIC supports this recommendation “given that this pathway proposed would provide adequate time for relevant [industry] standards to be published before including V2G AC into Rule 21.”<sup>14</sup>

The V2G AC Interconnection Pilot is reopened. The V2G AC Interconnection Pilot is extended until tariff modifications for a permanent interconnection process for V2G AC systems are approved and added to, and become effective in, Rule 21. All requirements as set forth in previous related decisions and

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<sup>14</sup> Response of the Vehicle-Grid Integration Council to Advice Letter 5185-E of Southern California Edison Company, Advice Letter 7125-E of Pacific Gas and Electric Company, Advice Letter 4350-E of San Diego Gas and Electric Company at 2.

resolutions shall remain in effect unless specifically modified here or elsewhere by Commission order.

The V2G AC Interconnection Pilot ended at the end of December 2023 and the Large IOUs have not received inquiries to interconnect under the Pilot.<sup>15</sup> We find it reasonable to reopen the V2G AC Interconnection Pilot as of the date of issuance of this Resolution given (1) that industry standards for enabling V2G AC interconnection have not yet been approved; and (2) there is opportunity to carry on learning objectives given the lack of experience gained during the initial timeline of the V2G AC Interconnection Pilot. The Large IOUs propose extending the V2G AC Interconnection Pilot for an additional two years, through December 2025. We, however, find it prudent to extend the V2G AC Interconnection Pilot until such time that tariff modifications for a permanent interconnection process for V2G AC systems are approved and added to, and become effective in, Rule 21; this will avoid gaps in the interconnection process for V2G AC pilot projects 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. Reopening and extending the pilot will allow more learning opportunities on V2G AC interconnection while industry standards are formalized. It will also allow time for V2G AC systems to be certified to those standards. Except for the extension of the timeline, and those changes discussed in Item 2 below, this direction is given without changes to previous orders.

- 2) The Large IOUs recommend further study of V2G AC interconnection pathways and:

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<sup>15</sup> PG&E, SCE and SDG&E Rule 21 Case Managers, e-mail communication with Energy Division, March 7, 2024. The Large IOUs have provided the following update on the V2G AC Pilot:

- V2G AC Pilot ended Dec 31, 2023
- No action has been taken to 'end' Pilot because Pilot was not part of [Rule] 21 Tariff (no action to take)
- No customer has contacted SCE/SDG&E to interconnect under the Pilot since the Pilot ended. ...[there] was the only [one] V2G AC project that applied to the Pilot thru PG&E.
- If a customer contacts the [Large] IOUs and wants to apply for the Pilot, the [Large] IOUs would inform the customer that the Pilot has ended, but may accept the request subject to the ED's approval of the [Large] IOUs' advice letter to extend out the pilot.

... support and are willing to participate in industry led efforts to develop an interim alternative testing and certification process for V2G-AC pilot projects using existing published standards. If any alternative certification process for V2G-AC pilot projects is determined using existing standards as outlined in Rule 21, the Utilities have the option to remove the requirement for relays for V2G-AC pilot projects. The alternative testing and certification must be applicable industry wide consistent to current certification processes. Once standard and certification requirements for V2G-AC have been published and Rule 21 is updated, all new V2G-AC projects must comply with those requirements and the alternative certification process developed for V2G-AC pilot projects will no longer be available for use.<sup>16</sup>

VGIC supports the Large IOUs' recommendation to undertake further study and supports the Large IOUs' recommendation to work with stakeholders and industry leaders to develop an interim alternative testing and certification process for V2G AC pilot projects.<sup>17</sup>

The Large IOUs proposal to participate in and support industry-led efforts to develop an interim alternative testing and certification process for V2G AC pilot projects using existing approved standards is approved. Provided interest exists from industry in such a process and if industry standards to enable V2G AC interconnection are not adopted by the date of issuance of this Resolution, the Large IOUs shall (1) participate in such efforts, and (2) shall submit a Tier 2 AL proposing modifications to, or reasons for not modifying, the V2G AC Interconnection Pilot.

We support industry-led efforts to develop an interim alternative testing and certification process for V2G AC pilot projects using existing published standards that would eliminate the use of costly relays, which is a requirement now in the V2G AC Interconnection Pilot. Having an industry-led effort aligns

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<sup>16</sup> Joint AL at 4.

<sup>17</sup> *Response of the Vehicle-Grid Integration Council to Advice Letter 5185-E of Southern California Edison Company, Advice Letter 7125-E of Pacific Gas and Electric Company, Advice Letter 4350-E of San Diego Gas and Electric Company* at 2.

with the formation of the “Vehicle to Grid Alternating Current Interconnection Subgroup” (V2G AC Subgroup), which was established via an Administrative Law Judge’s Ruling<sup>18</sup> in response to a motion of the California Energy Storage Alliance (CESA).<sup>19</sup> In the ruling, the “The Director of the Commission’s Energy Division [was] authorized to facilitate the administration of the subgroup...”<sup>20</sup> The V2G AC Subgroup was led by CESA in coordination with Commission staff and active participation from the Large IOUs.

If an industry-led effort is held, we direct the Large IOUs to participate in the discussions and to develop and implement, if feasible, an interim alternative testing and certification process for interconnecting V2G AC pilot project systems. In such a case, the Large IOUs are directed to collaborate with industry in setting up meeting dates and the first meeting is to be held within 20 business days of the issuance date of this Resolution.

It makes sense to implement an alternate testing and certification process before adoption of a formal interconnection process for V2G AC systems. A final meeting, therefore, shall be held no later than 120 calendar days after the issuance date of this Resolution, or sooner if it is determined an alternate testing and certification process is not feasible. The Smart Inverter Working Group meetings may be used for this purpose. In determining the date for the last meeting, we consider the estimated publication of UL 1741 Supplement SC, which is Q4 2024,<sup>21</sup> and estimate that discussions and adoption of a V2G AC interconnection process into Rule 21 will take place sometime in 2025.

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<sup>18</sup> *Joint Administrative Law Judges’ Ruling Establishing Subgroup and Schedule to Develop Proposal on Mobile Inverter Technical Requirements for Rule 21 and Noticing Workshop* issued on August 23, 2019 in R.17-07-007 and R.18-12-006.

<sup>19</sup> *Motion of the California Energy Storage Alliance to Establish Sub-group and Schedule Joint Workshop in Rulemakings 17-07-007 and 18-12-006 to Introduce Sub-group Proposal on Mobile Inverter Technical Requirements for Rule 21 Interconnection* filed by CESA on May 29, 2019 in R.17-07-007 and R.18-12-006.

<sup>20</sup> *Joint Administrative Law Judges’ Ruling Establishing Subgroup and Schedule to Develop Proposal on Mobile Inverter Technical Requirements for Rule 21 and Noticing Workshop* at 1.

<sup>21</sup> UL Solutions (Presented by Tim Zgonena). *UL1741 Supplement SC - Update Bidirectional Electric Vehicle Supply Equipment (BEVSE) / Interconnection Systems Equipment (ISE) for EVs with Bidirectional Onboard Inverters*. March 28, 2024. Smart Inverter Working Group. The presentation stated “The UL 1741 Task

We also consider the possibility of industry standards, namely UL 1741 Supplement SC, being adopted by the date of issuance of this Resolution. We, therefore, find the requirement for participation in the industry-led effort, and associated ALs as described below, is provisional only if industry standards are not adopted by the date of issuance of this Resolution. If industry standards are adopted by the date of issuance of this Resolution, we find it moot to hold such meetings, and instead the V2G AC interconnection efforts can be resumed once the Vehicle to Grid Alternating Current Subgroup (V2G AC Subgroup) reconvenes, consistent with OP 54 of D.20-09-035.

The Large IOUs did not recommend a venue to modify the requirements of the V2G AC Interconnection Pilot. The Large IOUs, therefore, are directed to submit, 20 calendar days after the last meeting of the industry-led effort, a Tier 2 AL discussing modifications to the V2G AC Interconnection Pilot to implement an alternative testing and certification process and proposing to remove the relay requirement for the V2G AC Interconnection Pilot. If the alternative testing and certification process is not feasible, the Large IOUs shall explain the reasons for it. If an industry-led effort is not held, the Large IOUs are not required to submit ALs.

- 3) The Large IOUs recommend providing updates and engaging stakeholders under the existing notification process (pursuant to D.20-09-035, OP 53) that requires the Large IOUs to hold a meeting of the Vehicle-to-Grid Alternating Current Subgroup (V2G AC Subgroup) on a routine basis to provide the members of the subgroup updates on the status of the V2G AC interconnection industry standards.

Providing updates on any alternative certification process for V2G AC pilot projects using an e-mail notification process is approved.

OP 53 of D.20-09-035 requires the Large IOUs to “hold a meeting of the Vehicle-to- Grid Alternating Current Subgroup (V2G AC Subgroup) on a routine basis to provide the members of the subgroup updates on the status of the V2G

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Group is developing the Supplement SC draft in preparation for submittal to the UL1741 Technical Committee (TC) in mid-May 2024. Estimated publication as part of consensus UL 1741, Q4 2024.”

AC interconnections standards update [every 6 months]...<sup>22</sup> The Large IOUs have typically provided updates via e-mail notices in lieu of meetings because there has not been sufficient information to justify holding a full meeting.<sup>23</sup> The last update was provided in March of 2024 through the Smart Inverter Working Group,<sup>24</sup> and the next one is due in September of 2024. We find it reasonable to provide updates on an alternative certification process using the existing e-mail process. The Large IOUs shall announce upcoming meetings and provide a summary of previous meetings within these updates.

Because the timing of the updates submitted per OP 53 may not align with the progress of the discussions for an alternative certification process, we direct the Large IOUs to provide e-mail updates for the alternative certification process at the same time the meetings are announced until discussions have ended. We remind the Large IOUs that the Smart Inverter Working Group is a viable alternative for providing updates and should be leveraged. We authorize Energy Division to schedule Smart Inverter Working Group meetings as needed to meet such needs and direct the Large IOUs to participate in these meetings.

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<sup>22</sup> D.20-09-035 at 225.

<sup>23</sup> The last e-mail update providing the status of the V2G AC interconnection industry standards was sent to the parties of R. 17-07-007 and R. 18-12-006 (Order Instituting Rulemaking Regarding Transportation Electrification Policy and Infrastructure) on September 22, 2023. The e-mail stated:

- **UL 1741 SC – Standard for Interconnection System Equipment (ISE)/EVSE**
  - Development of standard continues, with an expected publication date of End of Q1 2024.
- **SunSpec J3072 – [IEEE] 2030.5 SunSpec profile standard and certification**
  - Development of standard and certification continues, with an expected publication date of Q4 2023.
  - Dependent on UL 1741 SC and SAE J3072 development
- **SAE J3072 – V2G-AC EV standard (equivalent to [IEEE] 1547-2018 and UL 1741 SB)**
  - J3072 has been re-opened for revisions
  - Besides revisions, needs to include test spec for vehicle – also requires 1547.1/UL 1741 SB.
  - Expected completion End of Q4 2023
  - Certification program is TBD

<sup>24</sup> During the Smart Inverter Working Group on March 28, 2024 it was presented that the estimated publication of UL 1741 Supplement SC is expected Q4 2024 and J3072-2024 is expected to be published by mid-June 2024.

Clarification of OP 54 of D.20-09-035: OP 54 of the Decision states “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.”<sup>25</sup> The Decision, however, is silent on the objective and outcome of reconvening the V2G AC Subgroup. We, therefore, clarify that the objective of reconvening the subgroup is, akin to its original objective,<sup>26</sup> to review and assess the ability of approved industry standards to ensure safe interconnection of V2G AC systems, and to understand the application of the approved industry standards to create interconnection at one, and/or multiple, fixed point(s) for one or more plug-in electric vehicles and present recommendations, if existing industry standards are sufficient; and, if not sufficient for safe interconnection, identify the gaps in the industry standards to ensure a future pathway to safe interconnection. We add the following objective to expedite the interconnection process of V2G AC systems: If approved industry standards are sufficient, an objective of the V2G AC Subgroup is to develop Rule 21 language to interconnect V2G AC systems outside of pilots; and if approved industry standards are not sufficient propose a method for interconnection on an interim basis until standards are sufficient for safe interconnection. The Large IOUs shall also identify any interconnection concerns and address those concerns. Additionally, participants may recommend topics that require discussion to allow V2G AC system to interconnect.

The Large IOUs are directed to attend all the meetings and provide presentations as needed. No later than sixty (60) days after completion of the discussions with the Vehicle to Grid Alternating Current Subgroup, and no later than eight months after the start of the subgroup, and with input from the Commission Energy Division, 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. The ALs may be filed jointly and shall include summaries of the discussions of the subgroup

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<sup>25</sup> D.20-09-035 at 225.

<sup>26</sup> D.20-09-035 at 166.

and party positions; the ALs shall also include, as attachment, a V2G AC Subgroup report if one is available.

### **COMMENTS**

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review. Please note that comments are due 20 days from the mailing date of this resolution. Section 311(g)(2) provides that this 30-day review period and 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day review and 20-day comment period for the draft of this resolution were neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments, and will be placed on the Commission's agenda no earlier than 30 days from today.

### **FINDINGS**

1. D. 20-09-035, issued by the Commission on September 30, 2022, directed the Large IOUs to submit Tier 3 ALs for approval of a temporary pathway for pilots seeking V2G AC interconnection, referred to as the "V2G AC Interconnection Pilot."
2. The Large IOUs submitted PG&E AL 6209-E, SCE AL 4510-E, and SDG&E AL 3774-E on May 28, 2021, to comply with the requirements of OP 44 of D. 20-09-035.
3. Resolution E-5165, issued on November 4, 2021, disposed of the May 28, 2021, ALs and approved the proposed temporary pathway to interconnection for V2G AC pilot projects.
4. The V2G AC Interconnection Pilot took place through December 31, 2022 and had an automatic timeline extension to December 31, 2023, which was triggered because industry standards and a permanent process for V2G AC interconnection have not yet been approved and added to the Utilities' Rule 21 tariffs.
5. Resolution E-5165 directed the Large IOUs to submit an AL at the completion of the V2G AC Interconnection Pilot period that includes lessons learned and recommendations for a permanent interconnection pathway for V2G AC systems interconnection.

6. On January 5, 2024 the Large IOUs submitted PG&E Advice Letter 7125-E, SCE Advice Letter 5185-E, and SDG&E Advice Letter 4350-E to meet the requirement of Resolution E-5165.
7. The Large IOUs propose extending the V2G AC Interconnection Pilot, with the same requirements, for an additional two years (i.e., January 1, 2024, to December 31, 2025).
8. As of March 7, 2024, the Large IOUs have not been contacted to interconnect V2G AC systems under the V2G AC Interconnection Pilot. The Large IOUs state that if contacted, the Large IOUs would inform the customer that the V2G AC Interconnection Pilot has ended, but may accept the request to interconnect subject to approval of the ALs to extend the pilot.
9. We find it reasonable to reopen and extend the V2G AC Interconnection Pilot given (1) the industry standards for enabling V2G AC interconnection have not yet been approved; and (2) the lack of experience in interconnecting V2G AC systems gained during the initial timeline of the V2G AC Interconnection Pilot.
10. Given the date of the disposition of the ALs, we find it reasonable to modify the extension timeline of the V2G AC Interconnection Pilot.
11. We find it prudent to extend the V2G AC Interconnection Pilot until such time that tariff modifications for a permanent interconnection pathway for V2G AC systems are added to Rule 21 and are approved to avoid gaps in the interconnection of V2G AC systems.
12. The Large IOUs recommend further study of alternative V2G AC interconnection pathways and agree to participate in industry-led efforts to develop such pathways.
13. We find it prudent for the Large IOUs to participate in and support industry-led efforts to develop an interim alternative testing and certification process for V2G AC pilot projects using existing approved standards.
14. Having an industry-led effort aligns with the formation of the “Vehicle to Grid Alternating Current Interconnection Subgroup.” The Subgroup was led by CESA in coordination with Commission staff and active participation from the Large IOUs.

15. If an industry-led effort is held we find it prudent to direct the Large IOUs to participate in industry-led efforts in coordination with the Commission staff to develop and implement, if feasible, an interim alternative testing and certification process for interconnecting V2G AC pilot project systems if a national standard is not adopted by the date of issuance of this Resolution.
16. It is reasonable for the Large IOUs to provide updates on any alternative certification process using an e-mail notification process.
17. It is reasonable for the Large IOUs to submit ALs to inform the Commission of any modifications to the V2G AC Interconnection Pilot.
18. It is reasonable to clarify Ordering Paragraph 54 of D.20-09-035.
19. It is reasonable to reconvene the Vehicle to Grid Alternating Current Subgroup to discuss the approved V2G AC industry standards and develop Rule 21 language to interconnect V2G AC systems outside of pilots if industry standards are sufficient for safe interconnection of V2G AC systems.
20. It is reasonable for the Large IOUs to submit ALs recommending modifications to Rule 21 to incorporate language to allow V2G AC systems to interconnect after completion of the V2G AC Subgroup.

**THEREFORE IT IS ORDERED THAT:**

1. The requests in Pacific Gas and Electric Company's Advice Letter 7125-E, Southern California Edison Company's Advice Letter 5185-E, and San Diego Gas & Electric Company's Advice Letter 4350-E are approved as modified.
2. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are directed to reopen the V2G AC Interconnection Pilot as of the date of issuance of this Resolution and to continue it until such time that tariff modifications for a permanent interconnection process for V2G AC systems are approved and added to Rule 21 with an effective date.
3. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are directed to participate in industry-led efforts to develop, and implement if feasible, an interim alternative certification process for the interconnection of V2G AC pilot projects provided there is interest from

industry in such a process as discussed herein and if industry standards to enable V2G AC interconnection are not adopted by the date of issuance of this Resolution.

4. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are directed to provide updates on any alternative certification process for V2G AC pilot project interconnection using an e-mail notification process as discussed herein.
5. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are directed to participate in the Vehicle to Grid Alternating Current Subgroup once industry standards are approved to discuss the approved industry standards and develop Rule 21 language to interconnect V2G AC systems and meet all necessary requirements as discussed herein.
6. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to submit a subsequent Advice Letters as discussed herein.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed, and adopted at a conference of the Public Utilities Commission of the State of California held on August 22, 2024; the following Commissioners voting favorably thereon:

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Rachel Peterson  
Executive Director