

## PUBLIC UTILITIES COMMISSION

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March 03, 2022

PG&E AL 6286-E, 6286-E-A, and 6286-E-B  
SCE AL 4559-E and 4559-E-A  
SDG&E AL 3822-E, 3822-E-A, and 3822-E-B

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**Subject: Staff Disposition of: PG&E AL 6286-E, 6286-E-A, and 6286-E-B; SCE AL 4559-E and 4559-E-A; and SDG&E AL 3822-E, 3822-E-A and 3822-E-B -- Modifications to Rule 21, Generating Facility Interconnections, Pursuant to Decision 20-09-035 Ordering Paragraphs 7, 49, 50 and 52 (SCE only)**

Dear Dietz, Menon, Kaushik and Anderson:

Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E) submitted Advice Letters (ALs) 6286-E, AL 4559-E, and AL 3822-E, respectively, pursuant to Ordering Paragraph (OP) 55<sup>1</sup> of Decision (D.) 20-09-035. The ALs were protested by Tesla, Inc. (Tesla) and the Interstate Renewable Energy Council, Inc. (IREC). In response, PG&E, SCE and SDG&E submitted supplemental PG&E AL 6286-E-A, PG&E 6286-E-B, SCE AL 4559-E-A, SDG&E AL 3822-E-A and SDG&E AL 3822-E-B addressing selected contested topics. PG&E, SCE, and SDG&E have met the requirements set forth in D.20-09-035 Ordering

<sup>1</sup> OP 55 provides a list of the OPs in D.20-09-035 requiring changes to Electric Tariff Rule 21 and the corresponding Advice Letter deadline for each change.

Paragraphs 7, 49, 50 and 52 (applicable to SCE only) by making the necessary tariff changes. PG&E AL 6286-E, 6286-E-A and 6286-E-B, SCE AL 4559-E and 4559-E-A, and SDG&E AL 3822-E, 3822-E-A and 3822-E-B and corresponding substitute sheets are approved with an effective date of August 6, 2021.

Attachment 1 contains a discussion of the ALs, the protests of Tesla and IREC, the IOUs replies to the protests and Energy Division staff's determination that PG&E AL 6286-E, 6286-E-A and 6286-E-B, SCE AL 4559-E and 4559-B, and SDG&E AL 3822-E, 3822-E-A, 3822-E-B and corresponding substitute sheets are compliant as modified with D. 20-09-035.

Please contact Jose Aliaga-Caro of the Energy Division staff at [jc5@cpuc.ca.gov](mailto:jc5@cpuc.ca.gov) if you have any questions.

Sincerely,



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## Attachment 1

### **I. BACKGROUND**

Decision 20-09-035 *Adopting Recommendations from Working Groups Two, Three, and Subgroup*, (D.20-09-035 or the Decision) issued on September 30, 2020, in the Rulemaking (R.) 17-07-007,<sup>2</sup> directs the modification of Electric Tariff Rule 21<sup>3</sup> (Rule 21) of Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric Company (SDG&E) (collectively the IOUs).

Ordering Paragraph (OP) 55<sup>4</sup> of the Decision orders PG&E, SCE and SDG&E to update Rule 21 in compliance with other OPs in the Decision; OP 55 provides a list of the OPs in the Decision requiring changes to Rule 21, the grouping of such changes, and the deadline for submitting the ALs. Per OP 55, the first set of ALs included changes ordered in seven (7) OPs: 7, 13, 14, 46, 49, 50 and 52.<sup>5</sup>

#### **A. Initial ALs: PG&E AL 5988-E, SCE AL 4328-E, and SDG&E AL 3642-E**

PG&E AL 5988-E, SCE AL 4328-E, and SDG&E AL 3642-E (the Initial ALs) were submitted on October 30, 2020 to respond to the OP 55 requirements. These ALs were timely protested on November 19, 2020. The IOUs submitted timely replies to the protests on November 30, 2020. In response to the protests, PG&E AL 5988-E-A, SCE AL 4328-E-A, and SDG&E AL 3642-E-A (collectively “the Supplementals to the Initial ALs”) were submitted on May 19, 2021 addressing *selected* contested issues from the protests. These supplemental ALs resolved those contested issues that allowed for consensus between parties. These supplemental ALs, at Energy Division’s guidance, did not contain all the content included in the Initial ALs and *only included* modifications to Rule 21 as ordered by OPs 13, 14, and 46. The Supplementals to the Initial ALs were disposed of separately and are not discussed herein.<sup>6</sup>

#### **B. Current ALs Subject to this Disposition Letter: PG&E AL 6286-E, SCE AL 4559-E and SDG&E AL 3822-E**

Modifications to Rule 21 in compliance with OPs 7, 49, 50 and 52 were *excluded* from the Supplementals to the Initial ALs. The reason for excluding content related to these OPs was because these modifications to Rule 21 required more in-depth discussions and were more complicated to resolve. Modifications in compliance with these OPs are the subject of this Disposition Letter.

Energy Division held meetings between February 2021 and July 2021 with the IOUs and the stakeholders who submitted protests to the Initial ALs. The purpose of the meetings was to clarify the

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<sup>2</sup> Order Instituting Rulemaking to Consider Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21.

<sup>3</sup> Rule 21 governs the interconnection of distributed energy resources to the utilities’ electric grid.

<sup>4</sup> The OPs in D.20-09-035 contained errors in references to other OPs. These were the result of an OP that was deleted, from the draft, in the final decision, which changed the numbering sequence of subsequent OPs. D.21-01-027, issued on January 21, 2021, corrected the numbering sequence. Table 1 of this Disposition Letter reflects this correction.

<sup>5</sup> OP 52 is applicable to SCE only.

<sup>6</sup> PG&E’s AL 5988-E-A and SDG&E AL 3642-E-A were approved by Energy Division disposition letter dated September 21, 2021; SCE AL 4328-E-A was approved by Energy Division disposition letter dated December 13, 2021.

issues, gain consensus and resolve issues related to the use of Power Control Systems (PCS). The cumulation of these discussions led to the filing of PG&E AL 6286-E, SCE AL 4559-E, SDG&E AL 3822-E (collectively “the Current ALs”) on August 6, 2021 modifying Rule 21 in compliance with OPs 7, 49, 50 and 52 of the Decision. This Disposition Letter addresses the Current ALs and the associated protests.

### *C. Ordering Paragraph Requirements*

OP 7: OP 7 adopted Option B of Proposal 8i which maintains the current process whereby non-exporting projects of all sizes skip Interconnection Rule 21 Screens K, L, and M.<sup>7</sup>

Although the current process is maintained, modifications to Rule 21 were still needed to include language mandated by OP 49 and 50. Modifications to Rule 21 for OP 7 are included in the IOUs’ Rule 21 Section G.1.i--Screen I<sup>8</sup> (Engineering Review Details-Initial Review Screens-Screen I).<sup>9</sup>

OP 49 and OP 50: OP 49 and OP 50 adopted Proposal A-B-1 and Proposal A-B-2, respectively. These proposals allow the use of a PCS for non-export and limited-export applications. Specifically, OP 49 lists the requirements that a generating facility must meet to be treated as non-export or limited export, while OP 50 lists the requirements that a generating facility must meet to be treated as inadvertent export.

Modifications to Rule 21 for OP 49 and 50 are included in the IOUs’ Rule 21 Sections:

- G.1.i: Engineering Review Details-Initial Review Screens-Screen I,
- Mm1.Option 8: Non-Export Utilizing Certified Power Control Systems,
- Mm2.Option 9: Limited Export Utilizing Certified Power Control Systems,
- Mm3. Option 10: Non-Export with Inadvertent Export Utilizing Certified Power Control Systems, and
- Mm4. Option 11: Limited Export with Inadvertent Export Utilizing Certified Power Control Systems.<sup>10</sup>

OP 52 (applicable to SCE only): OP 52 adopted Proposal A-B-4 only for customers of SCE. SCE was ordered to revise its Rule 21 tariff to require SCE customers applying for interconnection with a PCS to use only the systems on a pre-approved list. Modifications to Rule 21 for OP 52 are included in SCE’s Rule 21 Section Hh.1.g (Smart Inverter Generating Facility Design and Operating Requirements-General Interconnection and Protective Functions Requirements).<sup>11</sup>

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<sup>7</sup> Screen K asks whether a generating facility is a net energy metering project with a nameplate capacity equal to 500 kW or less. Screen L asks whether there are known transient stability limitation or if the proposed project has interdependencies with earlier-queued Transmission System interconnection requests. Screen M asks whether the total generation capacity on the line section is less than 15 percent of line section peak load for all time sections bounded by automatic sectionalizing devices.

<sup>8</sup> Screen I asks whether power will be exported across the Point of Common Coupling.

<sup>9</sup> PG&E AL 6286-E, at 7-8, SCE AL 4559-E at 4-5, and SDG&E AL 3822-E at 2-3.

<sup>10</sup> PG&E AL 6286-E at 12-16, SCE AL 4559-E at 5-12, and SDG&E AL 3822-E at 5.

<sup>11</sup> SCE AL 4559-E at 5.

#### ***D. Traditional Protective Relays and Power Control Systems (PCS) – Background for OP 49 Requirements***

A traditional protective relay will physically disconnect the generating or storage facility from the grid if power flow is sensed in whichever direction power flow is not permitted. Its main function is to protect the electric grid by removing an element of the power system from service when it starts to operate in an abnormal manner that might damage or interfere with the effective operation of the electric grid. In the standard practice of the IOUs, the relay disconnects the generating facility if the relay senses reverse power flow for a time greater than 2 seconds. According to the Rule 21 Working Group 3 Report “if a customer installs a physical non-export relay it is relatively simple for the utility to validate that the system will not export. However, non-export relays can be prohibitively expensive.”<sup>12</sup>

PCS are systems or devices that electronically limit or control the Alternating Current (AC) or Direct Current (DC) of a generating facility to a programmable limit or level. PCS have an Open Loop Response Time (OLRT) that is described by the Working Group 3 Report below:

The example of a load-following generating facility with both solar and storage can illustrate the concepts of open-loop response time and inadvertent export. When load increases, the storage system discharges to meet that load. When the load decreases, the system reduces output or stops discharging but will inadvertently export to the grid for a period of time to the extent that instantaneous generation exceeds instantaneous load. **This time period is referred to as the open loop response time of the control system.** When load reduces quickly, power may be inadvertently exported to the grid during the time it takes for the system to sense the load reduction and tell the battery to stop discharging. If a system has been tested and certified under the UL CRD<sup>13</sup> for limited export, the generating facility can export power up to nameplate capacity until the control system makes a correction within its certified open-loop response time.

Utilities must account for this inadvertent export while also recognizing that it is short-lived and non-coincidental among customers on a circuit segment because the load of neighboring customers does not go up and down in unison. Further, it should be noted that these control systems do not limit the number of export occurrences, and the instances of export are based on the customer’s operating characteristics. Customers who have very cyclic loads will undergo inadvertent export many times, while customers who have relative steady load pattern will have very few instances of inadvertent export.<sup>14</sup>

A key difference between a traditional protective relay and a PCS has to do with the mechanism used to control power output to the electric grid. Once a relay registers a level of current that triggers the protective function, the relay will create a physical air gap between the generating system and the

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<sup>12</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 127.

<sup>13</sup> UL CRD refers to *Underwriters Laboratory Power Control Systems Certification Requirements Decision* which lists testing conformance for PCS. It “provides a way for inverters and power control systems to be tested and qualified for non-export and limited export.... A power control system certified to the UL CRD allows a device to demonstrate that it is capable of preventing or limiting export, within a time-delay of up to 30 seconds.” (Rule 21 Working Group Three Final Report, June 14, 2019, at 127.)

<sup>14</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 129, emphasis added.

electric grid, thereby bringing the power output to the electric grid to zero. Once a PCS registers a level of current that triggers the protective function, a PCS will rely on electronics to control the power output to the electric grid and may not entirely bring power output to the grid to a zero value and may not necessarily retain it at or near zero within the OLRT. Additionally, the Working Group 3 Final Report reads:

[A relay] acts in unexpected circumstances, when generating facility controls deviate from normal. A [PCS] device, in contrast, may operate much more frequently, or even continuously, to regulate system output under normal conditions. A further difference is the level of historical utility experience. Relays have been used for many decades, while very little experience yet exists with [PCS]. While power control systems have been used historically, they have not been relied upon historically in the same way that [PCS] devices without a physical non-export relay are now being relied upon.<sup>15</sup>

Discussions during the meetings Energy Division held with the IOUs and stakeholders centered on the OLRT and the limitations of a PCS to stop export of power within the OLRT of 2 seconds<sup>16</sup> per the requirements of OP 49. To reflect the inability of the PCS to act identically to a relay and make these proposals workable to ensure safety and reliability of the grid, the discussions revolved around adding a period of time after the OLRT for the PCS to reach a steady state value. Although no formal definition has been adopted in Rule 21 nor the standards for “steady state,” in general terms, steady state is a system condition where the controlled parameter (e.g., output power) does not change over time or the change is bounded within certain values.

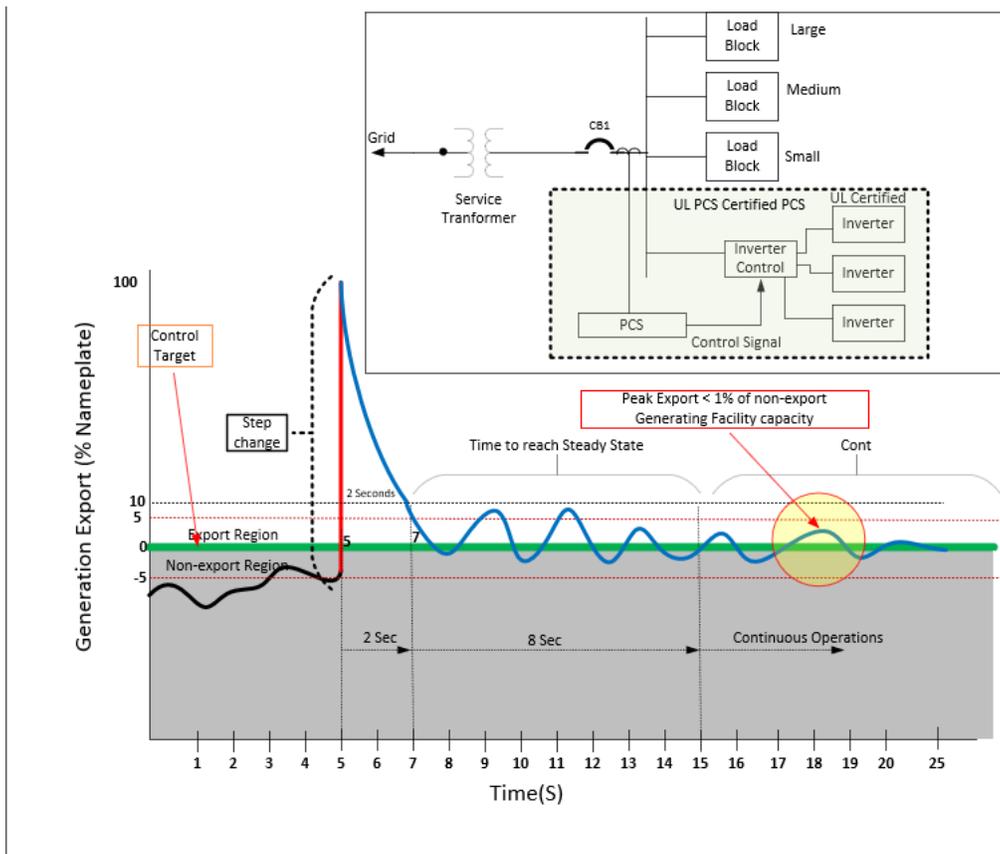
Figure 1 shows the concept of steady state for a 2 second ([s]) OLRT. Between time (t) equals (=) zero to t=5 [s] the generating facility is not exporting power to the electric grid and all power produced by the generating facility is being absorbed by the existing load (black squiggly line). At t=5 [s] there is a sudden drop in load and the facility starts exporting power to the electric grid (vertical red line the “step change”) more than the allowed limit (horizontal green line). The period between t=5 and t=7 [s] is the 2-second OLRT during which time the PCS attempts to bring the export power value back down (blue descending line) to the allowed limit. But the PCS may not reach the allowed limit within the OLRT and there could be a time after the 2 [s] OLRT where the PCS exports and absorbs small amounts of power (blue squiggly line). To account for this operation, the IOUs have added, after the OLRT, an 8 [s] period of time for the PCS to reach steady state--the PCS must reach steady state within 10 [s] (at t=15) after the step change. After t=15 [s], during continuous operation, the PCS will keep the export value bounded and below a pre-determined value.

**Figure 1: PCS Operation Responding to a Rapid Loss in Load**

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<sup>15</sup> Rule 21 *Working Group Three Final Report, June 14, 2019*, at 128.

<sup>16</sup> “A power control system certified to the UL CRD allows a device to demonstrate that it is capable of preventing or limiting export, within a time-delay of up to 30 seconds.” (Rule 21 *Working Group Three Final Report, June 14, 2019*, at 127.)



Source: Diagram from informal discussions papers. E-mail from SCE on Tuesday 6/1/2021 at 5:10 P.M.

### E. Protest by Tesla, and Replies by the IOUs

Tesla submitted a protest to the Current ALs on August 26, 2021. The IOUs filed timely replies on September 2, 2021 to Tesla's protest.

Tesla protested four topics. The protest and the IOUs' replies are summarized below:

1. **Section Mm1 should be expanded to explicitly indicate that non-exporting systems that meet the stated requirements and criteria enumerated as part of Option 8 shall be treated as non-exporting.** Tesla acknowledges that section Mm1 captures the requirements agreed upon, but requests language be added "that makes explicit that systems that meet the identified criteria will be treated as non-exporting."<sup>17</sup>

- The IOUs reply that the change proposed is unnecessary and Tesla's proposed language is "the complement and tantamount to the same requirements that PG&E has included in its tariff,"<sup>18</sup> that the IOUs proposed language "adequately addresses Tesla's

<sup>17</sup> Tesla Protest at 2.

<sup>18</sup> PG&E Reply to Tesla's Protest at 3.

concern,”<sup>19</sup> and that “Tesla’s proposed language is a different way to arrive at the same conclusion when compared to the existing language.”<sup>20</sup>

**2. The thresholds included in the criteria applicable to systems greater 600 kVA should be revisited and revised in the future based on empirical data and/or study to ensure they are grounded in a more objective and fact-based assessment of practical impacts.** Tesla argues that revisions in sections Mm1 and Mm2 include thresholds for the steady state value of the PCS as 1 percent. This percentage was a result of informal discussions between the IOUs and selected stakeholders that had protested this language. Tesla states that the 1% value is not based on empirical data or evidence and that the ALs should be modified to indicate that the thresholds are interim and will be updated when more information is available “ideally via an expressly defined research and evaluation plan over the next year that will further assess the practical impacts of inadvertent export and what levels/durations would result in material impacts on the grid.”<sup>21</sup>

- PG&E replies that “there is no evidence indicating that these threshold values are not the “right” thresholds.”<sup>22</sup> SCE replies “The proposed thresholds, which stakeholders supported, are appropriate and necessary to ensure grid safety and reliability given that it is not possible to determine the exact level, timing, and frequency at which a system would experience an issue”<sup>23</sup> and is not opposed to revisiting these values in the future as long as safety and reliability are not compromised. SDG&E also supports revising the existing criteria in the future based on new data.<sup>24</sup>

**3. The data requirements imposed on applicants that are included as part of Sections Mm3 and Mm4 regarding anticipated inadvertent exports are highly impractical and require additional work to operationalize.** Tesla acknowledges these requirements were included pursuant to OP 50 of the Decision, but is concerned that “they are highly impractical. In order to obtain this data the applicant would need to extensively meter their site at significant cost and then model how a storage or other DER system would operate to arrive at a reasonable estimate or characterization of anticipated inadvertent export”<sup>25</sup> and recommends “additional stakeholder dialogue to discuss how this information can be obtained without unduly burdening customers.”<sup>26</sup>

- The IOUs reply that this language was included in the Proposal A-B-2 which was a consensus proposal by stakeholders and was approved by the Decision. Additionally, the IOUs argue that it is impossible for them to determine how the system will operate and therefore must rely on the customer to provide this information.<sup>27</sup> SCE further

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<sup>19</sup> SCE Reply to Tesla’s Protest at 1.

<sup>20</sup> SDG&E Reply to Tesla’s Protest at 1.

<sup>21</sup> Tesla Protest at 2.

<sup>22</sup> PG&E Reply to Tesla’s Protest at 4.

<sup>23</sup> SCE Reply to Tesla’s Protest at 2.

<sup>24</sup> SDG&E Reply to Tesla’s Protest at 1.

<sup>25</sup> Tesla Protest at 3.

<sup>26</sup> Tesla Protest at 3.

<sup>27</sup> PG&E Reply to Tesla’s Protest at 5; SCE Reply to Tesla’s Protest at 2-3; and SDG&E Reply to Tesla’s Protest at 2.

argues that because it was a consensus proposal and was “approved by the Commission, there is no need for additional stakeholder dialogue.”<sup>28</sup>

4. **Additional clarification and information is needed regarding the distribution provider’s approved list of PCS systems.** Tesla requests that the IOUs “provide additional information regarding the process by which an entity can request to have their PCS listed, how the utilities will evaluate the PCS, as well as a timeline for the review to be completed from start to finish.”<sup>29</sup> Tesla also requests the IOUs to be directed to establish a uniform and coordinated review process.

- PG&E replies that it “will prepare a website detailing the process for its review and approval of PCSs, as well as its list of approved PCS, as part of the implementation of OP 52.”<sup>30</sup> SCE replies that this requirement is only applicable to SCE and states “While coordinating with the other IOUs is a good industry practice, it was not required as part of OP 52. SCE will maintain a website detailing the process for SCE to review and approve control systems, along with its list of approved control systems, as part of the implementation of OP 52.”<sup>31</sup> SDG&E replies that this requirement is only applicable to SCE.<sup>32</sup>

#### *F. Protest by IREC, and Replies by the IOUs*

IREC submitted a protest to the Current ALs on September 2, 2021. Protests were due on August 26, 2021; therefore, this protest was submitted late. Energy Division informed the IOUs that IREC’s late protest was accepted, and per GO 96-B, Section 7.4.4, the IOUs had five business days to reply. The IOUs filed timely replies on September 10, 2021 to IREC’s protest.

IREC protested six topics. The protest and the IOUs’ replies are summarized below:

1. **The requirements in the newly added Mm1 through Mm4 are unduly restrictive and are only acceptable as a temporary solution.** IREC argues the proposals “to establish requirements for the use of certified PCS are unduly restrictive, not supported by evidence of documented risks, and thus should only be used as a temporary solution.”<sup>33</sup> IREC states that there is no evidence to demonstrate that there is a need to impose further restrictions on facilities using PCS, beyond requiring a two or ten second OLRT and believes it is more appropriate to require that PCS have an open loop response time of two or ten seconds and nothing more. IREC notes it agreed upon certain restrictions beyond requiring a two or ten second OLRT with the intent that these restrictions were temporary, and that IREC prepared a document, with input from the IOUs, describing the “next steps” IREC states that the IOUs had agreed to include the “next steps” document in their Advice Letters but failed to do so.

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<sup>28</sup> SCE Reply to Tesla’s Protest at 3.

<sup>29</sup> Tesla Protest at 3.

<sup>30</sup> PG&E Reply to Tesla Protest at 5.

<sup>31</sup> SCE Reply to Tesla Protest at 3.

<sup>32</sup> SDG&E Reply to Tesla Protest at 2.

<sup>33</sup> IREC Protest at 2.

- PG&E and SCE reply that there was a discussion on the “next steps”<sup>34</sup> document, but it is incomplete and consequently was not included in the Current ALs.<sup>35</sup> PG&E states it is committed to completing the analysis and “taking additional actions, including updating the appropriate Mm sections if the analysis supports that updates to these sections will not compromise equipment operations and/or grid safety.”<sup>36</sup> SCE also shares this commitment<sup>37</sup> and SDG&E “supports revisiting existing criteria in the future, based upon new empirical data to avoid or add requirements.”<sup>38</sup>

2. **No evidence indicates that an open loop response time of 2 or 10 seconds is insufficient to ensure the safe and reliable operation of the grid, and it is not rational to conclude that the Decision imposes additional restrictions.** IREC argues that to “interpret the language in the Decision<sup>39</sup> as imposing additional restrictions beyond the open loop response time is not rational...[and] Interpreting that language as an additional requirement involves developing substantial further technical specifications that go well beyond what the Commission adopted in its Decision.”<sup>40</sup> While IREC asserts the additional requirements are unnecessary from a safety and reliability standpoint, it remains committed to addressing the IOUs’ concerns. The “Next Steps” process IREC proposes identifies the list of concerns and research that can address them. IREC states that the Commission should either (1) adopt the Next Step process as a requirement for approving the Current ALs or (2) reject the Current ALs and “remove the additional requirement that projects cease operation within two seconds.”<sup>41</sup> IREC argues that the IOUs have not identified any evidence that projects with PCS that meet the OLRT would cause safety or reliability impacts to the grid.<sup>42</sup> IREC argues that “In the absence of a Next Steps document, the Commission should require that PCS certified under the UL CRD have an open loop response time of 2 or 10 seconds, and nothing more.”<sup>43</sup> IREC states “Essentially all the requirements in Ordering Paragraph 49 would remain except the duplicative language in item (ii) indicating systems should reduce export within two seconds.”<sup>44</sup>

- PG&E replies “acceptance of proposal A-B #1 and A-B #2 was based on the working group consensus that the control system would be able to reduce export to approve limit within a required time (2 seconds or 10 seconds)...[and that OP 49] is very clear about the two second requirement.”<sup>45</sup> PG&E states that the additional proposed language regarding the steady state period of time in the tariff revisions was necessary to bring the PCS operational performance close to OP 49 requirements because the PCS failed

<sup>34</sup> As PG&E describes it, “The “next steps” process IREC mentions identifies the list of potential concerns the utilities have identified, research that can address those concerns, and provided that parties will evaluate and discuss the research.”

PG&E Reply to IREC Protest at 2-3.

<sup>35</sup> PG&E Reply to IREC Protest at 2-3; SCE Reply to IREC Protest at 1-2.

<sup>36</sup> PG&E Reply to IREC Protest at 3.

<sup>37</sup> SCE Reply to IREC Protest at 2.

<sup>38</sup> SDG&E Reply to IREC Protest at 1.

<sup>39</sup> Footnote 5 in IREC’s Protest at 3-4 states “the language in question reads that a PCS shall: “be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit.””

<sup>40</sup> IREC Protest at 3-4.

<sup>41</sup> IREC Protest at 4.

<sup>42</sup> IREC Protest at 4.

<sup>43</sup> IREC Protest at 4.

<sup>44</sup> IREC Protest at 4.

<sup>45</sup> PG&E Reply to IREC Protest at 3-4.

to meet the Decision’s requirements to “reduced export power to the approved export limit” as agreed upon in the Working Group 3 Report. PG&E states it is committed to continue to work through these issues with stakeholders once sufficient information is available to show there are no safety issues from the PCS and only then should the requirements be modified. Similarly, SCE states:

SCE is not misinterpreting the Decision to impose additional restrictions. The language in the Decision is clear that the PCS “must be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit... To date, the PCS has been unable to meet OP 49’s requirement to “reduce export power to the approved export limit” within two seconds.<sup>46</sup>

and:

SCE is unable to ignore the export associated with these systems without evaluating the risks. However, SCE is committed to continuing to work on these issues with stakeholders. Indeed, SCE and stakeholders already agreed to add language to Sections Mm1 and Mm2 to bring the requirement closer to the PCS operational performance. (SCE added the following language to address the fact that the PCS cannot meet the Decision’s requirements: “A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.”) Moreover, when sufficient information is available that shows that there are no safety issues due to the performance of the PCS, SCE would be supportive of reviewing and modifying the requirements.<sup>47</sup>

SDG&E “argues the opposite: no evidence existing to indicate the open-loop response time of 2 or 10 seconds is sufficient to ensure safety and reliability.”<sup>48</sup> SDG&E also states that it is not misinterpreting the OP 49 language and that the language in the Decision is clear in stating that the PCS “must be able to reduced export power to the approved export limit within two seconds of exceeding the approved export limit.”<sup>49</sup> SDG&E also expresses that “the PCS has fallen short of its expectations and cannot meet the performance requirements of OP 49 to ‘reduce export power to the approved export limit.’”<sup>50</sup> SDG&E also states it is committed to continuing the discussions on these issues with stakeholders and that it supports modifications to the requirements once information is available that there are no safety issues due to the performance of the PCS.

**3. Section Mm1 needs revision to clearly state that projects will be treated as non- export during the screening process.** IREC argues that section Mm1 does not provide sufficient

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<sup>46</sup> SCE Reply to IREC Protest at 2.

<sup>47</sup> SCE Reply to IREC Protest at 3.

<sup>48</sup> SDG&E Reply to IREC Protest at 1.

<sup>49</sup> D.20-09-035 at 222.

<sup>50</sup> SDG&E Reply to IREC Protest at 2.

clarity that qualifying projects will be treated as non-exporting projects in Screen N or other appropriate screens when they meet all the IOUs' requirements, and suggests language should be added to section Mm1(iii) to make that clear.

- The IOUs reply that the proposed language included in the Current ALs was drafted by IREC. Furthermore, the IOUs state that there was no conversation to include language related to Screen N within section Mm1 because projects under this section would not make it to Supplemental Review (Screen N) as these projects are considered non-export.<sup>51</sup>
4. **Section Mm4 is Missing Part of the Consensus Language.** IREC states that at the end of Rule 21 section Mm4 (Option 11, Limited Export OLRT between 2 and 10 seconds), the submitted advice letters failed to include language that was part of the consensus language agreed upon during discussions and should be added back to the tariff. Specifically, IREC argues that the following language be added “Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests.”
- The IOUs reply that the language was intentionally left out because Section Mm4 is for exporting generators and are thus part of the interconnection queue and are used to study subsequent interconnection requests. Furthermore, “The language remains for Mm3, inadvertent export, because it is not expected that all projects would be in inadvertent export mode at the same time. However, Section Mm4 addresses exporting generators that are expected be exporting at the same time, so they must be studied as such.”<sup>52</sup>
5. **PG&E’s proposed language contains minor inconsistencies with the language proposed by the other IOUs.** IREC notes that it is important that the language used in Rule 21 be consistent across each of the IOUs’ tariffs to avoid confusion and facilitate further revisions down the road and requests that this inconsistency be remedied.
- PG&E states it “regrets it missed these differences and will submit a supplement to address them.”<sup>53</sup>
6. **SCE proposes to revise its Interconnection Application forms, but PG&E and SDG&E have not.** IREC argues all the IOUs should revise their interconnection application forms. Additionally, IREC argues that SCE’s interconnection application forms do not use Rule 21’s defined terms, suggests revisions to SCE’s forms; and recommends that if the other IOUs are required to revise their forms, they should pay attention to the use of defined terms.
- IOUs’ Replies: PG&E states that it has revised its Interconnection Application for Non-Export. PG&E states it:

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<sup>51</sup> PG&E Reply to IREC Protest at 4-5; SCE Reply to IREC Protest at 3; SDG&E Reply to IREC Protest at 2-3.

<sup>52</sup> PG&E Reply to IREC Protest at 5; SCE Reply to IREC Protest at 3; SDG&E Reply to IREC Protest at 3.

<sup>53</sup> PG&E Reply to IREC Protest at 6.

included changes to address the various non-export scenarios in its updates to forms for the consolidated application portal – the Smart Connect/ You[r]Projects advice submittal, AL 6270-E.<sup>54</sup> While this AL is approved and effective, PG&E is open to additional changes on its forms for the non-export scenarios. PG&E is contemplating additional changes to its forms for its new portal in succeeding roll-out.<sup>55</sup>

SCE opposes most of IREC’s proposed modifications to its Interconnection Application forms.<sup>56</sup> SDG&E “agrees to revise its Interconnection Application Form consistent with SCE’s proposed revisions.”<sup>57</sup>

***G. Supplemental ALs Filed in Response to IREC’s Protest: PG&E AL 6286-E-A and 6286-E-B, SCE AL 4559-E-A, and SDG&E 3822-E-A and 3822-E-B***

On November 19, 2021 PG&E filed Supplemental AL 6288-E-A addressing IREC’s protest regarding the inconsistent language in its Rule 21 modifications. On January 7, 2022 PG&E filed Supplemental AL 6288-E-B seeking to update its existing interconnection application forms to align with those of SCE and SDG&E.

On November 19, 2021 SDG&E filed Supplemental AL 3822-E-A addressing IREC’s protest regarding aligning its interconnection forms with those of SCE. On January 7, 2022, SDG&E filed Supplemental AL 3822-E-B standardizing verbiage for the Interconnection Application Forms.

On January 7, 2022 SCE filed Supplemental AL 4559-E-A addressing IREC’s protest and modifying Form 14-732, Generating Facility Interconnection Application and Form 14-918, Rule 21 Exporting Generating Facility Interconnection Request, to provide greater consistency among the IOUs.

On January 28, 2022, the IOUs submitted substitute sheets correcting a typo in modifications to Section G.1.i (Screen I).

Details to these supplemental filings are described in Section II: Disposition.

***II. DISPOSITION***

Energy Division staff (Staff) has reviewed D.20-09-035, the IOUs’ ALs (PG&E AL 6286-E, SCE AL 4559-E and SDG&E AL 3822-E), Tesla’s and IREC’s protests, the IOUs’ replies to the protests, the Supplementals ALs (PG&E AL 6286-E-A and 6286-E-B, SCE 4559-E-A, and SDG&E AL 3822-E-A and 3822-E-B) and finds that PG&E AL 6286-E, 6286-E-A and 6286-E-B, SCE AL 4559-E and 4559-E-A, and SDG&E AL 3822-E, AL 3822-E-A, and AL 3822-E-B and corresponding substitute sheets are in compliance with OPs 7, 49, 50 and 52 of D.20-09-035.

***A. Disposition of Tesla’s Protested Topics***

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<sup>54</sup> PG&E AL 6270-E: Modifications to Various Pacific Gas and Electric Company's Electric Rule 21 Filed Forms to Support the Consolidation of its "YourProjects" Generator Application and Service Plan Application Online Portals

<sup>55</sup> PG&E Reply to IREC Protest at 6.

<sup>56</sup> SCE Reply to IREC Protest at 4.

<sup>57</sup> SDG&E Reply to IREC Protest at 3.

**1. Tesla: Section Mm1 should be expanded to explicitly indicate that non-exporting systems that meet the stated requirements and criteria enumerated as part of Option 8 shall be treated as non-exporting.**

Background: Section Mm1, Option 8 (Non-Export Utilizing Certified Power Control Systems) is added to Rule 21 to comply with OP 49. Section Mm1, Option 8 describes the requirements for non-export systems that use a PCS with an OLRT of no more than two seconds.

Protested Issue and Replies: Tesla requests language be added to Section Mm1, Option 8 to make explicit that systems that meet the identified criteria will be treated as non-exporting. The IOUs argue that the language Tesla proposes is redundant and unnecessary as it is already included in the proposed language. SCE states:

SCE's proposed language adequately addresses Tesla's concern by making clear that a non-export system will be evaluated under screens I, J, K, M, N, and O utilizing the provided calculation only if it has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1 percent of the PCS controlled nameplate.<sup>58</sup>

The IOUs have proposed the following language:

If the non-export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL<sup>59</sup> testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity.<sup>60</sup>

Tesla's proposes the following language should be added at the end of the IOUs proposed language:

If the non-export system has an aggregate PCS controlled nameplate of 600 kVA or less, or the maximum reported steady state value of the PCS is 1% or less of the PCS controlled nameplate (as provided in the NRTL testing reports), then the system is considered non-exporting (export = zero) in screens I, J, K, M, N and O.<sup>61</sup>

Disposition: Tesla is concerned about a system being considered as non-export, under Option 8, in screens I, J, K, M, N and O if the system has an aggregate PCS controlled nameplate of 600 kVA or less, or the maximum reported steady state value of the PCS is 1% or less of the PCS controlled nameplate. We dispose of Tesla's concerns based on the Rule 21 screens:

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<sup>58</sup> SCE Reply to Tesla Protest at 1-2.

<sup>59</sup> National Recognized Testing Laboratory, a private sector organizations that performs certification for certain products to ensure that they meet the requirements of both the construction and general industry electrical standards.

<sup>60</sup> PG&E AL 6286-E at 13, SCE AL 4559-E at 6, SDG&E AL 3822-E at 83 (Tariff Sheet: Cal. PUC. Sheet No. 35153-E)

<sup>61</sup> Tesla Protest at 2.

- i. Screen I: Screen I asks “Will power be exported across the PCC?” This screen determines whether a project is considered export or non-export. All projects must go through this screen. Choosing any option within this screen determines that the project is non-export as long as the project meets the requirements in the option chosen. Therefore, Staff finds that inclusion of Tesla’s proposed language is redundant since choosing Option 8, and passing the requirements, would already classify the project as non-export.
- ii. Screens J, K, M: OP 7 of the Decision requires “Option B of Proposal 8i is adopted whereby non-exporting projects of all sizes skip Interconnection Rule 21 Screens K, L, and M.”<sup>62</sup> Modifications in compliance with OP 7 are included in modifications to Screen I, whereby the IOUs propose the following language (strikethroughs signify deletions, underline signify additions):
  - o Screen I: Will power be exported across the PCC?
    - If Yes, Continue to Screen J. This includes Options 5, ~~and 6, 9, 10 and 11~~ below.
    - If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate ~~Protective Function~~ Options 1, 2, 3, 4, 7 or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If ~~Protective Function~~ Option 8 is used, see section ~~Mm2-[Mm1~~<sup>63</sup>] to determine screen application.<sup>64</sup>

This language is inclusive of non-export systems of all sizes and states that Screens J, K, L, and M are skipped once an option is chosen. Staff determines that this language adequately addresses Tesla’s concern of non-export systems skipping screens J, K and M upon choosing Option 8.

- iii. Screens N and O: Under Rule 21, the Fast Track Review process consists of the Initial Review (Screens A through M) and, only if required, a Supplemental Review (Screens N through P). The need for Supplemental Review is determined based on the results of the Initial Review screens (Screens A-M). The modifications for OP 7, as stated above, guarantee that Initial Review is passed once a non-export option is chosen. Projects that pass the Initial Review and meet all the requirements of the option chosen may not be required to go to Supplemental Review.

Option 8 (Section Mm1) lists the minimum requirements for non-export systems that use a certified PCS with an OLRT of no more than 2 seconds or less. In addition, the tariff modification states “The PCS must reduce export to zero or less within two seconds of commencing export. A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.”<sup>65</sup> This language applies the time to reach steady state window which was discussed during the meetings Energy Division held between stakeholders—it allows the use of the PCS given its

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<sup>62</sup> D.20-09-035 at 207.

<sup>63</sup> Substitute sheets submitted on January 28, 2022 by the IOUs corrected a typo—the original proposed text referenced section Mm2, which is Option 9, not Option 8. The substitute sheets now reference Section Mm1 (Option 8).

<sup>64</sup> PG&E AL 6286-E-A at 7, SCE AL 4559-E at 4, SDG&E AL 3822-E at 2.

<sup>65</sup> PG&E AL 6286-E at 12, SCE AL 4559-E at 6, SDG&E AL 3822-E at 83 (Tariff Sheet: Cal. PUC. Sheet No. 35153-E).

limitations to reduce export to zero within 2 seconds. Option 8 also specifies, as the IOUs propose:

If the non-export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity.

The language above applies to systems **greater than** 600 kVA with the maximum reported steady state value of the PCS greater than 1% of the PCS controlled nameplate. It does not apply to systems below 600 kVA or below the steady state value of the PCS less than 1%, which concerns Tesla. Tesla's proposed additional language is the inverse of the language already proposed by the IOUs. If systems below the specified criteria pass the Mm1 screen, they will bypass Screens N and O. Therefore, Staff determines that this process addresses Tesla's concern of non-export systems skipping screen N and O.

For the foregoing reasons, Staff determines that the IOUs' language is sufficient under Section Mm 1, Option 8, and there is no need to add the additional language Tesla has requested and that Tesla's concern is addressed by the Rule 21 screening process. Should any issues arise regarding this topic through any formal or informal complaint, Staff may address it through an appropriate venue. Therefore, this request by Tesla is denied.

**2. Tesla: The thresholds included in the criteria applicable to systems greater 600 kVA should be revisited and revised in the future based on empirical data and/or study to ensure they are grounded in a more objective and fact-based assessment of practical impacts.**

Background: Revisions in sections Mm1, Option 8 (Non-Export Utilizing Certified Power Control Systems) and Mm2, Option 9 (Limited Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 49 and include thresholds for the steady state value of the PCS as one percent (1%). This percentage was a result of informal discussions Energy Division held between the IOUs and selected stakeholders that had protested this language in the Initial ALs. The percentage was chosen as a means to evaluate this screen given the limitations of the PCS in achieving the requirements set forth in the Decision.

Protested Issue and Replies: Tesla states that the 1% value is not based on empirical data or evidence and that the ALs should be modified to indicate that the thresholds are interim and will be updated when more information is available.

PG&E, in its reply, states that there is no evidence indicating that the thresholds are not the right ones and states "we are in a condition where the thresholds are not well understood and therefore, keeping grid safety and reliability in mind, it is more appropriate to side with keeping these assumptions on the

side of needing to perform additional analysis than to assume no safety issues will occur.”<sup>66</sup> SCE and SDG&E state they are not opposed to revisiting this criteria in the future based on available information as long as safety and reliability are not compromised.

Disposition: While Staff finds merit in revisiting this topic, Staff does not agree that language to revisit this topic needs to be included in the Current ALs. The 1% requirement was a compromise to allow PCS, which perform differently than a traditional relay, to achieve the goals of the new screens (Mm1 and Mm2). Therefore, this request by Tesla is denied at this time.

This determination, however should not be interpreted as indicating that this issue is not worthy of discussion at a future date. Staff reminds stakeholders that there are venues to further discuss these topics, such as the Interconnection Discussion Forum (IDF) and the Smart Inverter Working Group (SIWG). Additionally, per D.21-06-002<sup>67</sup> OP 17 Energy Division will be compiling a list of topics to revisit in the future rulemaking. OP 17 of D.21-06-002 specifically states:

One year from the closure of this proceeding, Commission Energy Division is authorized to seek informal comments on new interconnection issues and potential revisions to interconnection policies, from entities listed on this and future interconnection proceeding service lists. The comments shall be used to draft the preliminary scope in an Order Instituting Rulemaking for the successor interconnection rulemaking.<sup>68</sup>

Staff expects that by this time, if not sooner, the utilities will have better experience implementing these new screens and have more knowledge for the issue to be better addressed.

**3. Tesla: The data requirements imposed on applicants that are included as part of Sections Mm3 and Mm4 regarding anticipated inadvertent exports are highly impractical and require additional work to operationalize.**

Background: Sections Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems) and Mm4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 50. OP 50 of the Decision states “during Supplemental Review the applicant shall identify, within 15 days, the frequency of inadvertent export, the real power level in watts of inadvertent export and the time duration of inadvertent export.”

Protested Issue and Replies: Tesla argues that the OP 50 requirements are impractical for the customer and recommends additional stakeholder dialogue so as not to burden customers.

The IOUs reply that this language was approved by the Decision. Additionally, the IOUs argue that it is impossible for them to determine how the system will operate and therefore must rely on the customer to provide this information.

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<sup>66</sup> PG&E Reply to Tesla Protest at 4.

<sup>67</sup> Decision 21-06-002 in R.17-07-007 resolved remaining issues from the Rule 21 Working Group 4 Report.

<sup>68</sup> D.21-06-002 at 92.

Disposition: The Decision adopted this requirement. Therefore, this request by Tesla is denied. Should this become an issue in the future, there are venues where it can be addressed such as the IDF or the SIWG. Alternatively, Tesla has the option to formally request modification of the Decision per the CPUC's Rules of Practice and Procedure.

**4. Tesla: Additional clarification and information is needed regarding the distribution provider's approved list of PCS systems.**

Background: Information regarding a pre-approved list is included for SCE only pursuant to OP 52.

Protested Issue and Replies: Tesla requests the utilities "provide additional information regarding the process by which an entity can request to have their PCS listed, how the utilities will evaluate the PCS, as well as a timeline for the review to be completed from start to finish."<sup>69</sup> Tesla also requests the IOUs to be directed to establish a uniform and coordinated review process.

PG&E replies that it "will prepare a website detailing the process for review and approval of PCSs and a list of approved PCS as part of the implementation of OP 52."<sup>70</sup> SCE replies that this requirement is only applicable to SCE and states that coordination with other IOUs was not required as part of OP 52. Furthermore, SCE replies it will maintain a website detailing the process for review and approval of control systems, and a list of approved control systems. SDG&E replies that this requirement is only applicable to SCE.

Disposition: Pursuant to OP 52 of the Decision and the Rule 21 Working Group 3 Report<sup>71</sup> the pre-approved list requirement is only applicable to SCE. While not explicitly obligated to do so, PG&E, in its reply, stated that it will maintain a website and list of approved PCS. Staff finds that PG&E's efforts are not mandated by the Decision but are welcomed as they will increase transparency and inform developers of approved PCSs. Staff also finds, that while these topics merit further discussion, they are beyond the scope of the requirements of OP 52 as the Decision did not order SCE to provide information on the process by which an entity can request approval and listing of a PCS. This topic is better suited for a discussion in the IDF, and Staff expects to place it on a future IDF agenda. Staff encourages SCE, SDG&E and PG&E, to informally provide additional transparency about their process to review and approve PCSs. Therefore, this request by Tesla is denied.

***B. Disposition of IREC's Protested Topics***

**1. IREC: The requirements in the newly added Mm1 through Mm4 are unduly restrictive and are only acceptable as a temporary solution.**

Background: Sections Mm1, Option 8 (Non-Export Utilizing Certified Power Control Systems) and Mm2, Option 9 (Limited Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 49; and Sections Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems) and Mm4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 50. Energy

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<sup>69</sup> Tesla Protest at 3.

<sup>70</sup> PG&E Reply to Tesla Protest at 5.

<sup>71</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 137-138.

Division held meetings between February 2021 and July 2021 with the IOUs and the stakeholders that protested the Rule 21 modifications arising from OP 49 in the Initial ALs. The purpose of the meetings was to analyze how to align the requirement of OP 49 with the operational capabilities of PCSs.

Protested Issue and Replies: IREC argues the proposals to establish requirements for the use of certified PCSs are “unduly restrictive, not supported by evidence of documented risks, and thus should only be used as a temporary solution...[and there is no evidence] to demonstrate that there is a verifiable need to impose further restrictions on facilities using PCS, beyond requiring a two or ten second open loop response time.”<sup>72</sup> IREC states that the appropriate approach is to simply require that PCS have an open loop response time of two (Ordering Paragraph 49) or ten (Ordering Paragraph 50) seconds and nothing more. IREC notes it agreed upon certain restrictions during the Energy Division discussions beyond requiring a two or ten second OLRT with the intent that these restrictions were temporary, and that IREC prepared a document (“Next Steps on Power Control System Performance”)<sup>73</sup> with input from the IOUs describing the next steps to be taken concerning the use of PCSs. The document lists steps to be taken to “identify whether, and to what extent, inadvertent export from certified power control systems may impact the distribution system.”<sup>74</sup> The document outlined steps to be taken by the IOUs to evaluate transformer loading scenarios to determine impacts of inadvertent export on transformers, scenarios to be analyzed with regards to OP 49 and OP 50 to understand the impacts of PCS, timelines to conduct these analysis, and the IOUs’ concerns. The document mentions Department of Energy research projects:

that are expected to evaluate impacts from inadvertent export: The National Renewable Energy Laboratories (NREL) “Improving Solar and Solar+Storage Screening Techniques to Reduce Utility Interconnection Time and Costs” project and the Interstate Renewable Energy Council and the Electric Power Research Institute “Building a Technically Reliable Interconnection Evolution for Storage” (BATRIES)<sup>75</sup>

and includes a timeline for the CPUC Energy Division to re-convene discussions with stakeholders and the IOUs regarding these research projects. IREC states that the IOUs agreed to include the Next Steps on Power Control System Performance in their Advice Letters but failed to do so.

PG&E and SCE reply that there was a discussion regarding this document, but it is incomplete and consequently was not included in the Current ALs. PG&E, SCE and SDG&E state they support revisiting the criteria and updating the appropriate Mm sections if the analysis supports updates that will not compromise equipment operations and/or grid safety.

Disposition: While it was Energy Division’s understanding that the “Next Steps on Power Control System Performance” document *would be* included in the Current ALs, after more consideration Staff determines that the “Next Steps on Power Control System Performance” document provided by IREC contains some information that is not appropriate for an advice letter, and is not necessary in order to

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<sup>72</sup> IREC Protest at 2-3.

<sup>73</sup> See IREC Protest, Attachment A.

<sup>74</sup> IREC Protest, Attachment A at 1.

<sup>75</sup> IREC Protest, Attachment A at 2.

continue further discussions. Therefore, this request by IREC to include the document in the Current ALs is denied.

Denial of including the “Next Steps on Power Control System Performance” document in the Current ALs should not be interpreted, however, as Staff’s determination that this issue is not worthy of discussion at a future date, or that the Utilities acted in good faith in drafting the ALs. While the document outlines a clear course of action, it contains wording that is inappropriate to include in an AL, such as mandating Energy Division to take certain actions<sup>76</sup> or mandating the CPUC to convene meetings to discuss the results of studies.<sup>77</sup> Staff finds that such mandates for Energy Division or the CPUC are not appropriate for a third-party to impose upon as a requirement for next steps to be taken concerning further discussions around the OLRT and PCS. Furthermore, there are venues to further discuss these topics, such as the IDF and the SIWG. Pursuant to D.21-06-002 OP 17 Energy Division will be compiling a list of topics to revisit in the future rulemaking. These venues allow Energy Division and the Commission to further explore this topic without the necessity for including a “next steps” document in the Current ALs. The IOUs support revisiting the criteria and updating the appropriate sections in Rule 21. Staff will work with IREC and the IOUs to schedule further discussions on this topic in the venues identified above.

**2. IREC: No evidence indicates that an open loop response time of 2 or 10 seconds is insufficient to ensure the safe and reliable operation of the grid, and it is not rational to conclude that the Decision imposes additional restrictions.**

Background: This issue is related to Section II.B.1 (Disposition of IREC Protested Topic 1) above.

Sections Mm1, Option 8 (Non-Export Utilizing Certified Power Control Systems) and Mm2, Option 9 (Limited Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 49; and Sections Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems) and Mm4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 50. Energy Division held meetings between February 2021 and July 2021 with the IOUs and the stakeholders that had protested the Rule 21 modifications due OP 49 and 50 in the Initial ALs. The purpose of the meetings was to attempt to align the requirements of OP 49 and OP 50 with the operational capabilities of a PCS.

Protested Issue and Replies: IREC states that it was its understanding that

based on the extensive discussions of the Working Group [3], that a two second open loop response time was sufficient. To interpret the language in the Decision<sup>5</sup> as imposing additional restrictions beyond the open loop response time is not rational.<sup>78</sup>

IREC states “Interpreting that language as an additional requirement involves developing substantial further technical specifications that go well beyond what the Commission adopted in its Decision.”<sup>79</sup>

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<sup>76</sup> Such as “In April 2022, the CPUC energy division will re-convene the stakeholders to discuss the BATTERIES and NREL research results.” IREC Protest, Attachment A at 2.

<sup>77</sup> IREC Protest, Attachment A at 1.

<sup>78</sup> IREC Protest at 3. IREC footnote 5 states: “the language in question reads that a PCS shall: “be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit”.”

<sup>79</sup> IREC Protest at 4.

While IREC does not believe additional requirements are necessary from a safety and reliability standpoint, it remains committed to addressing the IOUs' concerns. IREC states that the Commission should adopt the process outlined in the "Next Steps on Power Control System Performance" document as a requirement for approving the Current ALs or "alternately, the Commission should reject the Advice Letters and instead simply remove the additional requirement that projects cease operation within two seconds."<sup>80</sup> IREC argues that the IOUs have not identified evidence that projects with PCS that meet the OLRT would cause safety or reliability impacts to the grid. IREC argues that "In the absence of a Next Steps ["Next Steps on Power Control System Performance"] document, the Commission should require that PCS certified under the UL CRD have an open loop response time of 2 or 10 seconds, and nothing more."<sup>7,81</sup>

SDG&E replies that there is no evidence existing to indicate the open-loop response time of 2 or 10 seconds is sufficient to ensure safety and reliability. PG&E replies that "acceptance of proposal A-B #1 and A-B #2 was based on the working group consensus that the control system would be able to reduce export to approve limit within a required time (2 seconds or 10 seconds)...[and that OP 49] is very clear about the two second requirement."<sup>82</sup> SCE and SDG&E also express that they are not misinterpreting the Decision to impose additional restrictions and that OP 49 is clear that the PCS must be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit.

PG&E states that the additional proposed language (i.e., the steady state language) in the tariff revisions was to bring the PCS operational performance close to OP 49 requirements because the PCS failed to meet the Decision's requirements to reduce export power to the approved export limit as agreed upon in the Working Group 3 Report. SCE and SDG&E also state that the PCS has been unable to meet OP 49's requirement to reduce export power to the approved export limit within the two seconds ordered by OP 49. Additionally, SCE states it is:

unable to ignore the export associated with these systems without evaluating the risks.... Indeed, SCE and stakeholders already agreed to add language to Sections Mm1 and Mm2 to bring the requirement closer to the PCS operational performance. (SCE added the following language to address the fact that the PCS cannot meet the Decision's requirements: "A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.")<sup>83</sup>

PG&E, SCE and SDG&E express commitment to continue to work through these issues with stakeholders once sufficient information is available to show there are no safety issues due to the performance of the PCSs and support reviewing and modifying the requirements in the future as additional information becomes available.

Disposition: IREC's protested issue is two-fold:

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<sup>80</sup> IREC Protest at 4.

<sup>81</sup> IREC Protest at 4. IREC footnote 7 states "Essentially all the requirements in Ordering Paragraph 49 would remain except the duplicative language in item (ii) indicating systems should reduce export within two seconds...."

<sup>82</sup> PG&E Reply to IREC Protest at 3-4.

<sup>83</sup> SCE Reply to IREC Protest at 3.

(1) *Adoption of “Next Steps on Power Control System Performance” document as a Requirement to Approve the Current ALs:* While Staff recognizes the importance of future discussions that may lead to modifications of Sections Mm1 through Mm 4 in Rule 21, as discussed in Section II.B.1 of this Disposition Letter (Disposition of IREC Protested Topic 1) the document does not need to be formally adopted in order to continue discussions as there are other venues available to stakeholders, Energy Division, and the Commission to address this subject. Furthermore, although this document serves to outline future steps to take, it was not part of the requirement of the OPs in the Decision and thus it is not necessary to include the document in the Current ALs. Therefore, this request by IREC is denied.

However, the document does serve as a starting point for future discussions. Topics for future discussion include, but are not limited to:

- Transformer Impacts – The IOUs, working with transformer manufacturers, shall evaluate loading scenarios to determine potential impacts of inadvertent export on transformer life.
- DOE Funded Research Projects – Reconvene stakeholders to discuss the BATTRIES and NREL research results, and relevant findings of these projects and applicability to inadvertent export and PCSs.
- Identify Further Concerns – The IOUs identified further concerns (e.g., Impact to Voltage Regulation Equipment, Impact on protection (fuses, reclosers), Impact on reactive power equipment (Capacitor banks) that need to be discussed further in light of new research findings and IOU experience with PCSs.

Staff will evaluate the topics and place them in the correct venues for discussion; these topics shall be on the agenda for the 2022 meetings for either IDF or SIWG. Depending on outcomes of those discussions, Staff will pursue any necessary steps needed for tariff modifications if such modifications are warranted.

(2) *Open Loop Response Time of Two (OP 49) Seconds—“Additional Requirement” and Steady-State Language:* OP 49 states:

Proposal A-B 1 is adopted. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall modify their Rule 21 tariffs to allow the use of a power control system for non-export and limited export interconnection applications. Rule 21 shall be modified to establish the following five specifications that generating facilities must meet to be treated as non-export or limited export: i) use a power control system that passes the requirements of the Underwriters Laboratory (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol; ii) use a power control system that has an open-loop response time of no more than two seconds, as provided in the control systems specification data sheets, **and must be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit** [emphasis added]...

With regards to IREC’s claim that “the Commission should reject the Advice Letters and instead simply remove the additional requirement that projects cease operation within two seconds” Staff clarifies that this is **not an additional requirement**. The Decision adopted Proposal A-B-1<sup>84</sup> without

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<sup>84</sup> D.20-09-035 at 153.

modifications.<sup>85</sup> In the Working Group 3 Report, Proposal A-B-1, which was a consensus proposal that stakeholders agreed upon, specifically states “the PCS is required to reduce export power to the approved export limit within 2 seconds of exceeding the approved export limit.”<sup>86</sup> The Working Group 3 Report also notes the proponent’s position of CALSSA:

A zero-export system uses power controls in lieu of a physical non-export relay but operates in an **equivalent** [emphasis added] fashion to a system with a physical non-export relay. **Rule 21 currently includes a maximum response time of two seconds for relays.** If a power control system **responds within the same timeframe** the resource should be treated the same as a resource using a relay. Also, limited export is no different. If it **will not export beyond the set amount for more than two seconds**, the controlled maximum export should be treated as the system capacity.<sup>87</sup>

The language in the Working Group 3 Report and the Decision is clear: the PCS is required to reduce export power to the approved export limit within 2 seconds. Therefore, Staff finds IREC’s argument regarding this as being an “additional requirement” is inaccurate and the IOUs are not misinterpreting the language for this requirement.

Staff finds that because these are new technologies there is neither evidence for nor against the assertion that PCS OLRT of 2 or 10 seconds is sufficient to ensure grid safety and reliability. In adopting proposals A-B-1 (OP 49) and A-B-2 (OP 50) to allow the use of a power control system for non-export, limited export and inadvertent export for interconnection applications the Decision found that “that adoption of these recommendations allows the Commission to maintain technology neutrality, while fully utilizing new technologies that can **safely and reliably substitute non-export relays** [emphasis added] and limit the grid impacts of interconnecting generation.”<sup>88</sup>

In keeping with the intent to keep the grid safe and reliable, and because the PCSs do not meet the requirements in the exact manner as a relay, a steady state period of time has been added to Rule 21 to align the current capabilities of PCS with the requirements of the Decision for OP 49. The steady state period of time for the PCS allows the power output of the generating facility to arrive at a well bounded level of export. For OP 49, the IOUs have included the following language “The PCS must reduce export to zero or less within two seconds of commencing export. A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.”<sup>89</sup> In so doing, the IOUs have met the requirements of OP 49 and have added language to better align the capabilities of the PCS to the intent of the Decision. Staff acknowledges that the time to reach steady state is an additional requirement. However, Staff finds inclusion of the steady state period of time strikes a balance between the 2-second zero current requirement as required by OP 49 and the capabilities of the PCS because it allows the use of a PCS in a manner “almost equivalent” to a relay. Out of abundance of caution to maintain a safe and reliable grid and minimizing grid impacts due to interconnecting generation, Staff finds the proposed language

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<sup>85</sup> As opposed to Proposal A-B-3 (not discussed herein) in which the Decision specifically states “We also adopt Proposal A-B-3 but modified...” (D.20-09-035 at 154)

<sup>86</sup> Rule 21 *Working Group Three Final Report, June 14, 2019*, at 131.

<sup>87</sup> Rule 21 *Working Group Three Final Report, June 14, 2019*, at 132, emphasis added.

<sup>88</sup> D.20-09-035 at 154.

<sup>89</sup> PG&E AL 6286-E at 12 and 14, SCE AL 4559-E at 6 and 7, and SDG&E AL 3822-E at 82 (Sheet 166) and 83 (Sheet 167).

by the IOUs complies with OP 49 and the intent of the Decision. The language complies with the requirement of the Decision as it does not prohibit a PCS from reaching that steady state within the 2-second OLRT.

For the reasons stated above, this request by IREC is denied.

**3. IREC: Section Mm1 needs revision to clearly state that projects will be treated as non-export during the screening process.**

Background: Section Mm1, Option 8 (Non-Export Utilizing Certified Power Control Systems) is added to Rule 21 to comply with OP 49. Section Mm1, Option 8 describes the requirements for non-export systems that use a PCS with an OLRT of no more than two sections.

Protested Issue and Replies: IREC argues that section Mm1 does not provide clarity that qualifying projects will be treated as non-exporting projects in Screen N, or other screens, when they meet all the IOUs' requirements, and suggests language should be added to section Mm1 to make that clear.

The IOUs reply that there was no discussion to include language related to Screen N within section Mm1 because projects under this section would not make it to Supplemental Review (Screen N) as these projects are considered non-export.

IREC proposes the following language be added, which is the same language proposed by Tesla (See Section II.A.1 of this Disposition Letter).

If the non-export system has an aggregate PCS controlled nameplate of 600 kVA or less, or the maximum reported steady state value of the PCS is 1% or less of the PCS controlled nameplate (as provided in the NRTL testing reports), then the system is considered non-exporting (export = zero) in screens I, J, K, M, N and O.

Disposition: This language is the same language proposed by Tesla and the issue has already been disposed of in Section II.A.1 of this Disposition Letter. Therefore, the request by IREC is denied for the same reasons.

**4. IREC: Section Mm4 is Missing Part of the Consensus Language.**

Background: Sections Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems) and Mm4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) are added to Rule 21 in response to OP 50 adopting Proposal A-B-2 from the Rule 21 Working Group 3 Report.

Protested Issue and Replies: IREC argues that Section Mm 4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) failed to include language agreed upon during the discussions with the IOUs and requests the following language be added:

vi. Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests.

The IOUs reply that this language (“the disputed language”) was intentionally omitted from the Current ALs because Section Mm4 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) is for exporting generators that are part of the interconnection queue and are used to study subsequent interconnection requests. The IOUs also assert that the language remains for Section Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems).

In Section Mm3, Option 10 (Non-Export with Inadvertent Export Utilizing Certified Power Control Systems) the IOUs propose to include the same language proposed by IREC:

The distribution provider evaluating generating facilities requesting interconnection under this section shall:

...

6. Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests.<sup>90</sup>

For Section Mm4, Option 11 (Limited Export with Inadvertent Export Utilizing Certified Power Control Systems) the above language is excluded.

Disposition: The Rule 21 Working Group 3 Report describes Issues A and B as follows:<sup>91</sup>

- Issue A: What changes are needed to clarify the parameters for approval of system design to achieve non-export and limited export?
- Issue B: How should utilities treat generating capacity for behind the meter paired solar and storage systems that are not certified non-export?

The Working Group 3 Report recognized that the two issues are interrelated and thus the proposals address them jointly.<sup>92</sup> In discussing Proposal A-B-1 the Working Group 3 Report states that Rule 21 language must be updated “to include the use of a PCS **for non-export and limited-export applications** [emphasis added]...”<sup>93</sup> In discussing Proposal A-B-2, the Working Group 3 Report states that the proposal needs to “Updated Rule 21 language to include the use of a PCS **for limited-export interconnection applications** [emphasis added].”<sup>94</sup> The Working Group 3 Report continues to discuss the process for the technical evaluations for Proposal A-B-2, which includes the language disputed herein: “For Existing Generating Facilities that meet the requirements under this proposal, only the largest generating facility in the line section would be used for aggregate evaluation for subsequent interconnection requests.”<sup>95</sup> The Working Group 3 Report does not mention this language is applicable for non-export systems; it only mentions it in the context of limited-export interconnection applications. The Decision adopted Proposal A-B-1 and A-B-2<sup>96</sup> without modifications. The Decision states “We find Proposals A-B 1 and A-B 2, which are consensus proposals, both appropriately address Issues A and B.”<sup>97</sup>

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<sup>90</sup> PG&E AL 6286-E at 15, SCE AL 4559-E at 9, SDG&E AL 3822-E at 85 (Tariff Sheet: Cal. PUC. Sheet No. 35155-E)

<sup>91</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 125.

<sup>92</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 125.

<sup>93</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 131.

<sup>94</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 133.

<sup>95</sup> Rule 21 Working Group Three Final Report, June 14, 2019, at 133.

<sup>96</sup> D.20-09-035 at 153.

<sup>97</sup> D.20-09-035 at 164.

OP 49 and OP 50 both list the requirements to be met for non-export and limited export interconnection applications. The difference is that OP 49 specifically lists the requirements to be met for generating facilities **to be treated as non-export or limited export**, while OP 50 lists the requirements to be met for generating facilities **to be treated as inadvertent export**. Non-export systems “are designed to prevent the transfer of electrical energy from the generating facility to the distribution or transmission system”<sup>98</sup> while limited export systems “are designed and set to **limit the level of export** [emphasis added] to some specified amount less than the nameplate capacity of the system.”<sup>99</sup> Under Rule 21 Inadvertent Export is defined as “The unscheduled and uncompensated export of real power from a Generating Facility (GF) for a limited duration as specified in Sections M and Mm.”<sup>100</sup>

OP 50 states:

Proposal A-B 2 is adopted. [The IOUs] shall modify their Rule 21 tariffs to allow the use of a power control system for non-export and limited-export applications. Rule 21 tariffs shall be modified to require that, to be treated as inadvertent export, a generating facility must meet the following six specifications: ... Upon meeting the six specifications, the Utilities shall review the facility as such: ... and only the largest facility in the line section shall be used for aggregate evaluation for subsequent interconnection requests....

OP 50 makes the distinction of two different types of applications: non-export and limited-export, both having inadvertent export. For Section Mm3 (**non-export** with inadvertent export applications) the IOUs have modified Rule 21 to include the disputed language, and for Section Mm4 (**limited export** with inadvertent export) the disputed language is omitted. Under the Mm3, Option 10 the generating facility would apply as a non-export interconnection, while for Mm4, Option 11 it would apply as a limited export interconnection.

Staff has reviewed Proposal A-B-2 in the Working Group 3 Report and the language in the Decision concerning the adoption of this proposal and concludes that the Decision adopted this proposal without modifications. Staff reads the plain language of the Decision to exclude exporting generation (i.e., limited export) from the interconnection studies that may affect subsequent interconnection requests or exclude them from the interconnection queue. Therefore, Staff determines that the language IREC proposes, while it is appropriate for Section Mm3 which is for non-export, is not required in Section Mm4 because Section Mm4 is for the interconnection of limited-export projects. As the IOUs’ have stated, under Mm4 the generating facility is still exporting and thus remains part of the interconnection queue and the export may affect subsequent interconnection requests. Therefore, this request by IREC is denied.

##### **5. IREC: PG&E’s proposed language contains minor inconsistencies with the language proposed by the other IOUs.**

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<sup>98</sup> D.20-09-035 at 154.

<sup>99</sup> D.20-09-035 at 156-157.

<sup>100</sup> PG&E Rule 21 at Section C (Definitions).

Protested Issue and Replies: IREC notes that PG&E’s proposed language is inconsistent with the proposed language of the other IOUs. PG&E replies that it will submit a supplemental AL to correct this.

Disposition: PG&E submitted Supplemental AL 6286-E-A on November 19, 2021 correcting the inconsistencies. Staff finds PG&E has implemented the necessary changes to align its tariff with the other IOUs. Therefore, Staff finds this issue is resolved with the supplemental language submitted by PG&E.

**6. IREC: SCE proposes to revise its Interconnection Application forms, but PG&E and SDG&E have not.**

Protested Issue and Replies: IREC argues all the IOUs should revise their interconnection application forms. Additionally, IREC suggests revisions specific to SCE’s forms and recommends that if the other IOUs are required to revise their forms, they should pay attention to the use of defined terms.

IREC further argues that “SCE’s interconnection application forms do not use Rule 21’s defined terms” and suggest the following revisions:<sup>101</sup>

- Replacing “rated output” and “rated capacity” with “Gross Nameplate Rating” and “net capacity” with “Nameplate Rating” (Form 14-918<sup>102</sup>)
- Replacing “operating capacity” or “output” with “Generating Profile” (Form 14-918)
- Adding “Power” to “Certified Control System” (Form 14-918, Form 14-732<sup>103</sup>) and deleting “Generators” in the term “M. For Generators Certified Control System” (Form 14-918)

IREC also suggests that SCE should consider listing Protection Option No. 9 as a check box in Form 14-732 because SCE adds Protection Option Nos. 8 and 10, but not Protection Option No. 9.

PG&E replies that it included changes to address non-export scenarios in its update to forms in the Smart Connect/YourProjects AL 6270-E (Modifications to Various Pacific Gas and Electric Company's Electric Rule 21 Filed Forms to Support the Consolidation of its "YourProjects" Generator Application and Service Plan Application Online Portals). PG&E also states “While this AL is approved and effective, PG&E is open to additional changes on its forms for the non-export scenarios. PG&E is contemplating additional changes to its forms for its new portal in succeeding roll-out.”<sup>104</sup>

SDG&E replies that it will revise its Interconnection Application Form consistent with SCE’s proposed revisions.

SCE opposes most of IREC’s proposed modifications to its Interconnection Application forms and states IREC’s proposed language should be rejected as the section where IREC’s proposed language is located was not modified by the AL filings. SCE gives the following reasons:

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<sup>101</sup> IREC Protest at 6-8.

<sup>102</sup> Form 14-918 - Rule 21 Exporting Generating Facility Interconnection Request

<sup>103</sup> Form 14-732, Generating Facility Interconnection Application

<sup>104</sup> PG&E Reply to IREC Protest at 6.

- Form 14-918 - Rule 21 Exporting Generating Facility Interconnection Request:
  - Replacing “rated output” with “Gross Nameplate Rating” – SCE states that “rated output” is existing language and used consistently in Form 14-918 and Rule 21, and not intended to represent a Rule 21 defined term.
  - Replacing “operating capacity” with “Generating Profile” – SCE states that “Generating Profile” is not a defined term and is not used in Rule 21 or its Current AL.
  - Replacing “net capacity” with “Nameplate Rating” – SCE states that the section IREC recommends changes to was not modified by the AL filings and the term should be kept to retain consistent language in Form 14-918 and Rule 21.
  - Adding “power” to the term “certified [power] control system” SCE agrees and will make the change in a supplemental AL.
  
- Form 14-732, Generating Facility Interconnection Application: SCE states no changes are required because Option No. 9 is listed in Form 14-918, the Rule 21 Exporting Generating Facility Interconnection Request Form.

Disposition: PG&E’s AL 6270-E (Modifications to Various Pacific Gas and Electric Company's Electric Rule 21 Filed Forms to Support the Consolidation of its "YourProjects" Generator Application and Service Plan Application Online Portals) was not protested, was approved and became effective on August 30, 2021. The purpose of AL 6270-E was to modify PG&E’s Rule 21 Filed Forms 79-1174-02 (PG&E’s Rule 21 Generator Interconnection Application), 79-1151B (Application Net Energy Metering Interconnection for Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts or Less), and 79-1151B-02 Application Net Energy Metering (NEM2) Interconnection for Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts or Less). According to PG&E, the changes were made to improve and consolidate PG&E customer generator application, and service planning, web portals into a new portal called YourProjects (previously known as “Smart Connect”). The changes included, but were not limited to:

- Updates Non-Export option selection, as described in changes due to ongoing Working Group 2/3 discussions with stakeholders and IOUs.
- Adds limited export questions (related to the deployment of Power Control Systems [PCSs], relays, or derated inverters).
- Revisions related to back-up generator interconnections, with additional questions related to the nature of the control device being used (e.g., ATS, contactor, or breaker).

Future updates to the Smart Connect/YourProjects are beyond the scope of the Current ALs. Staff anticipates that PG&E will update its forms as necessary at the next roll-out of the Smart Connect/YourProjects tool. Therefore, because PG&E AL 6270-E (Modifications to Various Pacific Gas and Electric Company's Electric Rule 21 Filed Forms to Support the Consolidation of its "YourProjects" Generator Application and Service Plan Application Online Portals) was already approved and changes to this tool are beyond the scope of this AL, Staff finds that no further action is required by PG&E at this moment regarding the Smart Connect/YourProjects until its next roll out of this tool.

However, on January 7, 2022, PG&E submitted a partial supplemental to its AL (PG&E AL 6286-E-B) proposing changes to align verbiage for its interconnection application forms with those of the other IOUs. PG&E proposes the following modifications to:

- Form 79-1174-02, the Rule 21 Generator Interconnection Application:
  - Attachment B (Non-Export)
    - Inclusion of the word “Certified” when referring to Power Control Systems for Option 8 (Non-Export)
    - Edits to account for Option 10 (Inadvertent Export) and Option 11 (Inadvertent/Limited Export) and OLRT requirements
  - Attachment D (Solar Technology), Attachment E (Wind Turbine Technology), Attachment F (Machine-Based Technology), Attachment G (Fuel Cell Technology), and Attachment H (Energy Storage Technology)
    - Edits to account for PCS Option 9 (Limited Export)

Staff finds these edits align PG&E’s forms with those of the other IOUs, therefore the issue of revising Interconnection Application Forms and aligning the forms with that of the other IOUs is resolved for PG&E.

SDG&E submitted Supplemental AL 3822-E-A on November 19, 2021 and AL 3822-E-B on January 7, 2022 updating its Interconnection Application Forms to align them with the other IOUs. Although SDG&E agreed to align its forms with that of SCE (which opposed the majority of IREC’s recommended language), SDG&E instead implemented revisions to its forms using the language proposed by IREC. Staff finds SDG&E has implemented the necessary changes to its forms. Therefore, Staff finds this issue is resolved for SDG&E.

SCE submitted Supplemental 4559-E-A on January 7, 2022 modifying Form 14-732, Generating Facility Interconnection Application and Form 14-918, Rule 21 Exporting Generating Facility Interconnection Request, to provide consistency among forms of the other IOUs. SCE has adopted IREC’s recommendations. Therefore, Staff finds this issue is resolved for SCE.

### ***C. Conclusion***

Staff finds that the IOUs have provided the necessary and clear language in the Rule 21 tariff modifications, and within the appropriate sections of Rule 21, to implement OPs 7, 49, 50 and 52 (SCE only) of D.20-09-035, including resolving topics 5 and 6 of IREC’s protest in the Supplemental ALs. Therefore, Staff concludes the IOUs have adequately complied with these OPs in PG&E AL 6286-E, 6286-E-A and 6286-E-B, SCE AL 4559-E and 4559-E-A, and SDG&E AL 3822-E, 3822-E-A and 3822-E-B and corresponding substitute sheets.

For the foregoing reasons, Staff denies both Tesla’s and IREC’s protest for the topics not resolved in the Supplemental ALs, and concludes that PG&E, SCE and SDG&E have met the requirements set forth in D.20-09-035 OPs 7, 49, 50, and 52. Therefore, PG&E AL 6286-E, 6286-E-A and 6286-E-B, SCE AL 4559-E and 4559-E-A, and SDG&E AL 3822-E, 3822-E-A and 3822-E-B and corresponding substitute sheets are approved.

November 19, 2021

**Advice 6286-E-A**

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

**Subject: Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3**

**Purpose**

Pacific Gas and Electric Company (PG&E) hereby submits this supplemental Tier 1 Advice Letter (AL) to update Electric Rule 21 - *Generating Facility Interconnections* - in compliance with the California Public Utilities Commission (CPUC, Commission) Decision (D.) D.20-09-035<sup>1</sup> (WG 2 & 3 Decision) Ordering Paragraph (OP) 55 and as described below, to address OPs 7, 49 and 50. For Ordering Paragraphs 7, 49 and 50, this advice letter replaces the proposals for those same ordering paragraphs in AL 5988-E.

This Tier 1 advice letter partially supplements PG&E's previous advice letter 6286-E, submitted on August 6, 2021. While the Sheets of Rule 21 listed in Attachment 1 are being replaced, the rest of the contents and tariff revisions contained in original Advice 6286-E remain unchanged.

**Background****Rulemaking 17-07-007 and Decision 20-09-035**

On July 13, 2017, The Commission adopted Order Instituting Rulemaking (R.) 17-07-007 to consider refinements to Electric Tariff Rule 21 of Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) (jointly, Utilities) regarding the interconnection of distributed energy resources.<sup>2</sup>

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<sup>1</sup> [Decision 20-09-035](#) - Date of Issuance 9/30/2020 - *Decision Adopting Recommendations from Working Groups Two, Three, and Subgroup*

<sup>2</sup> The Rule 21 tariff describes the interconnection, operating, and metering requirements for certain generating and storage facilities seeking to connect to the electric distribution system. Rule 21 provides customers access to the electric grid to install generating or storage facilities while protecting the safety and reliability of the distribution and transmission systems at the local and system levels. (See R.17-07-007 at p2.)

The October 2, 2017 *Scoping Memo of Assigned Commissioner and Administrative Law Judge* (Scoping Memo) set forth the scope and schedule of the proceeding. The Scoping Memo was subsequently revised in the *Assigned Commissioner's Amended Scoping Memo and Joint Administrative Law Judge Ruling issued November 16, 2018* (Amended Scoping Memo). Pursuant to the Scoping Memo, the proceeding is to be conducted in three phases that address technical issues, cost-related issues, and issues related to small multi-jurisdictional utilities. The Scoping Memo also established the working group process, whereby resolution of the technical issues of the proceeding would be proposed by six working groups, Working Groups One through Six. The Amended Scoping Memo pared down the number of working groups to four and delegated certain issues to the Smart Inverter Working Group.<sup>3</sup> D.19-03-013 adopted certain recommendations made by Working Group One. The WG 2 & 3 Decision resolves the set of issues assigned to Working Groups Two and Three and the recommendations from Vehicle-to-Grid Alternating Current (V2G AC) Subgroup. Also, the WG 2 & 3 Decision's advice letter matrix established a series of advice letters to implement the Decision according to a schedule.

#### Decision.21-01-027

On January 21, 2021, the CPUC issued D. 21-01-027 *Correcting Errors in Decision 20-09-035*. It noted for the purposes of this advice letter that references to ordering paragraph numbers 47, 50, 51, 53, should reference final decision ordering paragraph number(s) 46, 49, 50, 52.<sup>4</sup>

#### Advice Letters 5988-E and 5988-E-A, and Protests Thereto

Tier 1 AL 5988-E<sup>5</sup> was timely submitted October 30, 2020, and addressed OPs 7, 13, 14, 46, 49, 50 and 52 (the last for SCE only) (numbers as corrected by D.21-01-027<sup>6</sup>). Protests were received from The Interstate Renewable Energy Council, Inc. (IREC) and from California Solar & Storage Association (CALSSA) on November 19, 2020. PG&E responded to those protests on November 30, 2020.

To resolve AL 5988-E, Energy Division encouraged the Utilities to work with the protesting parties to resolve the consensus items for AL 5988-E. SCE thereupon coordinated a series of meeting in March and April with IREC (whose protest issues more or less aligned with those of CALSSA) to see where consensus could be achieved.

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<sup>3</sup> The Smart Inverter Working Group (SIWG) grew out of a collaboration between the Commission and the California Energy Commission in early 2013. The collaboration identified the development of advanced inverter functionality as an important strategy to mitigate the impact of high penetrations of distributed energy resources. [as explained in footnote 2 in D. 20-09-035]

<sup>4</sup> See D. 20-09-035 OP1 Table labeled *Decision 20-09-035 Ordering Paragraph Corrections*, last line under OP 55.

<sup>5</sup> [AL 5988-E](#) - *Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3*

<sup>6</sup> [D.21-01-027](#) *ORDER CORRECTING ERRORS IN DECISION 20-09-035* – issued January 21, 2021.

Supplemental AL 5988-E-A was submitted by PG&E on May 1, 2021. It addressed those ordering paragraphs where consensus had been achieved with protesting parties. However, based on guidance from the CPUC, AL 5988-E-A did not address OPs 7, 49 and 50, the topic of this advice letter, as PG&E had not reached consensus with the protesting parties on language for those ordering paragraphs.

#### Advice Letter 6286-E

On August 6, 2021, pursuant to Decision 20-09-035 and Energy Division's guidance, PG&E submitted Advice Letter (AL) 6286-E addressing Ordering Paragraphs 7, 49, and 50, modifying Electric Rule 21 to address in new sections Mm1, Mm2, Mm3 and Mm4 the interconnection application process and deployment of a Power Control System (PCS) for non-export and limited export (in OP 49) and for inadvertent export (in OP 50) projects. Additionally, OP 7 addresses associated changes to the Rule 21 technical review screens K, L and M.

IREC filed another protest on September 2, 2021, titled: *IREC's Protest to San Diego Gas & Electric's Advice Letter 3822-E, Pacific Gas and Electric's Advice Letter 6286-E, and Southern California Edison's Advice Letter 4559-E - Modifications to the Electric Rule 21 Inadvertent Export Pursuant to Decision 20-09-035.*

In its protest, IREC stated, "*The letters propose modifications to Rule 21 required by Ordering Paragraphs 7, 49 and 50 of Decision 20-09-035 (the Decision). These changes principally relate to identifying the requirements for systems seeking to control export through the use of a Power Control System (PCS) and the manner in which those systems will be evaluated under the interconnection screens in Rule 21.*" IREC chiefly contended that the three IOUs'<sup>7</sup> Advice Letters were not in compliance with the Decision.

PG&E filed its "*Reply to the Protest from Interstate Renewable Energy Council, Inc.'s to Advice 6286-E – Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3*" on September 10, 2021 (September 10, 2021 Reply), in which it refuted some of IREC's contentions, but also committed to submitting a supplemental advice letter to align its Rule 21 language with that of the other IOUs.

This advice letter is intended to fulfill PG&E's commitment to submitting a supplemental advice letter to align its Rule 21 language with that of the other IOUs.

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<sup>7</sup> The IOUs or Independently Owned Utilities include Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E).

### **Scope of this Advice Letter**

On November 9, 2021, the CPUC Energy Division requested that PG&E submit a supplemental advice letter to make the changes it had committed to in its September 10, 2021 Reply, as follows:

- Capitalizing the defined terms “distribution provider” and “generating facilities” in two places: Mm3 Option 10 and Mm4 Option 11;
- In Screen I, removing the extra word “below” in: “If Yes, Continue to Screen J. This includes Options 5, 6, 9, 10 and 11 **below**.”

In addition to these specific changes addressed in the September 10, 2021 Reply, PG&E is also making the following edits to language in Rule 21 for consistency and clarity, specifically:

- Standardizing capitalization of “Non-Export system;”
- For clarity, revising references throughout the Rule 21 Tariff from Roman numerals (i, ii, iii, etc.) to Arabic numerals (1, 2, 3, etc.) where appropriate.

Therefore, based on the above identified Ordering Paragraphs and as stated in its September 10, 2021 Reply, PG&E submits this supplemental advice letter to update its proposed tariff revisions for the consensus items as addressed below.

### **Tariff Changes**

Language marked in **GREEN** are corrections being made in this advice letter. Language marked in **RED** are revisions that were included in AL 6286-E:

#### **1. Capitalizing Defined Terms in Sections Mm3 and Mm4:**

##### **Mm3. OPTION 10: Non-Export with Inadvertent Export Utilizing Certified Power Control Systems**

The following are the minimum requirements for Non-Export systems that use certified power control systems (PCS) with an open loop response time (OLRT) between two and ten seconds. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

1. Have a nameplate capacity equal to or less than 1,000 kVA.
2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Non-Export may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741

in the future. The NRTL evaluation must have determined that the PCS conforms to the non-exporting functionality in accordance with the relevant CRD or UL published standard.

3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not export (zero-export).
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall:

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.
4. Complete supplemental review within 15 days of receiving the required information specified under ii) above.
5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information.
6. Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests.

Mm4. OPTION 11: Limited Export with Inadvertent Export Utilizing Certified Power Control Systems

The following are the minimum requirements for limited export controlled systems that use certified power control systems (PCS) with an open loop response time (OLRT) between two and ten seconds to maintain a level of export that is lower than the nameplate rating. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

1. Have a nameplate capacity equal to or less than 1,000 kVA.

2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Limited export systems may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the export limiting functionality in accordance with the relevant CRD or UL published standard.
3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not to exceed the proposed level of export.
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall:

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.
4. Complete supplemental review within 15 days of receiving the required information specified under ii) above.
5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information.

## 2. Removing extra word “below” in Screen I (original Rule 21 sheet 154):

### G. ENGINEERING REVIEW DETAILS (Cont'd.)

#### 1. INITIAL REVIEW SCREENS (Cont'd.)

##### i. Screen I: Will power be exported across the PCC?

- If Yes, Continue to Screen J. This includes Options 5, ~~and 6, 9, 10 and 11 below~~.
- If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate ~~Protective Function Options 1, 2, 3, 4, 7 or 8 below~~. Following that selection, ~~Screen J, K, L, and M are skipped and Initial Review is complete~~. If ~~Protective Function Option 8 is used~~, see section Mm1 to determine screen application.

Option 1 (“Reverse Power Protection”): To ensure power is never exported across the PCC, a reverse power Protective Function may be provided. The default setting for this Protective Function shall be 0.1% (export) of the service transformer’s rating, with a maximum 2.0 second time delay. For multiple tariff interconnections refer to Section J.8.

## 3. Standardizing capitalization of “Non-Export system” throughout the Rule 21 Tariff

### Mm1. OPTION 8: Non-Export Utilizing Certified Power Control Systems

The following are the minimum requirements for Non-Export systems that use certified power control systems (PCS) with an open loop response time (OLRT) no more than two seconds. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

1. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Non-Export systems may use a PCS that passes later published revisions to the CRD test protocol or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the non-exporting functionality in accordance with the relevant CRD or UL published standard.
2. Use a PCS that is certified with an OLRT of two seconds or less, as provided in the PCS’s specification data sheets.

3. The PCS must reduce export to zero or less within two seconds of commencing export. A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.
4. Set the PCS to not export (zero-export).
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

The evaluation of a Non-Export system requesting interconnection under this section:

1. Shall omit evaluation for screen D;
2. Shall utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, and G;
3. If the Non-Export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity.

**4. Revising references throughout the Rule 21 from Roman numerals to Arabic numerals, where appropriate**

Mm1. OPTION 8: Non-Export Utilizing Certified Power Control Systems (Cont'd)

The evaluation of a non-export system requesting interconnection under this section:

1. Shall omit evaluation for screen D;
2. Shall utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, and G;
3. If the non-export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported

steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity.

4. Screen P may be applied using the Generating Facility's Gross Nameplate Rating for evaluations that use fault current calculations. For other evaluations under screen P, the value identified in #3 above may be used.

Mm2. OPTION 9: Limited Export Utilizing Certified Power Control Systems (Cont'd)

The evaluation of a limited export system requesting interconnection under this section:

1. Shall utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, and G.
2. If the maximum steady state value is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports) utilize the requested limited export value plus the maximum steady state value of the PCS times the PCS controlled nameplate, to evaluate the impacts to the grid under screens D, I, J, K, M, N, and O. If the maximum steady state value is less than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), utilize only the requested limited export value under screens D, I, J, K, M, N and O.
3. Screen P shall be applied using the Generating Facility's Gross Nameplate Rating for evaluations that use fault current calculations. For other evaluations under screen P, the value identified in #2 above may be used.

Mm3. OPTION 10: Non-Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd)

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall:

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.

4. Complete supplemental review within 15 days of receiving the required information specified under ~~ii~~2 above.

Mm4. OPTION 11: Limited Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd)

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall:

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.
4. Complete supplemental review within 15 days of receiving the required information specified under ~~ii~~2 above.

For convenience of the reader, PG&E has included redline revisions in Attachment 2. Where Electric Rule 21 has been revised, the affected sheets are included in Attachment 1.

In this advice letter and accordance to CPUC General Order 96B, Section 9.5.3, PG&E has implemented the use of the "(P)" symbol to signify material subject to change under a pending advice letter. The redlines in Attachment 2 are color coded to the specific advice letter.

### **Protests**

PG&E asks that the Commission, pursuant to GO 96-B, General Rule 7.5.1, maintain the original protest and comment period designated in Advice 6286-E and not reopen the protest period.

**Effective Date**

Pursuant to General Order (GO) 96-B, Rule 5.1, this advice letter is submitted with a Tier 1 designation. PG&E requests that both Advice Letters 6286-E and 6286-E-A become effective on December 8, 2021, to coincide with planned implementation of the CPUC's directives pursuant to D.20-09-035 into PG&E's online application portal, YourProjects.

**Notice**

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service list for R.17-07-007 (Rule .21), R. 14-07-002 (NEM Successor) and R.19-09-009 (Microgrid). Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process\_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: <http://www.pge.com/tariffs/>.

/S/

\_\_\_\_\_  
Sidney Bob Dietz II  
Director, Regulatory Relations

cc: Service List R.17-07-007  
Service List R.14-07-002  
Service List R.19-09-009

**Attachments:**

**Attachment 1** –Clean version of updated Tariff

**Attachment 2** – Redline Tariff Revisions



# ADVICE LETTER SUMMARY

## ENERGY UTILITY



MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Pacific Gas and Electric Company (ID U39E)

Utility type:

- ELC       GAS       WATER  
 PLC       HEAT

Contact Person: Kimberly Loo

Phone #: (415)973-4587

E-mail: PGETariffs@pge.com

E-mail Disposition Notice to: KELM@pge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric      GAS = Gas      WATER = Water  
 PLC = Pipeline      HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 6286-E-A

Tier Designation: 1

Subject of AL: Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3

Keywords (choose from CPUC listing): Compliance, Rule 21

AL Type:  Monthly  Quarterly  Annual  One-Time  Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D.20-09-035

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested?  Yes  No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required?  Yes  No

Requested effective date: 12/8/21

No. of tariff sheets: 8

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: See Attachment 1

Service affected and changes proposed<sup>1</sup>: N/A

Pending advice letters that revise the same tariff sheets: 6014-E-A, 6286-E, 5915-E-B

<sup>1</sup>Discuss in AL if more space is needed.

**Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:**

CPUC, Energy Division  
Attention: Tariff Unit  
505 Van Ness Avenue  
San Francisco, CA 94102  
Email: [EDTariffUnit@cpuc.ca.gov](mailto:EDTariffUnit@cpuc.ca.gov)

Name: Sidney Bob Dietz II, c/o Megan Lawson  
Title: Director, Regulatory Relations  
Utility Name: Pacific Gas and Electric Company  
Address: 77 Beale Street, Mail Code B13U  
City: San Francisco, CA 94177  
State: California Zip: 94177  
Telephone (xxx) xxx-xxxx: (415)973-2093  
Facsimile (xxx) xxx-xxxx: (415)973-3582  
Email: [PGETariffs@pge.com](mailto:PGETariffs@pge.com)

Name:  
Title:  
Utility Name:  
Address:  
City:  
State: District of Columbia Zip:  
Telephone (xxx) xxx-xxxx:  
Facsimile (xxx) xxx-xxxx:  
Email:

| Cal P.U.C.<br>Sheet No. | Title of Sheet  | Cancelling<br>Cal P.U.C.<br>Sheet No. |
|-------------------------|---|---------------------------------------|
| 51980-E*                | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 154 | 50424-E                               |
| 51981-E                 | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 261 |                                       |
| 51982-E                 | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 262 |                                       |
| 51983-E                 | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 264 |                                       |
| 51984-E                 | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 266 |                                       |
| 51985-E                 | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 268 |                                       |
| 51986-E*                | ELECTRIC TABLE OF CONTENTS<br>Sheet 1                                     | 51665-E*                              |
| 51987-E*                | ELECTRIC TABLE OF CONTENTS<br>Sheet 20                                    | 51658-E*                              |



**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 154

**G. ENGINEERING REVIEW DETAILS (Cont'd.)**

**1. INITIAL REVIEW SCREENS (Cont'd.)**

h. Screen H: Is the line configuration compatible with the Interconnection type? (Cont'd.)

Significance: If the primary distribution line serving the Generating Facility is of a "three-wire" configuration, or if the Generating Facility's distribution transformer is single-phase and connected in a line-to-neutral configuration, then there is no concern about overvoltages to Distribution Provider's, or other Customer's equipment caused by loss of system neutral grounding during the operating time of the Non-Islanding Protective Function.

i. Screen I: Will power be exported across the PCC?

• If Yes, Continue to Screen J. This includes Options 5, 6, 9, 10, and 11.

(P)  
(T)/(P)

• If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate Options 1, 2, 3, 4, 7, or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If Option 8 is used, see section Mm1 to determine screen application.

(P)  
|  
(P)

Option 1 ("Reverse Power Protection"): To ensure power is never exported across the PCC, a reverse power Protective Function may be provided. The default setting for this Protective Function shall be 0.1% (export) of the service transformer's rating, with a maximum 2.0 second time delay. For multiple tariff interconnections refer to Section J.8.

(Continued)



**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 261

Mm1. OPTION 8: Non-Export Utilizing Certified Power Control Systems

(P)

The following are the minimum requirements for Non-Export systems that use certified power control systems (PCS) with an open loop response time (OLRT) no more than two seconds. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

1. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Non-Export systems may use a PCS that passes later published revisions to the CRD test protocol or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the non-exporting functionality in accordance with the relevant CRD or UL published standard.
2. Use a PCS that is certified with an OLRT of two seconds or less, as provided in the PCS's specification data sheets.
3. The PCS must reduce export to zero or less within two seconds of commencing export. A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of 10 seconds or less, meets this requirement.
4. Set the PCS to not export (zero-export).
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

(P)  
(T)/(P)  
(P)

(P)

(Continued)



**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 262

Mm1. OPTION 8: Non-Export Utilizing Certified Power Control Systems (Cont'd) (P)

The evaluation of a Non-Export system requesting interconnection under this section: (T)/(P)  
(P)

1. Shall omit evaluation for screen D; (P)
2. Shall utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, and G; (P)
3. If the Non-Export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity. (T)/(P)  
(P)
4. Screen P may be applied using the Generating Facility's Gross Nameplate Rating for evaluations that use fault current calculations. For other evaluations under screen P, the value identified in 3 above may be used. (P)  
(T)/(P)  
(P)

(Continued)





**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 266

Mm3. OPTION 10: Non-Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd) (P)  
(P)

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall: (T)/(P)  
(P)

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.
4. Complete supplemental review within 15 days of receiving the required information specified under 2 above. (P)  
(T)/(P)  
(P)
5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information.
6. Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests. (P)

(Continued)

Advice 6286-E-A  
Decision D.20-09-035

Issued by  
**Robert S. Kenney**  
Vice President, Regulatory Affairs

Submitted November 19, 2021  
Effective December 8, 2021  
Resolution



**ELECTRIC RULE NO. 21  
GENERATING FACILITY INTERCONNECTIONS**

Sheet 268

Mm4. OPTION 11: Limited Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd) (P)  
(P)

The Distribution Provider evaluating Generating Facilities requesting interconnection under this section shall: (T)/(P)  
(P)

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.
4. Complete supplemental review within 15 days of receiving the required information specified under 2 above. (P)  
(T)/(P)  
(P)
5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information. (P)

(Continued)

Advice 6286-E-A  
Decision D.20-09-035

Issued by  
**Robert S. Kenney**  
Vice President, Regulatory Affairs

Submitted November 19, 2021  
Effective December 8, 2021  
Resolution



**ELECTRIC TABLE OF CONTENTS**

Sheet 1

**TABLE OF CONTENTS**

| <b>SCHEDULE</b>                     | <b>TITLE OF SHEET</b>  | <b>CAL P.U.C. SHEET NO.</b> |     |
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| Sample Forms.....                   | 50636,49743,50637,50638,50639,49735,<br>.....50640,50641,49307,50642,49309,49310,49311-E |                             |     |

(Continued)



## Attachment 2

### Redline Tariff Revisions

For convenience of the reader, PG&E has included redline revisions in Attachment 2. Where Electric Rule 21 has been revised, the affected sheets are included in Attachment 1.

In this advice letter and accordance to CPUC General Order 96B, Section 9.5.3, PG&E has implemented the use of the “(P)” symbol to signify material subject to change under a pending advice letter. The redlines in Attachment 2 are color coded to the specific advice letter. The color coding is as follows:

| Redline Text Color  | Advice Letter | Subject   | Comments  |
|---|---------------|---|---|
|  | 6286-E        | Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3               | Effective as of August 6, 2021  |
|  | 6286-E-A      | Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3 | This advice letter makes minor revisions to Rule 21 to align with the other IOUs. |



**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 150

G. ENGINEERING REVIEW DETAILS (Cont'd.)

1. INITIAL REVIEW SCREENS (Cont'd.)

h. Screen H: Is the line configuration compatible with the Interconnection type? (Cont'd.)

Significance: If the primary distribution line serving the Generating Facility is of a "three-wire" configuration, or if the Generating Facility's distribution transformer is single-phase and connected in a line-to-neutral configuration, then there is no concern about overvoltages to Distribution Provider's, or other Customer's equipment caused by loss of system neutral grounding during the operating time of the Non-Islanding Protective Function.

i. Screen I: Will power be exported across the PCC?

• If Yes, Continue to Screen J. This includes Options 5, 6, 9, 10, and 11 below.

(P)  
(T)(P)

• If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate one of the first four options shown Options 1, 2, 3, 4, 7, or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If Option 8 is used, see section Mm1 to determine screen application.

(P)  
|  
|  
|  
(P)

Option 1 ("Reverse Power Protection"): To ensure power is never exported across the PCC, a reverse power Protective Function may be provided. The default setting for this Protective Function shall be 0.1% (export) of the service transformer's rating, with a maximum 2.0 second time delay. For multiple tariff interconnections refer to Section J.8.

(Continued)





**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Mm1. OPTION 8: Non-Export Utilizing Certified Power Control Systems (Cont'd) (P)

The evaluation of a Non-Export system requesting interconnection under this section: (T)/(P)  
(P)

1. Shall omit evaluation for screen D;

2. Shall utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, and G; (P)

3. If the Non-Export system has an aggregate PCS controlled nameplate greater than 600 kVA and the maximum reported steady state value of the PCS is greater than 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), the evaluation may utilize the following calculation when determining the impacts to the grid under screens I, J, K, M, N, and O: The sum of the nameplate values of the exporting DER resource (if any) plus the maximum percentage steady state value of the PCS (as provided in the NRTL testing reports) times PCS controlled nameplate capacity. (T)/(P)  
(P)

4. Screen P may be applied using the Generating Facility's Gross Nameplate Rating for evaluations that use fault current calculations. For other evaluations under screen P, the value identified in #3 above may be used. (P)  
(T)/(P)  
(P)

(Continued)





**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Mm3. OPTION 10: Non-Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd) (P)  
(P)

The Ddistribution Pprovider evaluating Ggenerating Ffacilities requesting interconnection under this section shall: (T)/(P)  
(P)

1. Apply screens A through M using the aggregate nameplate inverter rating.
2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.
3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export;
4. Complete supplemental review within 15 days of receiving the required information specified under #2 above. (P)  
(D)/(P)  
(P)
5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information.
6. Use only the largest facility in the line section for aggregate evaluation for subsequent interconnection requests. (P)

(Continued)



**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 255 (N)

Mm4. OPTION 11: Limited Export with Inadvertent Export Utilizing Certified Power Control Systems (Cont'd) (P)  
(P)

The Ddistribution Pprovider evaluating Ggenerating Ffacilities requesting interconnection under this section shall: (T)(P)  
(P)

1. Apply screens A through M using the aggregate nameplate inverter rating.

2. Notify the applicant if supplemental review is required, and if so, require the applicant to identify, within 15 business days of being notified, the frequency of inadvertent export, the real power level in watts of inadvertent export, and the time duration of inadvertent export.

3. If distribution upgrades are identified, use screen P to recognize power control parameters, taking into account local feeder conditions; the customer's operating profile; and the magnitude, duration, and frequency of anticipated export.

4. Complete supplemental review within 15 days of receiving the required information specified under #2 above. (P)  
(T)(P)

5. If the applicant does not provide the operating profile information within the specified 15 business days, perform supplemental review based on information included in the interconnection request within 30 business days of the request for customer operating profile information. (P)  
(P)

(Continued)

**PG&E Gas and Electric  
Advice Submittal List  
General Order 96-B, Section IV**

AT&T  
Albion Power Company

Alta Power Group, LLC  
Anderson & Poole

Atlas ReFuel  
BART

Barkovich & Yap, Inc.  
California Cotton Ginners & Growers Assn  
California Energy Commission

California Hub for Energy Efficiency  
Financing

California Alternative Energy and  
Advanced Transportation Financing  
Authority  
California Public Utilities Commission  
Calpine

Cameron-Daniel, P.C.  
Casner, Steve  
Cenergy Power  
Center for Biological Diversity

Chevron Pipeline and Power  
City of Palo Alto

City of San Jose  
Clean Power Research  
Coast Economic Consulting  
Commercial Energy  
Crossborder Energy  
Crown Road Energy, LLC  
Davis Wright Tremaine LLP  
Day Carter Murphy

Dept of General Services  
Don Pickett & Associates, Inc.  
Douglass & Liddell

East Bay Community Energy Ellison  
Schneider & Harris LLP Energy  
Management Service  
Engineers and Scientists of California

GenOn Energy, Inc.  
Goodin, MacBride, Squeri, Schlotz &  
Ritchie

Green Power Institute  
Hanna & Morton  
ICF  
International Power Technology

Intertie

Intestate Gas Services, Inc.  
Kelly Group  
Ken Bohn Consulting  
Keyes & Fox LLP  
Leviton Manufacturing Co., Inc.

Los Angeles County Integrated  
Waste Management Task Force  
MRW & Associates  
Manatt Phelps Phillips  
Marin Energy Authority  
McKenzie & Associates

Modesto Irrigation District  
NLine Energy, Inc.  
NRG Solar

OnGrid Solar  
Pacific Gas and Electric Company  
Peninsula Clean Energy

Pioneer Community Energy

Public Advocates Office

Redwood Coast Energy Authority  
Regulatory & Cogeneration Service, Inc.  
SCD Energy Solutions  
San Diego Gas & Electric Company

SPURR  
San Francisco Water Power and Sewer  
Sempra Utilities

Sierra Telephone Company, Inc.  
Southern California Edison Company  
Southern California Gas Company  
Spark Energy  
Sun Light & Power  
Sunshine Design  
Tecogen, Inc.  
TerraVerde Renewable Partners  
Tiger Natural Gas, Inc.

TransCanada  
Utility Cost Management  
Utility Power Solutions  
Water and Energy Consulting Wellhead  
Electric Company  
Western Manufactured Housing  
Communities Association (WMA)  
Yep Energy