

Resolution E-5230 Workshop #3

March 14, 2023

08:30 am - 4:35 pm

Topic B.1: Quarterly Reporting

Energy for What's Ahead®



Background on Topic B.1

"As presented during the November 29, 2022 workshop, the Large IOUs shall utilize Advanced Metering Infrastructure (AMI) data for projects with a nameplate of less than 1 MW and telemetry for LGP projects with a nameplate over 1 MW as telemetry is already a requirement per the current Rule 21 for projects sized above 1 MW. The Large IOUs are therefore directed to finalize details and tariff language during the workshops ordered in this Resolution and include it in the subsequent ALs."

- Resolution 5230

Conditions for AMI Data vs. Telemetry to Monitor LGP Export

- For LGP projects with nameplate under 1 MW:
 - AMI data will be utilized where available
 - If AMI is not available, telemetry will be required
- For LGP projects with nameplate greater than or equal to 1 MW, telemetry will be required.
 - If telemetry is monitoring only the generation output, utilities may also leverage AMI data, where available, to monitor export at the PCC

Note: Although AMI data has the potential of serving as a post-event data point, it is not designed to send data in real-time and does not provide real-time visibility to the utility system operators.

Proposed Tariff Language for Topic B.1

J.5. Telemetering

Existing language:

If the nameplate rating of the Generating Facility is 1 MW or greater, Telemetering equipment at the Net Generation Output Metering location may be required at Producer's expense. If the Generating Facility is Interconnected to a portion of Distribution Provider's Distribution System operating at a voltage below 10 kV, then Telemetering equipment may be required on Generating Facilities 250 kW or greater. Distribution Provider shall only require Telemetering to the extent that less intrusive and/or more cost effective options for providing the necessary data in real time are not available. Distribution Provider will report to the Commission or designated authority, on a quarterly basis, the rationale for requiring Telemetering equipment in each instance along with the size and location of the facility. Customer-owned, behind-the-meter, telemetry equipment is allowed where practicable to mitigate the costs associated with Distribution Provider's ownership of the equipment (i.e., the Income Tax Component of Contribution and Cost of Ownership charges), per D.19-03-013 Ordering Paragraph 5. Distribution Provider will allow for a cap of thirty calendar days to repair or replace malfunctioning equipment as notified by the Distribution Provider and if the malfunctioning equipment is not repaired by the thirtieth day, the Distribution Provider can make the necessary repairs and charge the customer for related costs or can disconnect the distributed energy resource.

Proposed Addition:

For Generating Facilities with a Limited Generation Profile attached to their Generator Interconnection Agreement, if AMI is not available, or Customer opts out, telemetry at the point of common coupling will be required.

Topic B.2: Use of Gross Nameplate Rating

Energy for What's Ahead®



Background on Topic B.2

"We direct the Large IOUs to discuss tariff language modifications during the workshops and to provide more information on which aspects of Screen P will be studied using the LGP value and which will not, if this is the case. In the November 10, 2022 SIWG meeting, the Large IOUs also state that Screens F, G, and H will be evaluated on nameplate rating. The Large IOUs note that 'Screens A-E are also not included in ICA calculation. The evaluation is not based on nameplate rating but will depend on aspects of each screen.' As it is still unclear how screens D, I, J, and K will be studied, discussions regarding these screens should continue within the workshop discussions. We find a mere statement 'Given that ICASG values do not account for screens D, J, and K, then it is appropriate to evaluate screen D using gross nameplate rating' without proper justification and details unconvincing. Accordingly, the Large IOUs are directed to fully justify their arguments. The discussions should refer to how the Decision adopts Proposal A-B 3 and how the Working Group Three Report states the screens should be applied, which we discuss below. Below we also address SDG&E's response regarding upward revisions in allowable generation."

- Resolution 5230

Proposed Tariff Language for Topic B.2

The IOUs recommend the addition of a 12th option for Screen I to provide better clarity and minimize the number of required revisions.

Existing Options:

- Option 1 (“Reverse Power Protection”)
- Option 2 (“Minimum Power Protection”)
- Option 3 (Certified Non-Islanding Protection)
- Option 4 (Relative Generating Facility Rating)
- Option 5: Inadvertent Export as described in Section M.
- Option 6: Inadvertent Export utilizing UL-1741 or UL-1741 SA/SB-listed grid support (non-islanding) inverters as described in Section Mm.
- Option 7: Non-Export utilizing Non-Export AC/DC Converter as described in Section O.
- Option 8: Non-Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm1.
- Option 9: Limited Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm2.
- Option 10: Non-Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm3.
- Option 11: Limited Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm4.

Summary of Assumptions for Fast Track Initial Review Screens for LGP Projects

Screen	Description	Nameplate/Maximum LGP
A	Networked Secondary Determines if project is located on a "Networked Secondary." ICA values not calculated for secondary systems (networked or not).	N/A
B	Certified Equipment Screen is related to certification of equipment (inverters, PCS) which is not related to ICA calculations.	N/A
C	Voltage Drop While ICA has PQ/Voltage fluctuations, that is mainly for primary systems. Screen C includes voltage drop and flicker on the service transformer and secondary service; service transformers and secondary service are not included in ICA.	N/A
D	Transformer Rating This screen is related to service transformer/secondary overloads which are not accounted for in ICA given that ICA only calculates the values at the primary system.	Maximum LGP Value (see proposed tariff language slide 14)
E	Single Phase Generator This screen is related to circuit phase balancing for single-phase generators. Single phase circuit balancing is not calculated in ICA.	N/A
F	Short Circuit Current Contribution ICA does not calculate Short Circuit Contribution Ratio (SCCR) to determine if SCCR is $\leq 10\%$.	Nameplate
F.1	Protection ICA ICA uses facility gross nameplate to determine whether short circuit contribution is within allowable limits.	Nameplate
G	Short Circuit Interrupting Capability ICA does not calculate impact of increased short circuit on protection and devices and equipment.	Nameplate
H	Line Configuration ICA does not account for line configuration loading per table G-1 of Rule 21.	Nameplate
I	Screen I asks whether the project will export power across the PCC. Currently there are 11 screen I options. Pending further discussion, a 12th may be need to be added to address LGP projects.	N/A
J	Rule 21 already uses Gross Nameplate Rating. The working group only recommended that "11 kVA" be changed to "30 kVA." No changes were recommended or discussed regarding changing Gross Nameplate Rating.	Nameplate
K	Same argument as for Screen J.	Nameplate
L	Transmission Dependency/Stability/Overvoltage/Islanding Test	Nameplate
M	Does the Generating Facility pass the ICA as required in G.1.m or is aggregate generation less than 15% of line section peak load for all line sections bounded by automatic sectionalizing devices?	Individual (all) LGP Values

Summary of Assumptions for Fast Track Initial Review Screens for LGP Projects

Screen	Description	Nameplate/Maximum LGP
N	Penetration Test	For failure of screen M, not applicable; for failure of other screens, current language applies
O	Power Quality & Voltage Fluctuation	For failure of screen M, not applicable; for failure of other screens, current language applies
P	Safety and Reliability Test Analysis of Screen P under supplemental review will be triggered by failure of Screens [A-H] . As indicated on slide 10, Screens F, F.1, G, and H use nameplate, therefore, Screen P would be evaluated using nameplate.	For failure of screen M, not applicable; for failure of other screens, current language applies

Proposed Tariff Language for Topic B.2

Mm5: OPTION 12: Limited Export with Limited Generation Profile Utilizing Certified Power Control Systems

Applicability:

The following are minimum requirements for limited export systems that use certified power control systems (PCS) with an open loop response time (OLRT) no more than two 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. 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 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 export limiting 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 the approved export limit, or less, within two seconds of exceeding the approved export limit. A PCS that is certified with an open-loop response time of two seconds or less, and a time to reach steady state of ten seconds or less, meets this requirement.
4. Set the PCS to not 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.

Proposed Tariff Language for Topic B.2

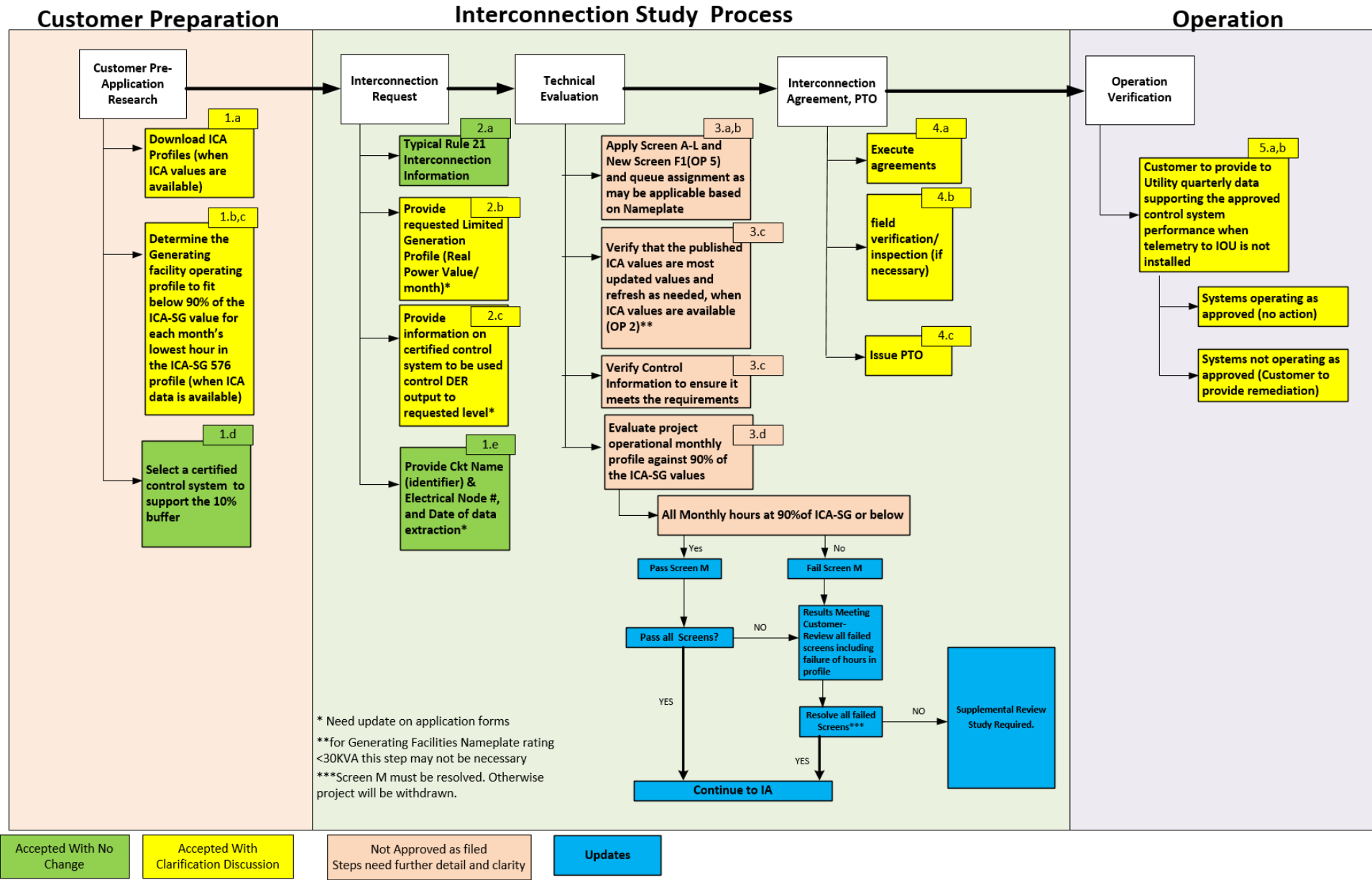
Mm5: OPTION 12: Limited Export with Limited Generation Profile Utilizing Certified Power Control Systems

The evaluation of a limited generation profile (LPG) project requesting interconnection under this section shall:

1. Utilize the Generating Facility's Gross Nameplate Rating for screens F, F1, G, and H.
2. Evaluation of Screens D and M:
 - a. 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 LGP values plus the maximum steady state value of the PCS multiplied by the PCS controlled nameplate, to evaluate screens M. Evaluate screen D using the maximum LGP value plus the maximum steady state value of the PCS multiplied by the PCS controlled nameplate.
 - b. If the maximum steady state value is less than or equal to 1% of the PCS controlled nameplate (as provided in the NRTL testing reports), utilize the requested LGP values to evaluate screen M. To evaluate screen D use the maximum LGP value.
3. If any hour of the customer LGP profile is above 90% of ICA-SG profile, the project will fail screen M / Initial Review.
4. If Initial Review fails, then customer will be notified of Initial Review failure and offered an optional results meeting.
5. If modifications that can mitigate the initial review failure are identified during the optional results meeting as per section F.2.b. of Rule 21, Applicant must provide updated LGP within 5 BD:
 - Reduction at each hour of the updated LGP must comply with Table F.1. Each hour may not be reduced by more than 20% of the original request.
 - Where reduction of LGP impacts other failed screens (such screen D), the cost and time for the restudy will be based on Table F.1.
 - Increases in project size i.e., increases in project nameplate or LGP values are not allowed under Fast Track.
 - If modifications to the LGP are not received within 5 BD, the project will be deemed withdrawn and the applicant will have the option of re-applying based on LGP or nameplate.

Topic C: Overview of Proposals: Including technical requirements, "Monthly" scheduling (See Topic 5), Nameplate capacity (Topic 2); Should include alignment of language (Section D of Res) and incorporate all topics in Resolution

Updated Framework / Proposed Changes to Implement LGP



Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

Discussion below provides clarification how customer will be given an opportunity to update the LGP values if one or more does not comply with 90%, the process, and timing of the communication with customer

Step	Resolution Question	IOU Response
3.d.iii	<p>5) "the Large IOUs propose to inform the customer if the export request for one or more of the 12 months of LGP is not at or below the 90% ICA-SG limit. The Large IOUs shall clarify how this will be communicated, within what timeline in the review process it will be communicated, and agree on a format for communicating the appropriate values to be utilized in order to expedite the response from the customer and streamline interconnection process. The Large IOUs shall discuss the significance to the queue position and if the customer will preserve their queue position under these circumstances. The Large IOUs shall also clarify how future grid conditions that warrant a change to the LGP will be communicated to the customer and the time required to change the LGP. This step shall also be updated as needed based on workshop discussions.</p>	<ul style="list-style-type: none"> • After further research, IOU's identified that section F(2)(b) of the tariff allows modifications that obviate the need for Supplemental Review. To be fair to all other Rule 21 projects (including those currently using ICA), IOU's propose failing Screen M in initial review whenever the LGP does not comply with 90% ICA-SG profile. • IOU's will allow LGP customers to provide an updated LGP as allowed under R21 section F(2)(b). <ul style="list-style-type: none"> • Updated LGP must be provided 5 BD after Optional Initial Review Results Meeting • Reduction at each hour of the updated LGP must comply with Table F.1. Each hour may not be reduced by more than 20% of the original request. • Where reduction of LGP impacts other failed screens (such screen D), the cost and time for the restudy will be based on Table F.1 • Increases in project nameplate or LGP values are not allowed under Fast Track • LGP updates needed based on future grid conditions were discussed in Joint AL: 4941-E, 6816-E, 4138-E <ol style="list-style-type: none"> 1. Scenario: Customer submits LGP values with one or more value exceeding 90% ICA-SG <ol style="list-style-type: none"> a. Project fails screen M (Initial Review). b. Customer is informed of the discrepancy during the Optional Initial Review Results Meeting and is allowed 5 business days to submit revised LGP values (to be added to Tariff) <ol style="list-style-type: none"> i. If Customer's revised LGP values correct the discrepancy, the project continues initial review. ii. If Customer does not provide corrected values within 5 business days, the Interconnection Request is withdrawn. Customer can re-apply based on nameplate or LGP.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

Discussion below provides clarification on how a project is studied if customer does not respond within 5 BD of being notified that the provided LGP does not comply with the 90% at each hour

Step	Resolution Question	IOU Response
3.d.iii	6) SDG&E shall correct its language to reflect "at or below 90%" instead of only "below 90%."	SDG&E confirms that it will make the change.
3.d.iv	7) the Large IOUs state that if the customer does not respond within 5 business days of the notification to update the LGP so that all values are at or below the 90% ICA-SG profile values the project will be evaluated using full nameplate capacity without monthly limits. We interpret this step to mean that unless a new LGP is proposed by the customer upon notification by the Large IOU to stay within the ICA-SG values, the application will default to a non-LGP option application and the studies will be conducted as a regular interconnection request without LGP and the customer will be responsible for any electric grid updates if they proceed with the application. The Large IOUs shall clarify this in the workshop discussions and include this clarification in the subsequent ALs.	The interpretation is correct; however, this language is no longer applicable and is superseded by the IOUs' updated proposal in response to 3.d.iii, Resolution Question 5 (see previous slide and updated process diagram).
3.d.iv	7 cont.)The Large IOUs shall also clarify any additional changes required for this step based on the outcome of discussions towards Resolving Issue 2, and abide by previous direction regarding material modifications.	<ul style="list-style-type: none"> • No additional changes required in reference to Issue 2 (applicability of Gross Nameplate Rating for certain Rule 21 screens) • Material modifications allowances per Rule 21 are not proposed to be changed

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 3. Technical Evaluation Phase:

Discussion below provides clarification when customer does not respond within the 5 BDs but still requests LGP interconnection and justification of the 5 BDs

Step	Resolution Question	IOU Response
3.d.iv	7 cont.) Additionally, the Large IOUs shall discuss the timeline for review of the screens, and consequences if the customer does not respond to notice within the time allowed. Among the topics to be discussed: Would the customer lose the queue position if the customer still requested LGP treatment? Does this timeline allow the developer to reasonably be able to contact equipment manufacturers and get clarity on technical questions around inverter capabilities? The Large IOUs shall justify the need for such a short response period, and how it aligns with other similar Rule 21 timeline requirement.	<ul style="list-style-type: none"> • This language in 3.d.iv is no longer applicable per updated proposal as indicated in 3.d.iii, Resolution Question 5 • IOUs feel this timeline (5BD) allows the developer a reasonable amount of time to contact equipment manufacturers and get clarity on technical questions around inverter capabilities. 5BD is used for other part of the Rule 21 where customer is required to provide additional information (Example: E.5.b.)
3.d.v	8) PG&E shall provide clarity on whether the tools are PG&E tools or the customer’s tools, and justify such needs. Should the SCE and SDG&E adopt this statement, this requirement will also apply.	<ul style="list-style-type: none"> • The following statements are applicable to PG&E, SDG&E, and SCE: • New IOU tools and/or enhancements to existing IOU tools will have to be developed to efficiently evaluate LGP projects. These tools (e.g., software) and/or enhancements are necessary to efficiently extract the most updated ICA-SG profile, import the customer provided LGP profile, compare each hour of the profile, and determine if the project meets the criteria at each hour • Additional enhancements to planning tools and ICA process may be needed to enable efficient and automated integration of LGP into the interconnection process. In addition, distribution modeling enhancement would be necessary to reflect the LGP projects. • Once an LGP project connects, a unique output profile must be stored, maintained, and referenced in system planning, interconnection, and ICA studies.

Detailed Discussion of Section C (LGP Framework) - Continue

Phase 4. Interconnection Agreement/PTO Phase:

4.b
field verification/inspection (if necessary)

Discussion below provides clarification the requirements for field performance verification, relationship to certification testing and process for developing commissioning test procedures

Step	Resolution Question	IOU Response
4.b	3) The Large IOUs shall clarify the purpose and need for field performance verification and commissioning testing, and the difference between the testing performed by the Large IOUs as opposed to that required by certification to a standard and how it fits into current Rule 21 requirements. This requirement shall be applied to any step where mention of such verification or testing is needed by the Large IOUs. The Large IOUs shall also discuss other possible methods to verify this, including using a remote inspection and using IEEE 2030.5 to verify performance.	<ul style="list-style-type: none"> The purpose of IOUs field performance verification/commissioning tests is to verify operational performance to ensure that the installed equipment has been set up to meet the intended need configured consistent with the Customer's proposed LGP values and the operational requirements of Rule 21 The IOU field performance verification/commissioning tests differ from certification testing in that these are operational tests for equipment that has been installed in the field as opposed to lab tests used by NTRLs to verify that the equipment being tested meets the requirement of the standard (such as IEEE1547.1-2020/UL1741SB) While IOUs reserve the right to verify performance on any project prior to issuing PTO, in practice IOUs will only perform field verification on projects which are using new methods or new equipment. Once IOUs become familiar with the methods and equipment, IOUs may not require to be the witness of the operational performance and commissioning tests (which should always be performed with or without IOUs witnessing) Consistent with Rule 21 Section L.5.a, IOUs conduct field performance verification/commissioning testing for LGP projects consistent with how it is conducted for non-LGP projects, including remote inspection if permissible (follow criteria in approved advice letters – SCE: 4257-E, PG&E 5878-E: SDG&E: 3573-E)
4.c	4) The Large IOUs shall clarify if this step will ensure that during the field performance verification/commissioning testing phase the generating facility complies with the LGP requirements. They should also specify whether this will make the proposed quarterly reporting unnecessary.	<ul style="list-style-type: none"> Field performance verification/commissioning tests will ensure that project is set up to comply with LGP requirements. The issue of quarterly reporting has been addressed. IOUs will use AMI data and telemetry (for projects ≥ 1MW) to verify LGP performance requirements.
4.b.ii	5) PG&E states that it will review, discuss, and agree on the verification procedures. More clarity is needed whether this is solely at PG&E's discretion or if it involves the customer. Should SCE and SDG&E also adapt similar language when aligning the process language, they shall also abide by this requirement.	<ul style="list-style-type: none"> Per Rule 21 Section L.5.a, IOUs may require a written Commissioning test procedure to be provided by the Interconnection Customer 10 days in advance of the Commissioning Test. IOUs will coordinate with customer on the development of the commissioning test procedure.

Topic E: Implementation of Limited Generation Profiles Using Current Smart Inverter Functions

Energy for What's Ahead®



Summary of possible options to accomplish LGP with currently available products presented at LGP Workshop 2

Takeaway from discussion with various industry members

Operational Option #	LGP Method Type	Output Measurement Point	288 LGP Storage	8760 LGP Storage	288LGP to 8760LGP Translation/Creation	Applicable Standards	Industry Discussion Takeaway
1	Method A: Server stores 288 LGP and sends Gateway the 288 LGP automatically (or manually) on a yearly basis	Inverter Terminals	Server (Source) Gateway (From Source)	Gateway	Gateway	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
1	Method B: Server stores 8760 LGP and sends Gateway the 8760 LGP automatically (or manually) on a yearly basis	Inverter Terminals	Server	Server (Source) Gateway (From Source)	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
1	Method C: Server stores 8760 LGP and sends Gateway the Plimit each hour of the 8760 LGP. Repeats each year unless a new 8760 LGP is uploaded	Inverter Terminals	Server	Server	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but there are areas needing further investigation and additional validation testing may be necessary
2	Method D: Server stores 288 LGP and sends Gateway the 288 LGP automatically (or manually) on a yearly basis	PCC	Server (Source) Gateway (From Source)	Gateway	Gateway	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
2	Method E: Server stores 8760 LGP and sends Gateway the Plimit each hour of the 8760. Repeats each year unless a new 8760 LGP is uploaded	PCC	Server	Server	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
2	Method F: Server stores 8760 LGP and sends Gateway the 8760 LGP automatically (or manually) on a yearly basis	PCC	Server	Server (Source) Gateway (From Source)	Server	1) CSIP for Gateway 2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Technology application may be possible but industry is not actively pursuing making products available. Further testing may be necessary
3	Method G: Use of UL PCS with integrated schedule	PCC	PCS	PCS	N/A	2) UL1741+SA or UL1741SB, 3th Edition for inverters 3)UL PCS CRD for UL PCS Device	Standards being developed- Anticipated by Q2-2023

Use of Non-Certified Equipment

- As presented in LGP Workshop 2, the IOUs recommend Operational Option 3, Method G: Use of UL PCS with Integrated Schedule.
- IOUs understand the UL PCS standards are on track to be completed by 2023 Q2. The standards are being designed to apply to all systems regardless of generating capacity.
- Further development and implementation of alternative approaches (e.g., testing procedures, testing, criteria, mitigation) would be duplicative and impose costs on requesting parties. Relying on the existing efforts of industry experts to design standards and test protocols is the best way to expedite and streamline the interconnection process for future projects.
- Resolution E-5230, 19/57 states: "We deny IREC's request on the use of non-certified devices. We affirm that the Large IOUs have the ability to allow non-certified devices by mutual agreement and nothing in our resolution of this issue impedes that ability. We, however, do not impose such a requirement."
- IOUs recommend further discussion to be held in March 16 SIWG meeting

Topic F: Implementing More Than 12 LGP Values Per Year

Energy for What's Ahead®



Background on Topic F

"In adopting a modified version of the Large IOUs' counter proposal, the Decision modified the proposal such that the 'frequency of changes is expanded to monthly limits to align with the Integration Capacity Analysis.' The Decision, however, did not specify that the monthly profile was limited to only one value.

The Decision addressed the frequency of change and did not restrict the number of values within a month to be only one. **The adopted 288-hour format includes 24 values per each of the 12 months of the year. Essentially this amounts to customers submitting the same value 24 times a month, on a monthly basis for a year when one value would suffice.**

The Large IOUs are therefore directed to discuss the 288-hour format and how it may allow for more than one value per month. Given that the Working Group Two Report was filed October 31, 2018, four years from the current date, we expect there is now more information and experience available to the Large IOUs to allow this.

The Large IOUs shall discuss their learnings and best practices in the workshops and propose how implementation of more than one value per month may be accomplished to better take advantage of the available capacity on a circuit to accomplish the goals of Issue 9."

- Resolution 5230

Proposal for Additional LGP Analysis following March 2 SIWG

- **Scope:** Compare ICA-SG for two time periods, for at least 1 node on at least 5 different circuits.
 - Frequency (% and count of hours)
 - Severity/Magnitude range (kW)
 - Breakdown of limiting criteria, e.g., voltage, thermal, protection (as recommended by IREC during March 2 SIWG)
- **Interpretation of Results:** if the number of LGP values increases, and the frequency **or** maximum magnitude of violation increase, the IOUs maintain their position to utilize 12 unique LGP values.
- **Timeline:** Analysis to be completed by LGP Workshop 4

SCE's Planned LGP Analysis for Workshop 4

1. Select a circuit, and any 3-phase node on that circuit
 - a. Select circuits with geographic diversity, e.g., San Joaquin Valley, Metro, Coastal, Valley, Inland. Stick to 12 and 16 kV circuits.
2. Define the circuit load profile for two time periods of 12 months each:
 - a. Compile the 576 circuit load profile for time period 1 (e.g., 2020 Jan-Dec)
 - b. Compile the 576 circuit load profile for time period 2 (e.g., 2021 Jan-Dec)
3. Query the nameplate amount of generation that has interconnected to the subject circuit during time period 2. This parameter does not play a role in the analysis and is for information only.
4. Compute the ICA Uniform Gen Static Grid for the selected node for **period 1** and **period 2**; store the results
5. For time period 1 and time period 2, create the following ICA-SG profiles (8 profiles for 2 time periods = 16 profiles):
 - a. Create a **288** minimum ICA-SG profile by taking the lowest ICA-SG value for each hour, multiply the profile by 90%
 - b. Create a **144** ICA-SG profile by taking the minimum of the 90% ICA-SG values (profile a.) over every **2-hour** window
 - c. Create a **96** ICA-SG profile by taking the minimum of the 90% ICA-SG values over every **3-hour** window
 - d. Create a **72** ICA-SG profile by taking the minimum of the 90% ICA-SG values over every **4-hour** window
 - e. Create a **48** ICA-SG profile by taking the minimum of the 90% ICA-SG values over every **6-hour** window
 - f. Create a **36** ICA-SG profile by taking the minimum of the 90% ICA-SG values over every **8-hour** window
 - g. Create a **24** ICA-SG profile by taking the minimum of the 90% ICA-SG values over every **12-hour** window
 - h. Create a **12** ICA-SG profile by taking the **monthly** minimums of the 90% ICA-SG values
6. Compare the results for each time period, and each level of granularity (288, 144, 96, 72, 48, 36, 24, 12). Frequency: Count the number of hours where ICA-SG profile for time period 2 is less than the ICA-SG profile for time period 1. Magnitude: Calculate the percent difference and the magnitude difference (kW) on an hour-by-hour basis. Identify the limiting criteria for each hour where the hourly value from time period 2 was less than the hourly value from time period 1. Repeat this process for each profile.
7. Calculate the energy (kWh) and power (kW) delivered over the course of the year for each of the 8 profile types.
8. Repeat the process for a different node on a different circuit until one node on at least 5 different circuits are analyzed.

PG&E's Planned LGP Analysis for Workshop 4

1. Query ICA results of January 2022 (period 1) and January 2023 (period 2).
2. For time period 1 and 2, create the following ICA-SG profiles:
 - a) 288LGP: Hourly values in all hours
 - b) Three-interval LGP: Three minimum values within three intervals of 8 to 17, 18 to 23, and 0 to 7
 - c) 16 to 21 hourly: Fixed minimum value in all hours, except 16 to 21 (variable for these hours)
 - d) 18 to 23 hourly: Fixed minimum value in all hours, except 18 to 23 (variable for these hours)
 - e) 16 to 23 hourly: Fixed minimum value in all hours, except 16 to 23 (variable for these hours)
 - f) 16 to 21 fixed: Fixed minimum value between 16 to 21 and fixed minimum value for other hours
 - g) 18 to 23 fixed: Fixed minimum value between 18 to 21 and fixed minimum value for other hours
 - h) 12LGP: Fixed minimum monthly values for all hours
3. Calculate the magnitude and frequency of violations (at least for 5 circuits) for each of the 8 ICA-SG profiles (a to h) of period 1 compared to the 288LGP (a) of period 2.
 - a) The 288LGP of period 2 is the maximum possible granularity (used as reference). Any generation more than this would result in violation of a voltage, thermal, and/or protection constraint.
 - b) All ICA-SG profiles of period 1 are multiplied by 90% to consider 10% buffer in hosting allowance.
 - c) Frequency: Number of hours where 288LGP of period 2 is less than 90% of the ICA-SG profile of period 1.
 - d) Magnitude: The difference between 288LGP of period 2 and 90% of the ICA-SG profile of period 1.
 - e) Limiting criteria: Identify the criteria for each violation.
4. The amount of generation added between January 2022 to January 2023 is reported for information only.
5. Calculate the energy (kWh) and power (kW) delivered over the course of the year for each of the 8 profile types.

Questions

Energy for What's Ahead®

