PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Agenda ID #22278
ENERGY DIVISION **RESOLUTION E-5296**
March 21, 2024

R E S O L U T I O N

Resolution E-5296. Approving in part and modifying Pacific Gas and Electric Company's, Southern Edison Company's, and San Diego Gas & Electric Company's Advice Letters, submitted per Resolutions E-5211 and E-5230, providing the specifics and process of Limited Generation Profiles.

PROPOSED OUTCOME:

- This Resolution approves in part, and modifies, Pacific Gas and Electric Company's (PG&E), Southern California Edison Company's (SCE), and San Diego Gas & Electric Company's (SDG&E) Advice Letters (ALs) filed in compliance with Decision 20-09-035 and Resolutions E-5211 and E-5230, providing the specifics on whether and how reductions to a customer's Limited Generation Profile (LGP) are determined, and providing recommendations regarding the standard review, certification requirements, and interconnection processes necessary for implementation of the LGP option.
- This Resolution orders PG&E, SCE and SDG&E to submit via Advice Letter changes to their Rule 21 Tariffs and other forms as applicable to allow the use of LGPs.
- This Resolution orders PG&E, SCE and SDG&E to monitor and report data on utilization of the LGP option to facilitate future refinements to its implementation.

SAFETY CONSIDERATIONS:

- The LGP option is a new interconnection option intended to maximize the use of existing hosting capacity on the grid. The safety and reliability risks posed by LGP generating facilities relative to non-LGP generating facilities are deemed minimal but remain uncertain.

ESTIMATED COST:

- Estimated costs are unknown. Data on cost impacts of any grid mitigations or upgrades will be collected. Other costs include data monitoring and reporting compliance costs and administrative costs to implement the LGP option.

By: (1) PG&E Advice Letter (AL) 6816-E, SCE AL 4941-E, and SDG&E AL 4138-E filed on January 9, 2023; and PG&E AL 6816-E-A, SCE AL 4941-E-A, and SDG&E AL 4138-E-A filed on January 23, 2023; and (2) PG&E AL 6929-E, SCE AL 5025-E, and SDG&E AL 4215-E filed on May 1, 2023; PG&E AL 6929-E-A, and SCE AL 5025-E-A filed on August 31, 2023; and SCE AL 5025-E-B filed on September 26, 2023.

SUMMARY

Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E), collectively the large investor-owned utilities (Large IOUs), jointly submitted two sets of Tier 3 Advice Letters (ALs):

1. The Joint January LGP AL and Supplement—PG&E AL 6816-E, SCE AL 4941-E, and SDG&E AL 4138-E (collectively the Joint January LGP ALs[1]) on January 9, 2023 and PG&E AL 6816-E-A, SCE AL 4941-E-A, and SDG&E AL 4138-E-A (collectively the Supplements to Joint January LGP ALs[2]) on January 23, 2023 to comply with Ordering Paragraph (OPs) 2 and 3 of Resolution E-5211 and OP 16 of Decision (D.) 20-09-035 (the Decision); and

2. The Joint May LGP AL and Supplements—PG&E AL 6929-E, SCE AL 5025-E, and SDG&E AL 4215-E on May 1, 2023 (collectively the Joint May LGP ALs[3]), PG&E AL 6929-E-A and SCE AL 5025-E-A on August 31, 2023 (collectively the

[1] Advice Letter Complying with Resolution E-5211 and Decision 20-09-035 Ordering Paragraph 16
[2] Supplement to Joint Advice 4941-E, Advice Letter Complying with Resolution E-5211 and Decision 20-09-035 Ordering Paragraph 16
[3] Proposed Modifications to Implement Limited Generation Profiles Pursuant to Ordering Paragraph 3 of Resolution E-5230.

Supplements to the Joint May LGP ALs[4]), and SCE AL 5025-E-B[5] on September 26, 2023, replacing SCE AL 5025-E-A in its entirety, to comply with Resolution E-5230 and OP 15 of the Decision.

This Resolution approves in part and modifies these advice letters and directs the Large IOUs to implement the LGP option according to the standard review, certification requirements, and interconnection processes ordered in this Resolution. The LGP option will become effective within nine months of an Underwriters Laboratory (UL) certification standard being approved for the scheduling function for UL Power Control System (PCS), as directed by OP 51 of D.20-09-035.

This Resolution discusses findings on the following topics:

- Curtailment of LGP facilities under business-as-usual and LGP-specific circumstances;
- Disparate treatment of LGP facilities versus non-LGP facilities;
- Data monitoring and reporting of curtailment of LGP facilities;
- Use of Gross Nameplate Rating of LGP facilities in Rule 21 screens;
- Use of non-certified devices, use of current smart inverter functions, and publication of technical requirements;
- Clarification of interconnection process for LGP projects and alignment of Rule 21 Tariff language with process proposal;
- Granularity of LGP values (number of unique LGP values per year) and future assessment of LGP granularity.

This Resolution orders Advice Letters on Rule 21 Tariff changes, and also orders: adopting the process and steps for curtailing LGP projects; adopting the process for implementing LGP projects; adopting the granularity of LGP values; adopting data monitoring and reporting requirements; specifying the data format of LGP values to be submitted by customers; and developing a plan for conducting assessments of the LGP option.

[4] Supplement to Advice 5025-E, SCE's Proposed Modifications to Implement Limited Generation Profiles Pursuant to OP 3 of Resolution E-5230.
[5] Supplement to Advice 5025-E-A, SCE's Proposed Modifications to Implement Limited Generation Profiles Pursuant to OP 3 of Resolution E-5230.

BACKGROUND

A. Reference List of Documents

The subject matter of this Resolution encompasses a large number of documents, summarized in Table 1. Some of these documents refer to or draw upon a series of seven workshops that occurred between November 7, 2022 and April 7, 2023, as ordered by Resolutions E-5211 and E-5230, to discuss a series of LGP topics; the proposals and discussions from these workshops have been used and memorialized by the Large IOUs and by non-IOU parties in their formal submissions to the Advice Letter process.

Table 1: Reference List of Documents

Date	Document	Notes
October 31, 2018	Rule 21 Working Group Two, Final Report	Working Group ordered by Rulemaking 17-07-007. Issue 9 of that Rulemaking addresses incorporation of ICA into Rule 21 and also proposes the LGP option
September 30, 2020	D.20-09-035	OP 15 and OP 16 called for Large IOUs to recommend implementation details of LGP; OP 51 also contains provisions related to LGP as part of Issue A-B 3 on smart inverter settings from Rule 21 Working Group Three
January 28, 2021	PG&E AL 6058-E SCE AL 4404-E SDG&E AL 3678-E	First set of advice letters to comply with D.20-09-035 OP 16; rejected in Resolution E-5211
March 30, 2021	PG&E AL 6141-E SCE AL 4455-E SDG&E AL 3721-E	Second set of advice letters to comply with D.20-09-035 OP 15 and OP 51; approved in part and modified in Resolution E-5230
October 10, 2022	Resolution E-5211	OP 2 called for workshops to discuss LGP implementation issues regarding whether/how curtailment should occur; OP 3 called for Large IOUs recommendations
December 1, 2022	Resolution E-5230	OP 2 called for workshops to discuss several other LGP implementation issues; OP 3 called for Large IOUs recommendations
January 5, 2023	Alternate Proposal	Submitted by IREC, Cal Advocates, CALSSA, and Applied Systems Engineering; included as Attachment A in the Joint January LGP ALs
January 9, 2023	PG&E AL 6816-E SCE AL 4941-E SDG&E AL 4138-E	Collectively called Joint January LGP ALs; addresses issues from Resolution E-5211
January 23, 2023	PG&E AL 6816-E-A SCE AL 4941-E-A SDG&E AL 4138-E-A	Collectively called Supplement to Joint January LGP ALs; Large IOUs commented on the Alternative Proposal

Date	Document	Notes
January 30, 2023	Protests to Joint January LGP AL	Separate protests submitted by IREC and Cal Advocates; IREC's protest also included protests to the Supplement to the Joint January LGP ALs
February 6, 2023	Protest to Supplement to the Joint January LGP AL	Submitted by Cal Advocates (accepted late)
February 6, 2023	Reply to protest	Joint Large IOUs reply to IREC and Cal Advocates January 30, 2023 protests to Joint January LGP ALs
February 14, 2023	Reply to protest	Joint Large IOUs reply to Cal Advocates protest
May 1, 2023	PG&E AL 6929-E SCE AL 5025-E SDG&E AL 4215-E	Collectively called Joint May LGP ALs; addresses issues from Resolution E-5230
May 22, 2023	Protest to Joint May LGP AL	Submitted by Cal Advocates
May 30, 2023	Reply to protest	Large IOUs' reply to May 22, 2023 protest by Cal Advocates
June 5, 2023	Protest to Joint May LGP AL	Submitted by IREC (accepted late)
June 23, 2023	Reply to protest	Large IOUs' reply to June 5, 2023 protest by IREC
June 27, 2023	Energy Division Data Request	Energy Division request asking the Large IOUs to provide analysis and data related to granularity of LGP values
July 21, 2023	Energy Division Data Request	Update #1 of Data Request
August 14, 2023	Energy Division Data Request	Update #2 of Data Request
August 31, 2023	PG&E AL 6929-E-A SCE AL 5025-E-A	Collectively called Supplement to the Joint May LGP ALs; response to original Energy Division Data Request and Updates #1 and #2
September 20, 2023	Energy Division Data Request	Update #3 of Data Request
September 26, 2023	SCE AL 5025-E-B	Replaces SCE AL 5025-E-A in entirety
September 26, 2023	Response to data request	PG&E and SCE responses to Energy Division Data Request Update #3 (provided in Appendices J and K)
October 16, 2023	Response	Cal Advocates response to August 31, 2023 Supplement to Joint May LGP ALs and September 26, 2023 AL 5025-E-B

B. Rulemaking 17-07-007

The California Public Utilities Commission (Commission) initiated Rulemaking (R.) 17-07-007 on July 13, 2017, to consider refinements and, if necessary, revise the rules and regulations governing the interconnection of generation, distributed energy resources (DERs) and storage facilities to the electric distribution systems of the Large IOUs. The Large IOUs' rules and regulations pertaining to the interconnection of generating facilities are set forth in Electric Rule 21 Tariff (Rule 21). As part of R.17-07-007 the Large IOUs and other stakeholders participated in four working groups, of which Working Group Two pertains to this Resolution. Proposals from Working Group Two included how to incorporate the Integration Capacity Analysis (ICA)[6] into Rule 21 and use Limited Generation Profiles (LGP)[7] (henceforth the use of LGPs for interconnection purposes is referred to as the "LGP-option" to distinguish it from the profile itself, the "LGP") to allow DERs to perform within existing ICA hosting capacity to avoid distribution grid upgrades. Decision 20-09-035 ruled on the proposals from Working Group Two.

C. Decision 20-09-035

D.20-09-035, issued by the Commission on September 30, 2020, directed the Large IOUs to submit ALs proposing revisions to Rule 21 addressing recommendations of Working Group Two. OP 15 and OP 16 of the Decision state, respectively:[8]

- OP 15: The counter proposal from [the Large IOUs] to resolve Issue 9 is adopted with modification… Utilities shall submit a Tier 3 Advice Letter providing recommendations (as applicable) regarding the standard review, certification requirements, and interconnection processes necessary for implementation of the proposal. Within 60 days of adoption of a certification scheme for the Limited Generation Profile, Utilities shall modify the Rule 21 Interconnection Application Process to allow a distributed energy resources customer to include a Limited

[6] The ICA is a tool developed in the Distribution Resources Plans (R.14-08-013) proceeding and informs developers of the hosting capacity a circuit has (that is, how much capacity is available before a grid upgrade is required). The ICA values vary over time depending on grid conditions.
[7] The purpose of the LGP option is to allow a generator to export power to the grid within allowable levels using control devices. Further details are found in Background Section C of this Resolution.
[8] D.20-09-035 at 209-210 and 224.

> Generation Profile with their application, require the customer to enable generation profile limiting functionality, and allow Utilities opportunity to alter the profile if safety and reliability concerns warrant it. Retroactive alterations to generation profiles shall not reduce generation to below a pre-defined static level, i.e., the lowest Integrated Capacity Analysis – Static Grid [ICA-SG] typical profile value identified at the time of the Interconnection Application. As part of the proposal, Utilities shall: i) allow customers to utilize a smart inverter's ability to increase its output on a monthly basis; and ii) use a 10 percent buffer, which shall be revisited...

- OP 16: [The Large IOUs] shall submit a Tier 3 Advice Letter… providing the specifics of whether and how reductions to a customer's Limited Generation Profile are determined. The Advice Letter shall include a description of how the Utilities will implement Ordering Paragraph 15…

The Large IOUs submitted ALs on January 28, 2021[9] and March 30, 2021,[10] to comply with OP 16 and OP 15 (and 51[11]), respectively, of the Decision. Resolution E-5211 and E-5230 disposed of those ALs. These resolutions are discussed further below.

D. Rule 21 Working Group Two Issue 9: Limited Generation Profiles (LGP)

The Decision resolved Issue 9 from Working Group Two. As stated in the Decision:

> Issue 9 looks at the conditions of operations the Commission should adopt to allow distributed energy resources to perform within existing hosting capacity constraints and avoid triggering [distribution grid] upgrades… The purpose of resolving Issue 9, as highlighted by IREC, is to utilize the Integration Capacity Analysis data to allow modern inverters, storage, and other technologies to confidently respond to grid conditions while ensuring safety and reliability.[12]

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[9] *See* PG&E AL 6058-E, SCE AL 4404-E, and SDG&E AL 3678-E.
[10] *See* PG&E AL 6141-E, SCE AL 4455-E, and SDG&E AL 3721-E.
[11] Related to LGPs, Proposal A-B 3 allows an inverter approved for non-export and limited-export to be set using different maximum export value settings at different times of the year and at the discretion of the utility until a future scheduling standard is released.
[12] D.20-09-035 at 51.

The electric grid has a finite ability, at any time, to accept power export from generating systems without needing grid upgrades. This ability, known as hosting capacity, changes over time based on grid conditions. Presently, to pass the Fast Track Screen M, a generating system interconnects at the lesser of 90% of the minimum ICA-Static Grid (ICA-SG) and 90% of the minimum ICA-Operational Flexibility (ICA-OF)[13,14] value. This is the most limiting case for hosting capacity to pass Screen M.

The LGP option makes better use of the existing hosting capacity—an LGP more closely resembles the ICA-SG curve—by allowing a generating system to vary its export of power[15] to the electric grid and to limit it to stay below the available hosting capacity at any given time. By doing so, the LGP option allows a generator to interconnect generation capacity without the need for grid upgrades at the time of application. The LGP option allows the interconnected system to "[exceed] the minimum annual Interconnection Capacity Analysis-Static Grid (ICA-SG) value while remaining below the maximum ICA-SG at any given time."[16] Figures 1 and 2 in Appendix A provide further illustration and explanation of the LGP option.

Despite an LGP facility's ability to better utilize existing hosting capacity, the LGP option is a static set of values that do not change over time—the profile is determined and agreed upon through the interconnection process. Available hosting capacity, however, does change over time as grid conditions evolve. This changes the ICA-SG values over time. Future hosting capacity limits may decrease and impede a generating system from exporting power at the initially agreed upon LGP levels.

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[13] *See* Rule 21 Working Group Two Final Report at 66 which states: "There are two types of ICA profiles… [1] ICA-Static Grid ("ICA-SG") 576 profile: This profile is the minimum ICA values at each of the 576 hours for the most limiting of these categories: thermal, voltage, power quality and protection. [2] ICA-Operational Flexibility ("ICA-OF") 576 profile: This profile is the minimum ICA values at each of the 576 hours for the most limiting of these categories: thermal, voltage, power quality, protection and safety. Where the safety ICA is not the lowest of all the categories, ICA-OF and ICA-SG are the same…The minimum annual ICA-OF value is the ICA's most conservative assessment of the system's ability to interconnect new DER. The maximum value for ICA-SG is the least conservative scenario. In between lies…the minimum annual ICA-SG."

[14] *See, e.g.,* PG&E Rule 21 Screen M.

[15] Normally this is accomplished using Power Control Systems (PCS). PCS are systems or devices that electronically control the power output of one or more generating facility. PCS limit the Alternating Current (AC) or Direct Current (DC) and loading on the grid supplied by the power production sources.

[16] Rule 21 Working Group Two Final Report at 119.

According to the Working Group Two Final Report's account of the Large IOUs' counter proposal, a customer would agree to "to allow future reductions to generation profile. Determination of such reductions would be made by IOUs under defined circumstance."[17] Furthermore, "the proposal acknowledges future grid conditions could result in actual hosting capacity being below the published [ICA-SG]. Under such circumstances, the utility may need to reduce generation to ensure safe and reliable service without grid upgrades."[18] In adopting the Large IOUs' counter proposal, the Decision "allow[s] Utilities opportunity to alter the profile if circumstances warranted."[19] The Decision adopted this concept stating "Accordingly, we adopt the element that the utility may need to reduce generation to ensure safe and reliable service without grid updates."[20] Resolution E-5211 clarifies that reduction of the export value in response to future grid conditions is a limitation and not a requirement.[21]

Use of Smart Inverter Functions

The Large IOUs' counter proposal adopted by D.20-09-035 would "Allow Interconnecting DER To Be Evaluated and Operate Under Limited Generation Operation Limits Leveraging Smart Inverter Phase III Function 3 (Limit Maximum Real Power Mode)."[22] According to the Working Group Two Report the proposal requires:

> Update [of] the interconnection procedures to allow customers which have certified [smart inverter functions] Phase III inverters to use Phase III Function 3 (Limited Maximum Real Power Mode) in order to limit maximum power output based on seasons of the year. This functionality must account for future changes in load profiles, which may require the Function 3 limits to be updated in order to prevent distribution safety and reliability issues.[23]

[17] Rule 21 Working Group Two Final Report at 126.
[18] Rule 21 Working Group Two Final Report at 126.
[19] D.20-09-035 at 56.
[20] D.20-09-035 at 59.
[21] *See* Resolution E-5211 at 22.
[22] Rule 21 Working Group Two Final Report at 125.
[23] Working Group Two Report at 125.

This allows DER customers to use a system's ability to increase monthly generation output during times of the year when a higher level of ICA hosting capacity is available and decrease it during times when it is not available. As part of using the LGP-option, a DER customer would agree to enable smart inverter functionality of Phase II communications and Phase III Function 3 "to ensure actual operations conform to the submitted Limited Generation Profile."[24]

The Ten Percent (10%) Buffer

The Decision adopted a 10 percent buffer on the ICA-SG values to use for interconnections using the LGP option. The 10 percent buffer was adopted because the ICA was a new tool for interconnection purposes whose accuracy was untested in real-world situations. The Decision states "…[the] 10 percent buffer for the Issue 9 proposal will ensure the safety and reliability of the grid while we gather data on the accuracy of the Integration Capacity Analysis."[25]

Granularity of LGP—Implementing More Than 12 LGP Values Per Year

Resolution E-5230 states "In the Working Group Two Report discussion of LGP (Issue 9) the Large IOUs counter proposal, which was modified and adapted by the Decision, proposed to submit the LGP in a standard 288-hour format"[26] and:

> 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 … . Large IOUs are therefore directed to discuss the 288-hour format and how it may allow for more than one value per month.[27]

In comments to the draft Resolution E-5230, the Large IOUs stated "the [D]ecision's "modification" of the "Utilities' counter proposal" adopted monthly limits, i.e.,

[24] Working Group Two Report at 126.
[25] Decision at 182 (*See* Findings of Fact 70).
[26] Resolution E-5230 at 34.
[27] Resolution E-5230 at 34.

12 different limits per year (one per month); it did not allow different hourly limits within a month."[28]

In response to the Large IOUs' argument, Resolution E-5230 clarifies the Commission did not "agree with the Large IOUs that the draft Resolution mischaracterizes what was adopted in the Decision with regards to the granularity of LGP schedules. As stated in the draft Resolution, the Decision did not specify the monthly profile was limited to only one value"[29] and the original language of the draft Resolution was not altered.

E. Resolution E-5211, Joint January LGP AL, Joint Alternate Proposal, and Supplement to Joint January LGP AL Responding to Joint Alternate Proposal

January 2021 Advice Letters to comply with OP 16 of Decision

On January 28, 2021, the Large IOUs submitted PG&E AL 6058-E, SCE AL 4404-E, and SDG&E AL 3678-E to comply with OP 16 of the Decision. In the ALs the Large IOUs identified a set of initial factors that could contribute to a customer's revised LGP.

Resolution E-5211

Resolution E-5211, issued on October 10, 2022, rejected the January 2021 set of ALs without prejudice. Resolution E-5211 found the ALs lacked specificity and failed to meet the requirements of all three elements articulated in OP 16 of the Decision: specificity on (1) whether and (2) how reductions to a customer's LGP are determined, as well as (3) inclusion of a description of how the Large IOUs will implement OP 15. Resolution E-5211 found the submitted ALs did not supply specific information on the circumstances under which reduction of an LGP export power will occur, or how reductions to a customer's LGP are determined (as directed in OP 16), and did not address that export values may only be lowered to the pre-defined ICA-SG level identified at the time of interconnection, as ordered in OP 15. Resolution E-5211 ordered the Large IOUs: (1) to participate in a minimum of two full-day workshops, and attend and participate in Smart Inverter Working Group (SIWG) meetings to discuss all material identified therein as needing discussion;[30] and (2) to file new

[28] Resolution E-5230 at 42.
[29] Resolution E-5230 at 42.
[30] Resolution E-5211 OP 2.

subsequent Tier 3 ALs that meet the requirements of OP 16 of the Decision and address the material identified therein.[31]

Joint January LGP AL

On January 9, 2023, the Large IOUs submitted the Joint January LGP AL (PG&E AL 6816-E, SCE AL 4941-E, & SDG&E AL 4138-E) to comply with the requirements of Resolution E-5211. In the Joint January LGP AL the Large IOUs discuss compliance with OP 2 and OP 3 of Resolution E-5211 by discussing: (1) participation in workshops and the SIWG; (2) Providing information on circumstances that lead to a reduction of export power and the procedure to determine the reduction of export power; (3) the areas of consensus and non-consensus of the topics discussed in the workshops; and (4) presenting proposed tariff change to Section D.9 of Rule 21.[32]

Joint Alternate Proposal

On January 5, 2023, the Interstate Renewable Energy Council, Inc. (IREC), on behalf of itself, the Public Advocates Office at the California Public Utilities Commission (Cal Advocates), the California Solar and Storage Association (CALSSA), and Applied Systems Engineering Inc. (collectively, Alternate Proposal Parties), submitted to the Large IOUs an alternate proposal for how to resolve whether and how reductions to a customer's LGP are determined pursuant to OP 16 of the Decision. The Alternate Proposal was included in the Joint January LGP AL as Attachment A.[33]

[31] Resolution E-5211 OP 3.
[32] Section D.9 of Rule 21 describes the Large IOUs terms of curtailment and disconnection of a generating facility from the grid in the event of emergency or to correct unsafe operating conditions.
[33] The Joint Alternate Proposal was provided in the Joint January LGP Advice Letter as Attachment A. During an LGP Workshop on December 16, 2023, IREC requested the opportunity to prepare alternative proposals. Per Energy Division direction, the Alternate Proposal was included in the Joint January LGP AL as Attachment A but due to timing constraints the Large IOUs were unable to comment on it before the AL was due. In the Joint January LGP AL, at 11, the Large IOUs state: "The Utilities are attaching the alternative proposal to this AL per Energy Division's direction, and by doing so do not adopt or endorse its recommendations... The Utilities understand they will have the opportunity to offer comments later."

Supplement to Joint January LGP AL

On January 23, 2023 the Large IOUs submitted the Supplement to the Joint January LGP AL (PG&E AL 6816-E-A, SCE AL 4941-E-A, & SDG&E AL 4138-E-A). In this Supplement the Large IOUs respond to the proposals in the Joint Alternate Proposal.

F. Resolution E-5230 and Joint May LGP AL

March 2021 Advice Letters to Comply with OP 15 and 51 of Decision

On March 30, 2021, the Large IOUs, submitted PG&E AL 6141-E, SCE AL 4455-E, and SDG&E AL 3721-E to comply with OP 15 and 51 of the Decision. In the ALs the Large IOUs outlined the interconnection process for LGP in five phases: (1) Customer Preparation, (2) Interconnection Request, (3) Technical Evaluation, (4) Interconnection Agreement/Permission to Operate (PTO), and (5), Operation Performance. The Large IOUs also provided information on the implementation requirements and changes needed in their systems to implement LGPs.

Resolution E-5230

Resolution E-5230, issued on December 1, 2022, approved in part and modified the March 2021 set of ALs. Resolution E-5230 found the ALs largely complied with OPs 15 and 51, which required the Large IOUs to provide recommendations (as applicable) regarding the standard review, certification requirements, and interconnection processes necessary for implementation of the LGP. There were issues, however, that called for further discussion and clarification; among them were the topics of (1) the use of smart inverter functions to implement the LGP option before certification standards are approved and (2) the level of granularity for LGPs. Resolution E-5230 directed the Large IOUs to participate in workshops and ordered them to submit Tier 3 ALs by May 1, 2023 to address the topics identified therein as well as those raised in the workshops.

Joint May LGP AL

On May 1, 2023, the Large IOUs submitted the Joint May LGP AL (PG&E AL 6929-E, SCE AL 5025-E, & SDG&E AL 4215-E) to comply the requirements of Resolution E-5230. In the Joint May LGP AL the Large IOUs discuss compliance with Resolution E-5230 by discussing: (1) participation in workshops and the SIWG; (2) quarterly reporting requirements; (3) use of gross nameplate rating for LGP projects; (4) use of non-certified devices by mutual agreement; (5) the proposals submitted by the Large IOUs on the interconnection process for the LGP option, (6) implementation of LGP option using current smart inverter functions; (7) and granularity of the LGP.

Supplements to the Joint May LGP AL

On August 31, 2023, PG&E and SCE submitted a Supplement to the Joint May LGP AL (PG&E AL 6929-E-A, and SCE AL 5025-E-A and SCE AL 5025-E-B) in response to Part 1 and Part 2 of an Energy Division Data Request.[34] On September 26, 2023, SCE submitted SCE 5025-E-B replacing SCE 5025-E-A in its entirety.[35] On September 26, 2023, PG&E and SCE provided responses to Part 3 of the Data Request. SDG&E did not submit a supplement or response to the Data Request because they noted they lacked the data to complete the request.

NOTICE

The Large IOUs state that notice of PG&E AL 6816-E, 816-E-A, 6929-E, and 6929-E-A; SCE AL 4941-E, 4941-E-A, 5025-E, 5025-E-A & 5025-E-B; and SDG&E AL 4138-E, 4138-E-A, and AL 4215-E were made by publication in the Commission's Daily Calendar. The Large IOUs state that they served copies of the ALs to the interested parties on the GO 96-B, R.11-09-011, and R.17-07-007 service lists.

[34] On June 27, 2023, the CPUC Energy Division issued a Data Request on the Joint May LGP AL, comprised of two parts: Part 1 on ICA violations resulting from different levels of granularity of LGPs, and Part 2 on the hours of ICA violations resulting from the various LGP levels of granularity to identify real grid impacts. There were three subsequent updates: Update #1 on July 21, 2023, Update #2 on August 14, 2023, and Update #3 on September 20, 2023. Update #3 added a new Part 3 requesting pre-LGP comparison cases and calculation of maximum power. See Discussion of E-5230 Topic F for details.
[35] SCE Supplement 5025-E-B was submitted to correct errors in Supplement 5025-E-A.

PROTESTS/RESPONSES

The Public Advocates Office (Cal Advocates) and the Interstate Renewable Energy Council, Inc. (IREC) submitted separate timely protests on January 30, 2023 to the Joint January LGP AL. IREC's protest also addressed the Supplement to the Joint January LGP AL. The Large IOUs submitted a joint timely reply on February 6, 2023.

Cal Advocates submitted a late protest to the Supplement to the Joint January LGP AL on February 6, 2023, which was accepted by Energy Division.[36] The Large IOUs were properly notified on February 7, 2023.[37] The Large IOUs submitted a joint timely reply to Cal Advocate's late protest on February 14, 2023.

Cal Advocates submitted a timely protest on May 22, 2023 to the Joint May LGP AL. The Large IOUs submitted a jointly timely response on May 30, 2023. IREC submitted a late protest on June 5, 2023. The late protest was accepted by Energy Division and the Large IOUs were properly notified on June 16, 2023. The Large IOUs jointly submitted a timely reply to IREC's late protest on June 23, 2023.

On August 31, 2023, the protest period for the Supplement to the Joint May LGP AL commenced. On September 18, 2023, Energy Division notified the R.17-07-007 service list that SCE's portion of the Supplement contained an error and that SCE would file a new supplement (SCE AL 5025-E-B) to correct the error.[38] On October 16, 2023, Cal Advocates filed a timely response to PG&E AL 6929-E-A and SCE AL 5025-E-B. The Large IOUs did not submit a reply to Cal Advocate's response.

[36] The Supplement to the Joint January LGP AL asked to "maintain the original protest and comment period … and not reopen the protest period." Energy Division did not reopen the protest period therefore Cal Advocate's protest was considered late.
[37] Per General Order 96-B, Section 7.4.4 (Late-Submitted Protest or Response): "The reviewing Industry Division may consider a late-submitted protest or response. If an Industry Division considers a late-submitted protest or response, it will so notify the utility, and the utility shall have five business days from the date of issuance of the notice within which to reply to the late-submitted protest or response."
[38] The notice extended the protest period for PG&E's portion of the Supplement to the Joint May LGP AL—PG&E AL 6929-E-A—to coincide with the protest period of SCE AL 5025-E-B.

DISCUSSION

Summary

This discussion summarizes proposals, positions, and responses provided by the Large IOUs and by the non-IOU parties in the Joint January LGP AL and Joint May LGP AL and associated documents, along with our findings and dispositions. We dispose of 22 distinct topics requiring resolution for the LGP option, as listed in Table 2.

Table 2: Outline of Discussion

Section of Discussion	Reference to Resolutions
A. Ordered Participation in Workshops and Smart Inverter Working Group Meetings	E-5211 Issue 1; and E-5230 Topic A
B. Discussion Background on Resolution E-5211 Issues 2A and 2B	
Disposition #1: Temporary Curtailment as Business-as-Usual Practice	E-5211 Issues 2A/2B
Disposition #2: Curtailment Specific to the LGP Option	E-5211 Issues 2A/2B
Disposition #3: Disparate Treatment of LGP and non-LGP Facilities	E-5211 Issues 2A/2B
Disposition #4: Cost Responsibility Associated with Curtailments	E-5211 Issues 2A/2B
Disposition #5: Cost Causation Principles Are Not Changed	E-5211 Issues 2A/2B
Disposition #6: Magnitude of Curtailment & Rule 21 Tariff Language Changes	E-5211 Issues 2A/2B
Disposition #7: Procedure and Steps for LGP Curtailment	E-5211 Issues 2A/2B
Disposition #8: Data Monitoring and Reporting of LGP Facility Curtailments	E-5211 Issues 2A/2B
C. Discussion Background on Resolution E-5230 Topics B thru E	
Disposition #9: Quarterly Reporting	E-5230 Topic B, Issue 1
Disposition #10: Use of Gross Nameplate Rating in Initial Review	E-5230 Topic B, Issue 2
Disposition #11: Use of Gross Nameplate Rating in Supplemental Review	E-5230 Topic B, Issue 2
Disposition #12: Tariff Language and New Mm5 Option 12	E-5230 Topic B, Issue 2
Disposition #13: Reductions to Limited Generating Profiles	E-5230 Topic B, Issue 3
Disposition #14: Use of Non-Certified Devices for LGP by Mutual Agreement	E-5230 Topic B, Issue 4
Disposition #15: Alignment of the Timelines for OP 15 and OP 51	E-5230 Topic B, Issue 5
Disposition #16: Publication of Technical Requirements	E-5230 Topic B, Issue 5

Disposition #17: Clarification of the Interconnection Process for LGP Projects	E-5230 Topic C
Disposition #18: IOUs' Proposed Tariff and Process Proposal Language Alignment	E-5230 Topic D
Disposition #19: Implementation of LGP Using Current Smart Inverter Functions	E-5230 Topic E
D. Discussion Background on Resolution E-5230 Topic F Scheduling and Implementing More Than 12 LGP Values	
Energy Division Data Request	E-5230 Topic F
Disposition #20: Choice of LGP Configuration(s) to Adopt	E-5230 Topic F
Disposition #21: Assessment of LGP Configurations After Three Years	E-5230 Topic F
Disposition #22: Data Format of LGP values to be Submitted by Customers	E-5230 Topic F

Dispositions #1 through #22 shown in Table 2 resulted from the questions posed and discussions ordered by Resolutions E-5211 and E-5230. The ordered discussions took place over the course of seven workshops, additional Smart Inverter Working Group meetings, and de facto through the interplay of Large IOUs Advice Letters, the Alternative Proposal by non-IOUs parties, non-IOU protests and responses to the Advice Letters, and the Large IOUs replies, for the two sets of advice letters including supplementals.

Dispositions #1 through #8 address the questions and issues raised in Resolution E-5211 on "whether" and "how" to curtail an LGP project, including circumstances leading to curtailment, permanence of curtailment, disparate treatment of LGP and non-LGP generator facilities, and cost responsibility associated with curtailment. We find there is fundamental disagreement between the Large IOUs and non-IOU parties on virtually all aspects of Resolution E-5211 Topics 2A/2B (as contained in the Joint January LGP Advice Letters and associated documents), and we have to account for large differences of positions and arguments on both sides, along with current practice of Rule 21 generating facility curtailment and associated cost-causation principles.

Dispositions #9 through #22 address the questions and issues raised in Resolution E-5230, on the ordered topics for implementing the LGP option. We find there is mostly agreement between the Large IOUs and non-IOU parties on the questions and issues of

Resolution E-5230 (as contained in the Joint May LGP Advice Letters and associated documents), with the exception of scheduling and implementing more than 12 unique LGP values, use of Gross Nameplate Rating in Supplemental Review, and addition of the relay-plus-automation-controller option into Rule 21 Tariff language.

The subject matter of this Resolution encompasses a large number of documents, as summarized in Table 1 in the Background section of this Resolution. We have placed some material in the Appendices and make reference back to the original material rather than reproducing large amounts of text from these documents. In particular, for the Joint January LGP Advice Letters and associated documents (concerning Resolution E-5211), we find that many of the same arguments appear in multiple places in the documents. We have organized the dispositions in a manner that provides both clarity and brevity while capturing what we believe to be the important aspects of proposals, arguments and positions.

A. Ordered Participation in Workshops and Smart Inverter Working Group Meetings

Resolutions E-5211 and E-5230 ordered discussion of several distinct issues related to the LGP option that are disposed of in this Resolution.[39, 40] Resolution E-5211 required the Large IOUs to participate in at least two workshops and to participate in Smart Inverter Working Group (SIWG) meetings to address identified discussion topics.[41] Resolution E-5230 similarly required the Large IOUs to participate in at least two additional workshops and to participate in SIWG meetings to address identified discussion topics.[42]

[39] E-5211 Ordering Paragraph 2: The Large IOUs "are ordered to participate in at least two workshops to discuss all material articulated in the Discussion section of this Resolution... The Large IOUs are expected to address topics identified by Energy Division as needing discussion and prepare relevant presentations..."
[40] E-5230 Ordering Paragraph 2: The Large IOUs "are ordered to participate in at least two half-day workshops to discuss all material articulated in the Discussion section of this Resolution... The Large IOUs are expected to address topics identified by Energy Division as needing discussion and prepare relevant presentations..."
[41] Participation in workshops was labeled "Issue 1" in Resolution E-5211.
[42] Participation in workshops was labeled "Issue A" in Resolution E-5230.

Energy Division staff confirms that the Large IOUs participated in discussions with staff to prepare for the workshops and SIWG meetings and to issue presentations ahead of scheduled meetings. As evidenced in their Advice Letters, The IOUs participated in three workshops associated with Resolution E-5211 and four workshops associated with Resolution E-5230, as well as participation in SIWG meetings.

We find that the Large IOUs have complied with the requirements of Resolutions E-5211 and E-5230 for participation in workshops and SIWG meetings to discuss the ordered LGP topics.

B. Discussion Background on Resolution E-5211 Issues 2A and 2B

Resolution E-5211 Issues 2A and 2B were framed as "whether" and "how" to curtail an LGP project as well as the permanence of such curtailment. Resolution E-5211 clarifies that "whether" means the circumstances that lead to a reduction of export (e.g., a "yes or no" response to a specific scenario or question) and that "how" means the procedure to determine the level of reduction of export power (e.g., the process to determine an updated LGP and what changes are required to interconnection agreements or the grid)."[43]

Issue 2A, "Specifics of Whether Reduction to a Customer's Limited Generation Profile Are Determined," ordered the discussion of three associated sub-issues: (1) the extent to which the LGP- option allows for performance that avoids triggering upgrades within existing hosting capacity constraints; (2) if future grid conditions reduce the hosting capacity, the extent to which Large IOUs may need to reduce generation to ensure safety and reliability without grid upgrades; and (3) the permanence of that reduction of capacity in generation. Resolution E-5211 also states that the second sub-issue (2) raises fairness and cost causation issues.[44]

Issue 2B, "Specifics of How Reduction to a Customer's Limited Generation Profile are Determined" ordered the discussion of five sub-issues: (1) understanding of the Large IOUs' current business-as-usual practices on curtailment of export power and how they apply to the LGP-option, including circumstances in which export power may be

[43] Resolution E-5211 at 11.
[44] Resolution E-5211 at 20; discussions as ordered by OP 2

reduced to below the lowest ICA-SG value identified at time of interconnection; (2) process for curtailment of export power for LGP customers and fairness to non-LGP customers who may have paid for grid upgrades; (3) defining Future Grid Conditions and the effect they may have on LGP customers; (4) defining and evaluating the availability of mitigation options, and how mitigation options differ from upgrade measures; and (5) criteria to establish a new LGP option and the process to implement it.[45]

All of the Issue 2A and 2B sub-issues were discussed in the workshops and SIWG meetings and the results of those discussions are memorialized in the Joint January LGP Advice Letters and associated documents.[46] We dispose of Resolution E-5211 Issues 2A and 2B below with eight distinct dispositions, Dispositions #1 through #8.

Resolution E-5211 ordered that the Large IOUs advice letters "specify which items have reached consensus within the workshop participants and which items have not reached consensus. If an item has not reached consensus, the Large IOUs shall provide details as to the bases for lack of consensus and the alternative proposals, if any."[47] The Large IOUs provide a list of the consensus items in the Joint January LGP AL.[48] We find the IOUs have met this requirement in listing the areas of consensus or non-consensus of the topics in scope for the Joint January LGP Advice Letters. We also find, however, that the Large IOUs have not provided sufficiently explicit explanations as to the bases for lack of consensus and we therefore provide further explanations in the following sections.

[45] Resolution E-5211 at 23; discussions as ordered by OP 2.

[46] The memorializing of sub-issue discussions is ordered by Resolution E-5211 Ordering Paragraph 3: "Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to submit subsequent Tier 3 Advice Letters, within 90 days, after issuance of this Resolution. The Advice Letters should contain all material articulated in the Discussion section of this Resolution and shall meet all the requirements of Ordering Paragraph 16 (and OP 15 as referenced in OP 16) of D.20-09-035."

[47] Resolution E-5211 at 9-10.

[48] Resolution E-5211 at 9.

Disposition #1: Temporary Curtailment as Business-as-Usual Practice

Resolution E-5211 made the distinction "between reducing a customer's export of power under the LGP option, and the Large IOUs' current business-as-usual process to reduce a customer's export of power."[49] The Resolution found "that existing rules should address circumstances that fall within the business-as-usual process irrespective of whether these apply to non-LGP or to LGP customers."[50] Resolution E-5211 requires the Large IOUs to "identify any circumstances that are already applicable to generating facilities (i.e., business-as-usual, or existing practices)."[51]

We find there is consensus that Rule 21 Section D.9 already provides for temporary curtailment of any generator. Those existing provisions will apply equally to LGP facilities as to non-LGP facilities and are not disputed. Section D.9 describes the conditions under which the Large IOUs currently curtail or disconnect generation. It states:

> Distribution Provider may limit the operation or disconnect or require the disconnection of a Producer's Generating Facility from Distribution Provider's Distribution or Transmission System at any time, with or without notice, in the event of an Emergency, or to correct Unsafe Operating Conditions. Distribution Provider may also limit the operation or disconnect or require the disconnection of a Producer's Generating Facility from Distribution Provider's Distribution or Transmission System upon the provision of reasonable written notice: 1) to allow for routine maintenance, repairs or modifications to Distribution Provider's Distribution or Transmission System; 2) upon Distribution Provider's determination that a Producer's Generating Facility is not in compliance with this Rule; or 3) upon termination of the Generator Interconnection Agreement. Upon Producer's written request, Distribution Provider shall provide a written explanation of the reason for such curtailment or disconnection.[52]

[49] Resolution E-5211 at 18-19.
[50] Ibid at 19.
[51] Ibid at 19.
[52] See, e.g., PG&E Rule 21 Section D.9 "Curtailment and Disconnection," Sheet 41, effective February 28, 2023.

The Large IOUs clarify that they must have the latitude to respond to abnormal conditions:

> The circumstances under which curtailment of exports or disconnection of generating facilities may be required are varied… Such circumstances include emergency conditions with little or no advance knowledge … and planned outages where some amount of advance knowledge exists"[53]

And the Large IOUs maintain they must have the ability to respond to such conditions "in accordance with good utility practice, as they determine best suits the particular situation and without regard to whether the owner of the generating facility has elected the LGP option."[54] The Large IOUs state:

> The Utilities must… have the ability—as necessary to ensure safe and reliable operation of the grid—to secure the reduction of exports from customers with generating facilities, to remotely disconnect the generator or customer where such capability exists, or to deenergize an entire circuit or portions of a circuit where the capability to remotely disconnect the generator or customer does not exist. This ability applies to all customers with connected generating facilities regardless of whether they have elected the LGP option.[55]

IREC does not object to the authority provided under Section D.9 of Rule 21 being applied to LGP projects and does not disagree that circumstances (predictable and unpredictable) may arise that can cause safety and reliability issues, and recognizes "that Rule 21 section D.9 already provides that authority [to reduce output from generating facilities, remotely disconnect generators, or deenergize circuits]."[56] IREC "urges the Commission to anchor any authorization for this sort of curtailment to the language in Rule 21. It is essential that when the authority provided by D.9 is exercised, it be done in a fair manner for all generators, regardless of whether they are using an LGP or not."[57]

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[53] Joint January LGP AL at 5.
[54] Ibid at 5.
[55] Ibid at 5.
[56] IREC Protest to the Joint January LGP AL at 3.
[57] IREC Protest to the Joint January LGP AL at 3.

Cal Advocates also concurs: "the IOUs should exercise their power according to section D.9 of Rule 21 to solve temporary safety and reliability issues."[58]

We affirm Rule 21, Section D.9 applies to both LGP and non-LGP customers.

Disposition #2: Curtailment Specific to the LGP Option

Resolution E-5211 made the distinction "between reducing a customer's export of power under the LGP option, and the Large IOUs' current business-as-usual process to reduce a customer's export of power," as noted in Disposition #1.[59] Resolution E-5211 required the Large IOUs to "identify circumstances that would normally be applicable to existing practices but have specific considerations that are only applicable under the LGP-option (LGP-only practices)."[60]

There is a lack of consensus between non-IOU parties and the Large IOUs as to whether further specific considerations for curtailment of LGP facilities would apply beyond those currently in Rule 21 Section D.9. The five issues of non-consensus are: (1) whether the Large IOUs may permanently curtail exports of LGP facilities; (2) the rationale for disparate treatment of LGP and non-LGP facilities under Rule 21; (3) whether the Large IOUs (and by extension, ratepayers) should be responsible for mitigation or upgrade costs to restore curtailed LGP facilities back to the levels originally specified in the interconnection agreement; (4) the magnitude of curtailment allowed, based on future grid conditions for system safety and reliability; and (5) whether data on LGP facilities should be monitored and reported to allow a potential future re-assessment of these issues. We address the first issue here and return to the remaining issues in the sections following.

The Large IOUs argue that they should be allowed to *permanently* reduce an LGP facility's export power to the minimum ICA-SG value in effect at the time of the interconnection application in the event of a specific set of circumstances – namely, that long-term or permanent reductions in metered load on a given circuit occur. The Large IOUs stated that such reductions (herein called "sustained load reduction") could arise

[58] Cal Advocates Protest to the Joint January LGP AL at 6.
[59] Resolution E-5211 at 18-19.
[60] Resolution E-5211 at 19.

from two specific circumstances, either of which would reduce metered load on the circuit to which an LGP generating facility is connected: (1) unexpected business wind-downs, and/or (2) the unanticipated addition of energy efficiency or other load management technologies.[61] Such sustained load reductions could potentially permanently reduce the circuit's hosting capacity.

The Large IOUs argue that in such cases an LGP facility's maximum export might need to be permanently curtailed to the minimum ICA-SG value at the time of interconnection application:

> The Commission has given the Utilities the right to reduce exports from a customer with an LGP generator to the lowest value of the ICA-SG profile if required to maintain safety and reliability while avoiding circuit upgrades. Specifically, the Commission adopted "the element that the utility may need to reduce generation to ensure safe and reliable service without grid updates."[62] The Resolution [E-5211] clarifies that this element only applies "during future grid conditions," such as when load reduction on the circuit has caused the ICA-SG values at the location of the LGP generating facility to be lower than the LGP values approved in the Interconnection Agreement.[63] Providing the Utilities with this right is consistent with the objective of minimizing ratepayer costs.[64]

The Large IOUs also state that situations explicitly not leading to curtailment would include system changes planned by the utility or changes in a utility's input data or modeling assumptions.[65] However, the Large IOUs left open the possibility of other

[61] Joint January LGP AL at 6.
[62] Joint January LGP AL at 6, referencing D.20-09-035 at 59.
[63] Joint January LGP AL at 6, referencing Resolution E-5211 at 220-23.
[64] Footnote in Joint January LGP AL at 6: "The Resolution states that "if another entity takes future action that reduces hosting capacity for those using the LGP-option, the other entity is the one causing the issue and should ultimately be responsible for the cost of curing the lack of hosting capacity." Resolution, p. 21. This statement implies that customers on a circuit that reduce their metered consumption could be held liable for the cost of circuit upgrades. The Utilities believe this is a fundamental policy determination that requires further deliberation, and, in any event, is beyond the scope of the Resolution."
[65] Southern California Edison Company's Reply to Public Advocates Office and IREC Protests of Advice Letter 4941-E, at 2.

situations leading to curtailment, saying "it is not possible to conceive of every potential circumstance that might lead to a curtailment decision."[66]

In their proposals for long-term or permanent curtailment, the Large IOUs argue that because LGP projects do create a higher risk of reaching or surpassing the hosting capacity of a given node, that it is reasonable to expect any required curtailment to apply differently to LGP versus non-LGP facilities.[67] This issue of "disparate treatment of LGP facilities" is addressed in the following section (Disposition #3).

IREC argues that the Joint January LGP ALs fail "to define with adequate specificity both the conditions which would trigger curtailment of an LGP project, and importantly, how that curtailment will be determined."[68] IREC argues the Large IOUs have not explained whether curtailment is appropriate, when considering other conditions on the grid may have changed since interconnection of the LGP project. Specifically, IREC states "The IOUs have not explained how they will determine whether to curtail an LGP customer following a reduction in load when multiple other conditions on the feeder may have also changed."[69]

The Large IOUs stated that circumstances which could lead to curtailment "**include** [emphasis ours] unexpected business wind-downs and/or the unanticipated addition of energy efficiency or other load management technologies that reduce metered load (and therefore hosting capacity) on the circuit to which an LGP generating facility is connected."[70]

IREC protests the use of the word "include" by the Large IOUs, stating that use of this word "suggests that other, unnamed circumstances may also apply."[71] IREC states: "despite the lOUs' statements during the working group process that the only circumstances that would result in the need for curtailment was a reduction in load, the

[66] Ibid at 3.
[67] Ibid at 4.
[68] IREC protest to Joint January LGP AL at 2.
[69] Ibid at 6.
[70] Joint January LGP AL at 6.
[71] IREC protest to Joint January LGP AL at 4.

IOUs appear to have backtracked and defaulted to more ambiguous, and not specific, language.[72]

IREC and the other Alternate Proposal parties argue that the Large IOUs' proposal to curtail export power beyond the circumstances in Rule 21 Section D.9, on an extended or permanent basis, is likely to make LGP projects difficult to finance and state:

> The IOUs' proposal currently exposes the customer to risk that at any point during the life of the project, the full value of the additional capacity [from the LGP option] could be entirely eliminated. Developers stated at the workshops that this risk would likely be unfinanceable. It is also reasonable to assume that, in any case, financing this risk would increase the development costs. Perhaps more critically, however, there has been no meaningful data presented to demonstrate that it is necessary to expose LGP customers to this risk or that LGP interconnections pose greater risk than non-LGP interconnections.[73]

IREC and the other Alternate Proposal parties propose that:

> the Commission authorize the utilization of LGP and that the IOUs address system safety and reliability after interconnection using the methods available to them under Rule 21 section D.9... The IOUs should not be authorized to curtail LGP projects for extended or unlimited durations and should treat LGP projects the same as they treat any other interconnection when applying section D.9.[74]

Regarding the issue of whether LGP-specific curtailment renders LGP projects more difficult to finance, we find that neither the Large IOUs nor non-IOU parties have provided satisfactory evidence to demonstrate their stance on whether the risk of curtailment of LGP projects would have an impact on projects being financeable. We therefore dismiss this argument.

We agree with the Large IOUs that LGP facilities do merit some form of disparate treatment related to cost responsibility, a subject to be taken up in Dispositions #3 and #4. We also agree with IREC that the Large IOUs have identified only one LGP-specific

[72] Ibid at 4.
[73] Alternate Proposal (Appendix A of Joint January LGP AL) at 4.
[74] Alternate Proposal (Appendix A of Joint January LGP AL) at 5.

circumstance (sustained load reduction) that would trigger curtailment of an LGP facility beyond the conditions already enumerated in Rule 21 Section D.9, and that other open-ended or ambiguous text by the Large IOUs on conditions for long-term or permanent curtailment does not meet the requirements of Resolution E-5211.

We note that long-term or permanent curtailment must also depend on what upgrades may be required to fully or partially reverse the curtailment, along with the cost-responsibility for those upgrades. Thus, the issue of long-term or permanent curtailments cannot be fully disposed until those topics are discussed in the sections below.

We find that a sustained load reduction on a circuit or feeder resulting from business wind-downs and/or the unanticipated addition of energy efficiency or other load management technologies is the only LGP-specific circumstance that shall be considered when deciding on long-term or permanent curtailment of the export power of an LGP facility. We clarify this provision applies to systems interconnected under the LGP option, and is independent of the requirements already set forth in Rule 21 Section D.9.

Disposition #3: Disparate Treatment of LGP and non-LGP Facilities

Resolution E-5211 required the Large IOUs to "detail the cause for why disparate treatment for LGP-option systems may be necessary."[75] The Resolution states that "the ability of LGP customers to dial back [curtail] production to the grid hosting capacity is a convenient and expedient short-term fix, but this expediency alone is not justification for a permanent reduction of export power…"[76] Resolution E-5211 clarified that the Decision is silent on specifics of how to implement the provision that "the utility may need to reduce generation to ensure safe and reliable service without grid upgrades."[77]

[75] Resolution E-5211 at 19.
[76] Ibid at 21.
[77] Ibid at 19.

The Large IOUs argue in favor of disparate treatment of LGP facilities relative to non-LGP facilities, in terms of curtailing export limits on a long-term or permanent basis should ICA-SG values on a circuit change.

To justify disparate treatment, the Large IOUs rely on the Decision giving them authority to curtail export power and state that there are "special considerations for LGP facilities."[78] These special considerations are outlined in several places in the Joint January LGP Advice Letters, and the Large IOUs make the following statement:[79]

> The Commission has given the Utilities the right to reduce exports from a customer with an LGP generator to the lowest value of the ICA-SG profile if required to maintain safety and reliability while avoiding circuit upgrades. … the Commission adopted "the element that the utility may need to reduce generation to ensure safe and reliable service without grid updates … Providing the Utilities with this right is consistent with the objective of minimizing ratepayer costs.
>
> In the event the utility determines that the customer's LGP generating facility does not operate as approved, such as exporting at a higher output than allowed in the interconnection agreement or operating in an unsafe manner, the Utilities have the right to reduce the export to the maximum accepted level or shut the generating facility down until the issue is resolved. While the Utilities currently have the ability to interrupt or reduce deliveries or disconnect a non-LGP generating facility in these circumstances, there are special considerations for LGP facilities given that they will be required to operate in accordance with the LGP set forth in the interconnection agreement.

IREC and Cal Advocates argue against disparate treatment and disagree with the utility statements, stating that permanent curtailment would unfairly discriminate against LGP facilities relative to non-LGP facilities, would create disparate treatment of LGP facilities and non-LGP facilities which they claim is contrary to the requirements of Resolution E-5211, and would open the door to curtailment in potentially other unspecified circumstances. IREC and Cal Advocates call such disparate treatment

[78] Joint January LGP AL at 6.
[79] Ibid at 6.

"unjust, unreasonable, and discriminatory."[80] They also argue that the ongoing risk of such long-term or permanent curtailments of LGP facilities would dissuade developers from choosing the LGP option in the first place.

IREC argues that "while load reductions are unlikely to occur frequently, the IOUs' proposal requires each individual project to bear the full risk of a load reduction occurring."[81] And "If the Commission fundamentally alters interconnection cost responsibility principles to hold LGP customers responsible for changes on the feeder that occur for reasons entirely outside their control, it must do so based on evidence that justifies disparate treatment."[82]

IREC further argues that the Large IOUs have not provided sufficient justification for why disparate treatment, between LGP and non-LGP projects, is appropriate and thus failed to comply with Resolution E-5211's requirement. IREC asserts that the Large IOUs have not provided evidence to demonstrate LGP projects pose safety and reliability risks different from non-LGP projects, and argues: "if this is not the case, then establishing a different policy for LGP customers will create a practice that unjustly discriminates against LGP customers."[83] IREC states:

> The lOUs have not provided any data or modeling to demonstrate that LGP projects pose an appreciably greater risk than other projects … [and] even if that data existed, it would be necessary to show why this increased risk (if it does exist) justifies disparate treatment. Since the circumstances that would trigger curtailment, i.e., [sustained] reduction in load, are entirely outside of the LGP project's control, the Commission needs to have justification for why it is reasonable to ask the LGP projects to assume responsibility for circumstances outside their control.[84]
>
> The repeated failure of the utilities to adequately define the reasons for disparate treatment also brings into doubt the basic premise of the lOU's proposal: that

[80] IREC protest to Joint January LGP AL at 2; Cal Advocates protest to Joint January LGP AL at 2.
[81] IREC protest to Joint January LGP AL at 10.
[82] Ibid at 9.
[83] Ibid at 7.
[84] Ibid at 5.

> LGP projects should be subject to permanent curtailment for circumstances not caused by the project or within the applicant's control. These projects will be treated differently from all other interconnections. The workshops and the multiple rounds of advice letters have revealed that this drastic change to the cost responsibility principles is fundamentally unjust, unreasonable, and discriminatory. The Commission has an obligation to ensure that its actions are reasonable, justified and not unduly discriminatory. That standard has not been met here.[85]

IREC notes that load is expected to change, and generally grow, due to building and transportation electrification and states "it is reasonable to suspect that incidents where net feeder loads decrease will become less likely. It is possible that many changes, like additional energy efficiency efforts, may be offset by load growth from electrification."[86]

IREC further notes that in response to a data request from IREC[87] the Large IOUs "indicated that they were not aware of even a single incident in the last five years in which a distribution system violation occurred due to load loss."[88, 89, 90]

Cal Advocates argues similarly to IREC that the Large IOUs' request to allow permanent curtailment is discriminatory toward LGP customers because all other

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[85] Ibid at 7.
[86] Ibid at 9.
[87] IREC data request and Large IOUs responses to the data request are included as Attachment 1 to the IREC protest to Joint January LGP AL; see Footnote 9 on Page 7 of IREC protest to Joint January LGP AL.
[88] Ibid at 7.
[89] PG&E responded to this aspect of the IREC data request with "Answer 8": "PG&E does not have a process to study the loss of load on circuits. Instead, PG&E annually studies the peak forecast of load and DER growth on each circuit and compares that to each circuit's capability. The result of this process is published annually in the Distribution Investment Deferral Framework (DIDF). If the loss of load results in a reduction of the most recently recorded peak load on a circuit, then the lost load is captured in the annual forecast process as a change to the forecast starting point. It should be understood that this loss of load increases load hosting capacity and makes it less likely that the circuit would have a forecasted overload or grid need at peak... At the present time, PG&E is unaware of system violations due to loss of load."
[90] SDG&E responded to this aspect of the IREC data request with "Response 5": "Instantaneous load reductions can have adverse effects on the grid. For example, if a large motor is turned off, voltages can spike. In general, however, reductions in load have not historically posed a significant challenge for grid reliability. SDG&E does not have records documenting distribution system violations due to the loss of load. As indicated in SDG&E's response to question 4, this could change in the future."

interconnection customers maintain their interconnection rights, and that different treatment for LGP customers is not justified. Cal Advocates states "The IOUs' proposal to make permanent curtailments to LGP projects after the GIA is signed violates Rule 21 by treating interconnected LGP customers differently than all other interconnected generation customers, who maintain their interconnection rights in perpetuity."[91] Cal Advocates points to PG&E's Rule 21, Section D.1. which provides that "Distribution Provider shall apply this Rule [Rule 21] in a non-discriminatory manner and shall not unreasonably withhold its permission for Parallel Operation of Producer's Generating Facility with Distribution Provider's Distribution or Transmission System…"[92]

Cal Advocates argues similarly to IREC that the IOUs could make projects unfinanceable and that the IOUs have not provided evidence of the magnitude of any offsetting risk that would justify permanent curtailment. Cal Advocates notes developers may find the risk of curtailment unacceptable and could result in the LGP option being unused. Cal Advocates argues that in assessing the risks associated with the possibility of LGP projects being permanently curtailed—potentially causing projects to be unfinanceable and causing the LGP option to be underutilized—versus the risks of additional costs to ratepayers for mitigations or upgrades to reverse any curtailments, the value of the LGP option to ratepayers must be considered. Cal Advocates states:

> LGP could bring... otherwise uneconomical DERs online which could increase grid reliability (i.e., by mitigating rolling blackouts during system peak) and [create] a more economical system in general by more fully utilizing the distribution grid and DERs. The IOUs' proposal is likely to foreclose realization of those benefits by shifting an unreasonable amount of risk onto each LGP project.[93]

The Large IOUs argue in response to IREC and Cal Advocates that LGP projects do "create a higher risk of reaching or surpassing the hosting capacity of a given node,"[94]

[91] Cal Advocates protest to Joint January LGP AL at 6.
[92] Ibid at 6.
[93] Cal Advocates protest to Joint January LGP AL at 7.
[94] Joint Large IOUs reply to IREC and Cal Advocates protests on Joint January LGP AL, at 4, and Footnote 11 at 4.

that it is reasonable to expect any required curtailment to apply differently to LGP versus non-LGP facilities, and that there is nothing unjust, unreasonable, or discriminatory about these differences – that LGP and non-LGP projects are not the same with respect to benefits and costs.[95]

In response to IREC's and Cal Advocates' assertion that curtailment of LGP projects is unjust, unreasonable, and discriminatory, the Large IOUs maintain "the Decision explicitly allows for disparate treatment between LGP and non-LGP projects. Moreover, different treatment of LGP projects is justified given that they are studied and screened differently than non-LGP projects."[96] The Large IOUs argue that while the LGP option enables the use of more generation, it is also different from non-LGP projects:

> LGP projects benefit from not being subject to ICA-Operational Flexibility (ICA-OF) limits and by avoiding distribution upgrades for which they would otherwise be responsible. Non-LGP projects (other than Net Energy Metering (NEM) projects less than 1 MW) do not have these benefits; they are subject to ICA-OF limits and are required to pay for distribution upgrades.
>
> It is therefore reasonable to expect any required curtailment to apply differently to LGP versus non-LGP projects. LGP projects can potentially be curtailed for indefinite time periods (but not below the lowest ICA-SG level as set forth in the LGP customer's generator interconnection agreement). Non-LGP projects will be restored to their interconnection capacity at ratepayer expense. There is nothing unjust, unreasonable, or discriminatory about these differences – LGP and non-LGP projects are simply not in the same position with respect to their benefits and their costs.[97]

Regarding the assertion by IREC and Cal Advocates that evidence is lacking that LGP projects pose an increase in safety or reliability risks, the Large IOUs point out there haven't been any LGP projects interconnected to have real-world data pertaining to risks. The Large IOUs state:

[95] Ibid at 4.
[96] Ibid at 4.
[97] Ibid at 4.

> LGP projects are designed to go through a different interconnection process, bypassing the ICA-OF screening, and will be screened against the monthly ICA static grid values.[98] This difference in utilizing relaxed limits is effectively the reason why parties in Working Group Two proposed to allow curtailment of LGP projects under future grid conditions unanticipated at the time of interconnection so that the utilities can manage safety and reliability risks.[13] The Decision adopted this proposal.[99]

Regarding IREC's comment of the lack of incidents of sustained load reduction having an effect on the system, the Large IOUs state:

> these observations do not support the conclusion that the Joint Utilities should not have the ability to curtail LGP projects for safety and reliability purposes should the need arise, but do reinforce the Joint Utilities' expectation that the likelihood of extended LGP export curtailments is quite low.[100]

In response to the assertion that LGP projects would be difficult to finance given the potential for future curtailment the Large IOUs argue:

> Protesting Parties have provided only colloquial observations from developers in support of this assertion… [the Large IOUs] do not believe that ratepayers should be required to mitigate financial risks associated with LGP projects. Developers must evaluate the risks of interconnecting projects under available interconnection options, including by utilizing an LGP, and adjust appropriately to the risk of curtailment.[101]

The Large IOUs continue by expressing:

> The Commission has already determined the appropriate allocation of risk by permitting the curtailment of LGP projects under specified circumstances.

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[98] Note that the reference here to "screened against the monthly ICA static grid values" refers to the Large IOUs proposal for 12 monthly LGP values (the "12-monthly" LGP configuration) as discussed in the section on Disposition of LGP Configuration Granularity. For other configurations besides the 12-monthly proposed by the Large IOUs, this reference would need to read differently.
[99] Joint Large IOUs reply to IREC and Cal Advocates protests on Joint January LGP AL, at 5.
[100] Ibid at 5.
[101] Ibid at 5.

> Through the Advice Letter, the Joint Utilities have identified appropriate limits on such curtailments and a process to minimize the need for such curtailments by first identifying low-cost mitigation alternatives. No further allocation of risk to ratepayers is necessary or appropriate.[102]

With regards to the Cal Advocates allegation that the Large IOUs proposal is in violation of Rule 21 by treating interconnection LGP customers differently than other customers, the Large IOUs argue:

> The requirement to apply Rule 21 in a non-discriminatory manner does not mean that all projects are necessarily treated the same. Indeed, Rule 21 already imposes different cost responsibility and technical requirements for different types of projects. The Decision created a new type of interconnection for LGP projects, so it is reasonable (and permitted in the Decision) for those projects to be subject to a potential for curtailment that may not be applicable to other types of projects.[103]

In disposing of the issue of disparate treatment, we find that the IOUs have failed to show that LGP projects constitute a fundamentally different risk to the distribution grid than conventionally interconnected projects. And we find that such fundamentally different risk would be the only rationale for justifying disparate treatment.

We note the limitation of circumstances allowed for curtailing export power from the previous section—a sustained load reduction from business wind-downs and/or unanticipated additional of energy efficiency or other load management technologies– already constrains the risk of curtailment.

We further take note of the statement by IREC, that in response to a data request by IREC to the Large IOUs, the Large IOUs indicated that they were not aware of even a single incident in the last five years in which a distribution system violation occurred due to sustained load reduction. Given this response, we find that sustained load reductions, while certainly possible, remain somewhat speculative. We can't say sustained load reductions won't happen, but are swayed by IREC's argument that the likelihood appears low, particularly given California's electrification mandates.

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[102] Ibid at 6.
[103] Ibid at 6-7.

As discussed in the next section, Disposition #4 Cost Responsibility of LGP Curtailments, we find that "low-cost mitigations" will likely be sufficient in the large majority of curtailment cases to partially or fully reverse curtailment and restore export values to the LGP values in the interconnection agreement. Thus, any curtailments are very likely to be avoidable or reversible at minimal cost and as part of ordinary utility maintenance budgets, thus also posing low or de minimis cost risk to ratepayers. We return to the issue of cost responsibility in the following section.

Finally, we also provide safeguards in the actual event that some LGP facilities do pose higher risks than non-LGP facilities, by ordering modest Data Monitoring and Reporting requirements, including reviews at 3-year intervals of any LGP facility curtailments, discussed further in Disposition #8 on Data Monitoring and Reporting.

We therefore reject, with two exceptions, the Large IOUs argument for disparate treatment of LGP facilities vs non-LGP facilities. We find that the circumstances leading to curtailments of LGP facilities, and the durations of such curtailments, shall adhere to the same provisions of Rule 21 Section D.9 as non-LGP facilities. The two exceptions for disparate treatment of LGP facilities that we accept are:

(1) The modification to Rule 21 Tariff provisions related to curtailment for the LGP-specific circumstances given in Disposition #2: namely for a sustained load reduction on a circuit or feeder resulting from business wind-downs and/or the unanticipated addition of energy efficiency or other load management technologies.

(2) Disparate treatment on cost responsibility may be warranted in exceptional cases, as discussed in Disposition #4.

Disposition #4: Cost Responsibility Associated with Curtailments

Resolution E-5211 ordered the Large IOUs to "define and discuss what low-cost and common mitigations are available (and if the mitigations include grid upgrades) to avoid curtailment [of export power], and under what circumstances they could be applied."[104]

We find a lack of consensus between the Large IOUs and non-IOU parties on the question of cost responsibility: who pays for any mitigations or upgrades that would be required to reverse the curtailment of an LGP facility and partially or fully restore LGP values to those of the LGP facility's interconnection agreement (herein called "restoration costs"). The Large IOUs argued that restoration costs should be paid by the LGP facility at its discretion, with the exception of "low-cost mitigations" that would be paid by the utility. Both IREC and Cal Advocates argue that such restoration costs should always be paid by the utility, as to do otherwise would discriminate against LGP facilities relative to non-LGP facilities and result in the disparate treatment that was discussed in the previous section (Disposition #3).

D.20-09-035 did not specify whether such reductions could be temporary or permanent. This lack of specificity has led to two differing opinions—the Large IOUs contend the Decision allows them to curtail power indefinitely in the absence of customer-funded upgrades. IREC and Cal Advocates argue that the LGP in effect at the signing of the interconnection agreement must be adhered to and that ratepayers must bear the costs for any mitigations or upgrades whose need only arises after an interconnection agreement has been executed with the generation customer, consistent with current practice that customers only pay for upgrades at the time of an interconnection agreement.

Resolution E-5211 clearly contemplates and differentiates between "low-cost mitigations" and "grid upgrades." The Resolution states "nothing in the Decision pre-empts the Large IOUs from taking proper action to avoid such curtailments (e.g., circuit reconfiguration) or from utilizing existing mitigations."[105]

[104] Resolution E-5211 at 20.
[105] Ibid at 20.

The Large IOUs state that any curtailment would be accompanied by an assessment of whether low-cost mitigations can be implemented to restore full or partial curtailment. They state:

> Following any urgent actions, the Utilities will undertake an initial assessment to determine whether low-cost mitigation measures can be implemented to restore some or all of the LGP exports and output of non-LGP generating facilities.
>
> Low-cost mitigation measures may include the following: (a) reconfiguring circuits on a permanent basis; (b) installing or relocating low-cost voltage regulating equipment; (c) adjusting existing equipment settings; (d) enabling or disabling existing capacitor banks; (e) if determined to be viable, utilizing Smart Inverter capabilities to adjust generating facility volt/var and volt/watt functions.
>
> The list above is non-exhaustive given that the availability and feasibility of low-cost mitigation measures are highly dependent on the specific circumstances giving rise to the reduction in LGP exports and the output of non-LGP generating facilities.[106]

The Large IOUs do not agree that cost-responsibility for grid upgrades, in contrast to low-cost mitigations, should be borne by ratepayers. They state:

> The Commission has already determined the appropriate allocation of risk by permitting the curtailment of LGP projects under specified circumstances. Through the Advice Letter, the Joint Utilities have identified appropriate limits on such curtailments and a process to minimize the need for such curtailments by first identifying low-cost mitigation alternatives. No further allocation of risk to ratepayers is necessary or appropriate.[107]

IREC and other Alternate Proposal parties argue that such restoration costs should always be paid by the utility, as to do otherwise would discriminate against LGP facilities relative to non-LGP facilities. That is, parties argue that non-LGP projects are not subject to such upgrade costs should sustained load reduction on a circuit occur, and that should circumstances arise where the distribution system requires

[106] Joint May LGP AL at 7.
[107] Joint Large IOUs reply to IREC and Cal Advocates protests on Joint January LGP AL at 6.

modifications in order to address long-term system issues (i.e., violations of voltage thresholds, equipment ratings, etc.) that are triggered by sustained load reduction, then "the IOUs shall treat the issue as it would were no LGP projects present: make any mitigations or system modifications necessary to resolve the issue and recover costs via its rate case."[108]

IREC and other Alternate Proposal parties also argue that "the IOUs' proposal is likely to foreclose realization of those benefits [bringing DERs online to increase grid reliability] by shifting an unreasonable amount of risk onto each LGP project."[109]

IREC asks the Commission for clarity as to who is responsible for the costs of mitigations or upgrades. IREC states: "although the IOUs indicated during the workshop process that the low-cost mitigations that may be undertaken to avoid the need for curtailment, where available, would be funded by the utility, the advice letter does not explicitly state as much. The Commission should confirm that these costs will be borne by the utility."[110]

IREC and the other Alternate Proposal Parties also suggest a "trial period" of up to 8 years, during which ratepayers would pay for all mitigations and upgrades to allow for real-world data gathering to inform "the Commission to develop a better method for defined risk sharing"[111] and load drop "events either never occur, or occur so rarely that the ratepayer costs are minimal (relative to the ratepayer benefits of LGP), or are non-existent… ."[112] IREC states: "the proposal would limit the ratepayer exposure to these events by capping the number of times these mitigations or modifications could occur before re-evaluation.[113]

In the previous section (Disposition #3), we found that disparate treatment of LGP facilities was warranted in relation to cost responsibility in exceptional circumstances. Here we define those circumstances. In order to do that, we discuss and provide

[108] Alternate Proposal (Appendix A of Joint January LGP AL) at 5.
[109] Ibid at 7.
[110] IREC protest to Joint January LGP AL at 6.
[111] Alternate Proposal (Appendix A of Joint January LGP AL) at 7.
[112] Ibid at 7-8.
[113] Ibid at 7.

guidelines on a distinction between "low-cost mitigations" and "grid upgrades" for the purposes of the LGP option.

Discussions during the three workshops ordered by Resolution E-5211 addressed the definition of low-cost mitigations.[114] In its presentation slides during the November 29, 2022, workshop, IREC wrote "If the conditions arose where a minor upgrade was required, the IOUs have indicated they (aka the ratepayers) may be willing to absorb the costs of mitigating that risk."[115] While that discussion attempted to delineate "minor upgrade" vs "major upgrade" we find it more consistent with Resolution E-5211 to define "low-cost mitigation" vs "grid upgrade."

Each of the Large IOUs' Rule 21 currently define Distribution Upgrades as:

> The additions, modifications, and upgrades to Distribution Provider's Distribution System at or beyond the Point of Interconnection to facilitate interconnection of the Generating Facility and render the Distribution Service. Distribution Upgrades do not include Interconnection Facilities.[116]

While Rule 21 does not explicitly define "mitigations," it does use the term "mitigations" in addition to "upgrades."[117] Rule 21 also employs the term "mitigate" in relation to mitigating failed Fast Track Screens A-M or failed Supplemental Review Screens N-Q. For Fast Track screens, Rule 21 Section G.1 states "some examples of solutions that may be available to mitigate the impact of a failed Screen A through H" are:[118]

- Replace an overloaded distribution transformer with a larger transformer
- Replace overloaded secondary conductors with larger conductor
- Determine if phase balancing on the transformer is possible with minimal review

[114] LGP Workshops held per Resolution E-5211 on November 7, 2022; November 29, 2022; and December 16, 2022.
[115] IREC presentation slides from November 29, 2022 workshop, see Appendix L.
[116] *See, e.g.,* PG&E Rule 21, effective 2/28/2023, Sheet 22.
[117] *See, e.g.,* Rule 21 Table F.1 (Modification to Pending Applications (D. 19-03-013 Type I Changes)) which states "Identified upgrades or mitigations are paid for by the customer."
[118] *See, e.g.,* PG&E Rule 21, Sheet 138 effective 2/16/2023.

- If possible without further study, check if the Generating Facility will actually overstress equipment

For Supplemental Review Screens, Rule 21 states "some examples of solutions that may be available to mitigate the impact of a failed screen" are:[119]

- Replacing a fixed capacitor bank with a switched capacitor bank
- Adjustment of line regulation settings
- Simple reconfiguration of the distribution circuit

The above language from Rule 21 gives us a foundation to delineate between low-cost mitigation and grid upgrades. We, however, also consider other proceedings to define, and give guidance on what constitutes "low-cost mitigations" and "upgrades" for the purposes of the LGP-option.

The General Rate Cases (GRC) allow cost recovery to the Large IOUs for daily operations expense and delineates between (a) maintenance functions as part of normal distribution system operations and daily operations expense, and (b) upgrade functions involving new capital expenditure associated with forecasting, planning, modernization, and improvement of electric distribution infrastructure.[120]

The GRCs' delineation between maintenance and upgrade functions is consistent with our finding that low-cost mitigations are consistent with maintenance functions and daily operation expenses. As such, current utility practice dictates that they should be paid for by ratepayers and not the LGP customer.

In a 2018 study of the costs of distribution system mitigations and upgrades in relation to distribution system hosting capacity of distributed generation, the National Renewable Energy Laboratory (NREL) found: [121]

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[119] See, e.g., PG&E Rule 21 sheet 152, effective 2/16/2023.
[120] *See*, *e.g.*, PG&E's 2023 GRC Testimony, PG&E-4, Chapter 17, Electric Distribution Capacity, Engineering and Planning. PG&E TY 2023 GRC, Application 21-06-021, Filed on 6/30/2021.
[121] NREL 2018. The Cost of Distribution System Upgrades to Accommodate Increasing Penetrations of Distributed Photovoltaic Systems on Real Feeders in the United States, by Kelsey A. W. Horowitz, Fei Ding, Barry Mather, and Bryan Palmintier. NREL/TP-6A20-70710, available at https://www.nrel.gov/docs/fy18osti/70710.pdf.

> In general, voltage violations were relatively low-cost to mitigate by using advanced inverters, and then adding line voltage regulators or capacitors and/or adjusting the set points of existing voltage regulating equipment…. Upgrades to mitigate thermal overloads, including reconductoring or replacement of transformers, are generally expensive.[122]

We note that the LGP configuration analyses presented by the Large IOUs in response to the Energy Division Data Request show that ICA-SG violations for 24-value LGP configurations are primarily voltage-related, and that load reductions and hence export reductions will be de minimis in many cases. That is, voltage-related violations are more likely to require no mitigations or only low-cost mitigations. (See Disposition #20 on Resolution E-5230 Topic F for more details.)

For the purposes of the LGP option, we draw from the above sources to modify the definition of "low-cost mitigation" put forth by the Large IOUs and adopt the following delineation between "low-cost mitigations" and "grid upgrades:"

Low-Cost Mitigations are:

- Routine or minor in nature and have historically been performed on the order of days, weeks, or a few months for design, procurement, and construction.
- Efforts that can be classified in the GRC as maintenance functions that are part of ordinary distribution system operations.[123]
- Expected to cost in the range of thousands or tens of thousands of dollars. (These dollar figures shall serve as a general guideline)
- Items defined in the Joint January LGP AL, noting that the list is "non-exhaustive given that the availability and feasibility of low-cost mitigation measures are highly dependent on the specific circumstances giving rise to the reduction in LGP exports and the output of non-LGP generating facilities."[124]
- Items that are called out in Rule 21 as "solutions that may be available to mitigate the impact of a failed screen."[125]

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[122] Ibid at vi.
[123] *See for example* PG&E's 2023 GRC Testimony, PG&E-4, Chapter 7, Distribution System Operations.
[124] Joint January LGP AL at 7.
[125] *See, e.g.,* PG&E Rule 21, Sheet 138, effective 2/16/2023.

Grid Upgrades:

- Require significantly longer design, procurement and construction times than low-cost mitigations, on the order of several months or multiple years.
- Require capital equipment expenditures on the order of hundreds of thousands or millions of dollars.
- Normally include such items as primary line reconductoring, substation transformer replacement, and protective equipment replacement.
- May include measures to address excess generation on a feeder, such as in-front-of-the-meter storage, or installing or upgrading infrastructure to route excess generation to areas of higher or new demand such as transportation electrification.
- Are those that can be classified in the GRC as DER interconnections funded by the interconnection applicants and associated with grid changes required by new generation at the time of interconnection application.[126]

In disposing of this issue, we find the IOU proposal around low-cost mitigations reasonable but extend it according to our definition above. Given the information presented above by NREL and the response by the Large IOUs to Energy Division's Data Request (See Discussion Background on Resolution E-5230 Topic F), we also find that low-cost mitigations will likely be sufficient in the large majority of curtailment cases to partially or fully restore curtailed LGP values.

Current practice assures that grid upgrade costs are recovered from ratepayers for any circumstances arising after an interconnection agreement has been executed. We assert that the proper venue for any changes to this practice is Phase II of proceeding R.17-07-007 (on cost responsibility). We are mindful of the fact, however, that one purpose of the LGP option is to avoid grid upgrades. We find that, in the specific event of sustained load reductions causing curtailment of an LGP facility, there is a lack of evidence to support the view that grid upgrades beyond low-cost mitigations will be required to restore the LGP facility curtailment. And we refer back to statements in

[126] *See for example* PG&E Test Year 2023 GRC, Application 21-06-021.Filed on 6/30/2021. PG&E Testimony, PG&E-4, Chapter 17, Electric Distribution Capacity, Engineering and Planning.

Disposition #3 on disparate treatment: there is a lack of evidence that over the past five years any sustained load reductions have caused violations needing to be mitigated.

Nevertheless, we find that there should be some mechanism or option(s) for IOUs to safeguard ratepayer interests against unreasonable costs of upgrades. We take note of IREC and the other Alternate Proposal Parties' proposal for a "trial period" after which re-evaluation could occur[127], and modify this idea to set a 10% threshold for upgrades that might warrant re-evaluation. We also take note of the existing Rule 21 tariff deviation option.

In summary, we find the utility shall pay for any low-cost mitigations, as defined in this section, that are required to fully restore curtailed LGP export values to those specified in the interconnection agreement, consistent with normal utility practices and consistent with the cost principles from the GRCs that such low-cost mitigations are covered through normal operations and maintenance budgets.

We find that grid upgrades required to fully restore curtailed LGP export values shall also be paid by the utility, but based on the available evidence, we expect required grid upgrades to be rare and that most curtailments can be addressed through low-cost mitigations. Given that one intention of the LGP option is to avoid grid upgrades, however, we also adopt two additional provisions to safeguard ratepayer interests:

(1) In case of exceptional circumstances where grid upgrades would be required to restore curtailed export values of an LGP facility, the Large IOUs may, under existing Commission rules, apply for a tariff deviation if they believe that undertaking an upgrade is not a reasonable use of ratepayer funds or is unreasonably costly in a particular case. In the case of an approved tariff deviation, permanent curtailment of the LGP facility could result.

(2) The Large IOUs may submit an advice letter proposing reconsideration of these findings on cost responsibility if, during the first three years of the LGP option being effective, cumulatively more than 10% of actual LGP facility curtailments, due

[127] Alternate Proposal (Appendix A of Joint January LGP AL) at 7.

strictly to the LGP-specific circumstance of sustained load reductions, have required grid upgrades to restore curtailed LGP export values.

Disposition #5: Cost Causation Principles Are Not Changed

We affirm that cost causation principles are not changed. Indeed, any changes are outside the scope of a resolution and must be addressed within a formal proceeding.

We uphold the existing cost causation principle, that the costs of any mitigations or upgrades required subsequent to the execution of an interconnection agreement be borne by ratepayers for all generating facilities. It is the Commission's policy to determine costs are just and reasonable (Cal. Pub. Util. Code § 451). So far, sufficient rationale has not been provided that any costs to ratepayers associated with the LGP option will be an undue burden on ratepayers.

Any changes to cost causation proposed by the Large IOUs and non-IOU parties are more appropriate for Phase II of R.17-07-007, the ratemaking phase. In arriving at this opinion, we rely on GO 96-B and the scope of issues for Phase II of R.17-07-007.

Per GO 96-B Section 5.1 "The advice letter process provides a quick and simplified review of the types of utility requests that are expected neither to be controversial nor to raise important policy questions. The advice letter process does not provide for an evidentiary hearing; a matter that requires an evidentiary hearing may be considered only in a formal proceeding."[128] Thus, the topic of cost-responsibility is not appropriately subject to disposition via the AL resolution process.

Additionally, R.17-07-007 has already scoped cost-recovery issues. Specifically, the scoping memo states agreement with SCE "that discussion in this proceeding is warranted regarding potential funding for implementation costs and cost recovery."[129] And that "due to the overlap of the issue of cost sharing of distribution upgrade costs across several issues listed above, Phase II will address the issue of cost sharing of

[128] General Order 96-B, at 8.
[129] R.17-07-007 at 4.

distribution upgrade costs, in general."[130] The R.17-07-007 scoping memo has adopted these issues to be determined in Phase II as follows:

- [Issue 3] What are the infrastructure and costs necessary to implement the Utilities' counter proposal for Issue 9 regarding Limited Generation Profile (adopted in D.20-09-035)? Are these costs reasonable? How should upgrade costs be treated in the event a circuit's hosting capacity is exhausted by developers using the Limited Generation Profile of Issue 9?[131]
- [Issue 12] How should the Commission address cost sharing of distribution upgrade costs in general?[132]

We uphold the existing cost causation principle, that the costs of any mitigations or upgrades required subsequent to the execution of an interconnection agreement be borne by ratepayers for all generating facilities. Phase II of the R.17-07-007 proceeding may determine alternative cost-responsibility principles.

Disposition #6: Magnitude of Curtailment and Rule 21 Tariff Language Changes

Decision 20-09-035 allowed for curtailment of LGP facilities down to the minimum ICA-SG value identified at the time of the Interconnection Application.[133] The Large IOUs propose to memorialize this curtailment provision in Rule 21 Section D.9 as follows:

> For Generating Facilities approved to utilize Limited Generation Profiles, Producer acknowledges that future grid conditions could result in actual hosting capacity being below the published ICA-SG value identified at the time of the Interconnection Application and that Distribution Provider may need to reduce generation to ensure safe and reliable service. Accordingly, if necessary to maintain safe and reliable operation of Distribution Provider's Distribution or Transmission System, Distribution Provider may reduce the approved Limited

[130] Ibid at 8.
[131] Ibid at 9.
[132] Ibid at 10.
[133] D.20-09-035 at 60.

> Generation Profile level to the lowest ICA-SG value identified at the time of the Interconnection Application.
>
> If the Distribution Provider must limit the operation of a Producer's Generating Facility to a level that is below the lowest ICA-SG value in effect at the time of the Interconnection Application to maintain safe and reliable operation of Distribution Provider's Distribution or Transmission System, then Distribution Provider shall implement measures – in accordance with Distribution Provider's practices for design and construction –to restore operation of Producer's Generating Facility to, at a minimum, the lowest ICA-SG value identified at the time of the Interconnection Application.[134]

The Large IOUs also propose to include in the Rule 21 language that "This reduction could be temporary or permanent."[135] The Large IOUs also state:

> As set forth in the Resolution, the Utilities will not request curtailment of LGP exports in excess of the amount required to preserve safety and reliability. Any reductions will be justified by the Utilities when providing notices to customers with LGP generating facilities.[136]

Both IREC and Cal Advocates argue that the proposed Rule 21 language should be rejected, and that the existing Section D.9 is adequate to cover LGP facilities. They argue any added language to Section D.9 is unnecessary, and that the proposed language is overly broad and does not provide "specifics on when curtailment would occur beyond 'future grid conditions.'"[137]

As a minor point, IREC recommends that if any tariff change is adopted, it should be numbered "in accordance with the format used in … Rule 21 (i.e., current section D.9 should be identified as D.9.a and the new section should be numbered D.9.b)."[138] We agree with this point.

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[134] Joint January LGP AL, at 10.
[135] Ibid at 10.
[136] Joint January LGP AL at 4.
[137] IREC protest to Joint January LGP AL at 4; and Cal Advocates protest to Joint January LGP AL at 7.
[138] IREC protest to Joint January LGP AL at 4.

Regarding reductions being temporary or permanent, we find that that current practice assures that any reduction is temporary, until mitigations or grid upgrades can be performed. We note that Disposition #1 above has already addressed the second paragraph of the Large IOUs proposed Rule 21 language, on business-as-usual temporary curtailments to maintain safe and reliable operation, and find that such added language is not required. We note that the issue of disparate treatment related to any curtailment of an LGP facility that is due to sustained load reduction, as well as the issue of cost responsibility, have both been discussed in Dispositions #3 and #4.

Regarding the need to add Rule 21 language specific to the LGP option related to the magnitude of curtailment, we disagree with IREC that no additional Rule 21 language is required. We conclude that new additional language is required for Section D.9, to address the additional circumstances under which an LGP facility can be curtailed, consistent with our findings in Disposition #2 on those circumstances being limited to sustained load reduction. We agree with IREC that the tariff language proposed by the Large IOUs does not provide specifics on when curtailment would occur.

As previously stated, D.20-09-035 allows extended or permanent curtailment of an LGP facility down to the lowest ICA-SG value. In this circumstance we note there is also the question of what further curtailment(s) are required on a circuit if curtailment of an LGP facility down to the lowest ICA-SG value is insufficient to ensure safety and reliability. We find that in such cases the utility is already allowed to curtail any interconnection customer to any level, which in its judgement best ensures safety and reliability, in accordance with existing Rule 21 Section D.9.

We modify the Large IOUs proposed Rule 21 language to read as follows:

> *D.9.a. [No change to existing text of Section D.9, just renumbered]*
>
> *D.9.b. For Generating Facilities approved to utilize Limited Generation Profiles, Producer acknowledges that if a sustained load reduction should occur on the circuit to which an LGP facility is interconnected, such that the circuit's hosting capacity is reduced, that Distribution Provider may need to reduce generation to ensure safe and reliable service. Accordingly, if necessary to maintain safe and reliable operation of Distribution Provider's Distribution or Transmission System, Distribution Provider may temporarily reduce the approved Limited Generation Profile level to the lowest ICA-*

> *SG value identified at the time of the Interconnection Application, or to any other level that the Distribution Provider determines is required to ensure safety and reliability in accordance with Section D.9.a. Distribution Provider will undertake any required mitigations or upgrades to allow the Limited Generation Profile level to be restored to the approved level in the facility's Generator Interconnection Agreement.*

And under the definitions section in Rule 21, a definition for "sustained load reduction" shall be added:

> *A sustained load reduction on a circuit is a permanent decrease in the load of one or more customers on that circuit resulting from business wind-downs and/or the unanticipated addition of energy efficiency or other load management technologies.*

Disposition #7: Procedure and Steps for LGP Curtailment

Resolution E-5211 ordered discussion of the process for curtailing LGP facilities when identified circumstances require curtailment. These circumstances were identified and defined in Disposition #1 (for business-as-usual practice) and Disposition #2 (for practices specific to LGP facilities).

The Large IOUs propose the procedure and steps for curtailing an LGP facility given in Appendix C. These steps first have the utility identify any low-cost mitigations that may partially or fully restore curtailment, then undertake to study whether upgrades are required. Based on study results, the utility will either undertake the upgrades at its own expense to restore curtailment to the minimum ICA-SG value at the time of the original interconnection application, or if curtailment is already above that value, ask the LGP customer if the customer is willing to pay for the upgrades required to restore full LGP values given in the interconnection agreement.

IREC expresses concerns about the Large IOUs proposal and notes the IOUs have not proposed tariff language or provided timelines for how long these three steps will take. IREC states "the Commission should ensure that the steps are well defined, with reasonably efficient timelines specified for the utility's review process, and that it is

documented in Rule 21, a Commission approved LGP agreement, or another document."[139]

We accept Steps 1 and 2 of the Large IOUs proposed procedure for LGP facility curtailment, but modify Step 3, with modified language as provided in Appendix C, to be consistent with Disposition #4 on cost responsibility.

Disposition #8: Data Monitoring and Reporting of LGP Facility Curtailments

Both D.20-09-035 and Resolution E-5211 did not contemplate or discuss data monitoring and reporting. However, we find merit in requiring some modest data tracking and reporting requirements on curtailments, to inform possible future refinements to the LGP option, including on the issues of disparate treatment, cost responsibility, and impacts on ratepayers.

IREC and the other Alternate Proposal parties propose that:

> [The Large IOUs] should be required to track and provide documentation of all mitigations or system modifications that it believes are necessary due to [sustained] reductions in load (regardless of whether an LGP project exists or not). By tracking this data, the Commission can revisit its policy regarding distribution upgrades caused by reductions in load with more information in the future.[140]

IREC independently stresses the Commission's need to better understand the frequency of occurrence of sustained load reductions, the drivers, if they pose safety and reliability issues unique to LGP projects, and the associated costs of upgrades. IREC states the Commission would then have:

> A better ability to determine how the risks, and associated costs, should be allocated. IREC's central concern with the IOU proposal is that it will likely result

[139] IREC protest to Joint January LGP AL at 6.
[140] Alternate Proposal (Appendix A of Joint January LGP AL) at 5.

> in no LGP projects being built, and thus provide no opportunity to learn from and refine the cost responsibility rules accordingly.[141]

The proposed data in the Alternate Proposal for monitoring and reporting is provided in Appendix D, along with point-by-point responses by the Large IOUs. This data focused on all mitigations taken across the entire utility system in response to sustained load reduction, and includes how the need for mitigations was identified, the cost of mitigation, the time taken to implement the mitigation, details on all generation facilities on the circuit, whether an LGP facility is located on the circuit, information on that LGP facility, and whether curtailment of that LGP facility would have avoided the need for mitigation, whether any other projects have interconnected to the circuit subsequent to the LGP projects, and the load profile in existence at the time the LGP project applied for interconnection.

The Alternate Proposal also requires tracking of all feeders across the entire utility system in terms of how many feeders have LGP facilities, how many feeders have only non-LGP facilities, and how many feeders have both types of facilities. Finally, the proposal includes the provision that "if after 8 years of tracking and reporting, no IOU has identified ten or more of the mitigations or modifications described above, the reporting requirement shall be terminated and the trial period for the LGP considered complete."[142]

The Large IOUs argue that the proposed data is burdensome and unsupported by the Decision. They respond to some specific items in the proposal by saying that some data may be available but reporting processes do not exist, and that needed tracking systems do not exist. They state:

> The Alternate Proposal states that the Utilities "should be required to track and provide documentation of all mitigations or system modifications that it believes are necessary due to reductions in load (regardless of whether an LGP project exists or not)." There are tens of thousands of distribution circuits across the Utilities' distribution service territories and the number of load customers is in the millions (residential, commercial, industrial, agricultural and other

[141] IREC protest to Joint January LGP AL at 10.
[142] Alternate Proposal (Appendix A of Joint January LGP AL) at 7.

> categories). Developing a system to track mitigations/system modifications due to reductions in load "regardless of whether an LGP project exists on the circuit" is a significant undertaking.[143]

In response to a Cal Advocates' assertion that the burden is rendered smaller by the fact that "the likelihood of extended curtailments of LGP projects is low,"[144] the Large IOUs reply that:

> Tracking extended LGP project curtailments would require new systems to be built at considerable expense… The number of extended curtailments has no bearing on whether new tools and systems would have to be built at considerable expense to implement the Alternate Proposal. Whether the Joint Utilities have to track one curtailment or hundreds, the same tools must be built. The associated expenses will be borne by ratepayers.[145]

The Large IOUs do not support the Alternate Proposal because "[it] would require extensive reporting with no corresponding value."[146] They argue several points in opposition to the proposal:

> 1. They may not know immediately if a safety/reliability event causing reduction in export power is caused by load loss and contend:
>
> > The Alternate Proposal is practically asking the Utilities to track and provide documentation of mitigation or system modifications associated with every safety or reliability event. Such an unreasonable ask will add unnecessary administrative overhead to Utilities' operational responses in these events, which typically are time sensitive. In addition, the distribution system is highly dynamic in nature. The Joint Utilities' Distribution System Operations groups respond to and manage hundreds of system modifications on a daily basis to maintain safe and reliable

[143] SCE, Joint Utilities' Reply to Cal Advocates Protest of Supplement to Joint January LGP AL, at 4.
[144] Cal Advocates Protest of Supplement to Joint January LGP AL, at 4.
[145] Ibid at 4.
[146] Ibid at 7.

> service. It would be extremely cumbersome to document and track each of these jobs to the level of detail contemplated by the Alternate Proposal.[147]
>
> 2. That the data reporting and collection is outside the Large IOUs' normal course of business—The Large IOUs oppose the Alternate Proposal arguing "it exposes ratepayers to costs that the Commission decision does not require ratepayers to bear, and therefore do not see any benefit in the data tracking included in the Alternate Proposal"[148] and argue it "would require extensive data reporting above and beyond these operational requirements, and this reporting would extend for eight years."[149]
>
> 3. That there are no existing processes … to link mitigations or modifications, and their associated costs, to specific instances of load reduction. Moreover, any tracking and reporting on "mitigations or modifications" should be limited to significant modifications (e.g., equipment replacement), and should not address system modifications or low-cost mitigation alternatives, including those that are part of the utilities' day-to-day operational activities[150]

The Large IOUs do acknowledge that they will track certain data as part of their normal business practices and give the following examples:[151]

- Enhance the interconnection portals to allow interconnecting generators to elect the LGP-option;
- Track issues such as whether the LGP customer is complying with its LGP or if it needs to be curtailed for safety and/or reliability reasons.

IREC, in response to the Large IOUs' comment that the data requirements in the Alternate Proposal are burdensome, points out that the Large IOUs have not identified what data will be used to determine LGP curtailment. IREC further argues that the Large IOUs "continue to resist data collection that would help demonstrate whether

[147] Ibid at 4.
[148] Ibid at 5.
[149] Ibid at 5.
[150] Ibid at 5.
[151] Ibid at 5.

their assumption [of the likelihood that distribution system violations caused by loss of load will arise because of an LGP project] is correct or not."[152]

We reject the data monitoring and reporting proposal by IREC and the other Alternate Proposal parties. We agree with the Large IOUs that such system-wide and comprehensive data, going well beyond data on LGP project curtailments, is burdensome and costly. IREC and other Alternative Proposal parties have not sufficiently justified how these requirements would advance the LGP process and also appear to go well beyond what might usefully refine the LGP process. Finally, the requirements were only proposed after all workshops were completed and thus were not vetted through the workshop discussions.

Nevertheless, and while data reporting requirements were not contemplated in the original Decision, we find merit in requiring some data tracking and reporting requirements to inform future refinements to the LGP option. IREC and the other Alternate Proposal parties argue that data monitoring and reporting is needed to assess the risks associated with curtailment and the overall value of the LGP option[153] and we find that modest monitoring and reporting could accomplish those goals.

The purpose of the data monitoring and reporting requirements we adopt is to identify whether load reductions and impacts to LGP customers (i.e., export power curtailment) are actually *de minimis* or pose safety and reliability concerns in real-world application of the LGP option. Also, the purpose is to determine the impact of curtailments on power export as well as to determine the extent to which low-cost mitigations or upgrades can effectively restore partial or full LGP values after curtailment.

We adopt the five data monitoring and reporting requirements given in Appendix E, to apply only to each LGP interconnection customer whose LGP values have been curtailed due to sustained load reductions on the circuit. These requirements apply to any such curtailment at any time after the Interconnection Agreement has been signed, regardless of how long the curtailment lasted and whether the curtailment remains in effect.

[152] IREC protest to Joint January LGP AL at 8.
[153] Alternate Proposal (Attachment A of Joint January LGP Advice Letter), at 7-8.

C. Discussion Background on Resolution E-5230 Topics B through E

Resolution E-5230 addressed a number of topics on implementing the LGP option. For most of these topics, consensus was achieved between the Large IOUs and non-IOU parties during workshop discussions and then reflected in the Joint May 2023 LGP Advice Letters.[154] The Large IOUs' proposals for Topics B through E are largely or wholly adopted, with modifications as noted in the sections below.

Decision 20-09-035 OP 15 required the Large IOUs to provide recommendations (as applicable) regarding the standard review, certification requirements, and interconnection processes necessary for implementation of the LGP proposal.[155] We find this requirement is satisfied as these topics are addressed in the Joint May LGP Advice Letters. Those recommendations and their disposition are the subject of the sections below on Topics B through E.

Disposition #9: Quarterly Reporting (E-5230 Topic B, Issue 1)

Resolution E-5230 found that quarterly reporting of LGP facilities is not required. The Resolution states "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."[156] Resolution E-5230 directed the Large IOUs to finalize details and tariff language during the ordered workshops.

There was consensus on the proposed Large IOUs language with one modification. The Large IOUs propose the following:

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[154] The memorializing of sub-issue discussions is ordered by Resolution E-5230 Ordering Paragraph 3: "Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to submit subsequent Tier 3 Advice Letters by May 1, 2023. The Advice Letters should contain all material articulated in the Discussion section of this Resolution, including the approved sections of their proposals and any modifications warranted for those steps as discussed in this Resolution."

[155] OP 16 ordered the Large IOUs in their advice letters to include a description of how the Large IOUs will implement OP 15.

[156] Resolution E-5230, at 13.

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

And the Large IOUs propose to add the following language to section J.5 of Rule 21:

> For Generating Facilities with a Limited Generation Profile attached to their Generator Interconnection Agreement, if AMI [Advanced Metering Infrastructure] is not available, or Customer opts out, telemetry at the point of common coupling will be required at the Producer's expense.[157]

IREC agrees with the Large IOUs language but suggests "that in the proposed language for section J.5, it is advisable that the word "telemetry" be replaced with "Telemetering equipment" defined term used in Rule 21 and elsewhere in that section."[158]

We agree with the Large IOUs language and IREC's edit, and adopt the following addition to Section J.5 of Rule 21 (added in Appendix B):

> *For Generating Facilities with a Limited Generation Profile attached to their Generator Interconnection Agreement, if AMI [Advanced Metering Infrastructure] is not available, or Customer opts out, telemetering equipment at the point of common coupling will be required at the Producer's expense.*

Disposition #10: Use of Gross Nameplate Rating in Initial Review (E-5230 Topic B, Issue 2)

Resolution E-5230 directed the Large IOUs to further discuss, and justify, the use of gross nameplate for Rule 21 screens. Resolution E-5230 specified that should the IOUs continue to propose the use of gross nameplate for screens D, I, J, and K, the IOUs were

[157] Joint May LGP AL at 6.
[158] IREC Protest to Joint May LGP AL, at 3-4.

to discuss the proposal at workshops and in their subsequent AL—the Joint May LGP AL. Resolution E-5230 Section B Issue 2 states:

> 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 in unclear how screens D, I, J, and K will be studied, discussions regarding these screens should continue within the workshop discussions. … the Large IOUs are directed to fully justify their arguments.[159]

General consensus among parties was reached on use of Gross Nameplate Rating in the Rule 21 Initial Review screens. Consensus was not reached on the use of Gross Nameplate Rating in Screens N, O, and P during Supplemental Review, which we discuss in Disposition #11. In summary, the following was agreed or uncontested for Initial Review:

- Screens F, F1, G, and H: Gross Nameplate Rating will be used;
- Screen P: Gross Nameplate Rating will be used solely for aspects involving fault current calculations;
- Screens D, J, K, M, N, and O: Gross Nameplate Rating will not be used.

We note for the above agreed use of Gross Nameplate Rating:

- Screens F, F1, G, and H: the Large IOUs proposal was uncontested.
- Screen P: the Large IOUs justified use of Gross Nameplate Rating for aspects involving fault current calculation to ensure safety and reliability should the Generating Facility's PCS fail and begin to export at Gross Nameplate Rating higher than the maximum LGP value.
- Screens D, J, K, M, N, O, and P: we find that the Large IOUs have complied with the directive in Resolution E-5230 on Section B Issue 2, in that Gross Nameplate

[159] Resolution E-5230 at 16.

Rating is not to be utilized in any other screens and thus further justification for use of Gross Nameplate Rating is no longer necessary.

We adopt the following use of Gross Nameplate Rating in Initial Review: Screens F, F1, G, and H: Gross Nameplate Rating will be used; Screen P: Gross Nameplate Rating will be used solely for aspects involving fault current calculations; Screens D, J, K, M, N, and O: Gross Nameplate Rating will not be used.

Disposition #11: Use of Gross Nameplate Rating in Supplemental Review (E-5230 Topic B, Issue 2).

The Large IOUs propose the following procedure for Supplemental Review and use of Gross Nameplate Rating in Supplemental review:[160]

If the Initial Review fails due to the LGP values requested by the Customer in its interconnection application exceeding 90% of ICA SG Profile for any hour, the project will fail Screen M /Initial Review. The Customer will be notified of Initial Review failure and offered an Optional Results Meeting. 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, the Customer must provide updated LGP values within 5 business days:

- Reduction at each hour of the updated LGP values must comply with Rule 21 Table F.1. Each hour may not be reduced by more than 20% of the original request.
- If IOU determines that the ICA results are outdated and the project would fail Screen M based on the updated ICA results, the Customer will be allowed to update their proposed LGP values with no restrictions on the amount of reduction.
- Where reduction of LGP impacts other failed screens (such screen D), the cost and time for the restudy will be based on Rule 21 Table F.1.
- Increases in generator size, i.e., increases in generator nameplate or LGP values, are not allowed under Fast Track.

[160] Joint May LGP AL at 9.

> Updated LGP values must be provided 5 business days after Optional Initial Review Results Meeting. If the IOU's do not receive the updated LGP within 5 business days, and the project proceeds to Supplemental Review as per Rule 21, section F.2.c., the project would be studied using the generator nameplate capability for Screen N and applicable portions of Screens O and P.

The Large IOUs argue that any LGP interconnection application with LGP values exceeding 90% of ICA-SG values must either be revised or must proceed to Supplemental Review using the Generator Nameplate Rating. They reiterate that the requirement of the LGP option is for it to be at or below 90% of ICA-SG values, and allowing projects that have an LGP that exceeds 90% of the ICA-SG values is counter to the intent of the LGP option.[161]

IREC protests the Large IOUs proposal and provides a counter-proposal that all LGP interconnection applications proceed to Supplemental Review and be analyzed using LGP values, regardless of whether LGP values exceed 90% ICA-SG values. IREC proposes that if the LGP profile contains one or more LGP values that exceed the 90% of the most up-to-date ICA-SG profile, the IOUs should perform a load flow analysis for the hours that exceeded the 90% ICA-SG.[162]

IREC states "There is nothing in the Decision or in the Resolutions which indicate that an LGP project should be prevented from taking full advantage of supplemental review. As such, IREC protests this unjust and unreasonable proposal"[163] for two reasons: (a) that it seems unlikely that a project that proposed an LGP would be inclined to switch to being a full export project; (b) that Screen N in Supplemental Review requires that if voltage is a prevailing constraint, the utility must conduct a power flow analysis that evaluates whether "the full range of smart inverter functions including the volt/var function" eliminate the constraint."[164]

[161] Ibid at 10.
[162] IREC Protest to the Joint May LGP AL at 8; SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 5-6.
[163] IREC Protest to the Joint May LGP AL at 8.
[164] Ibid at 8.

In response to IREC's protest and counter-proposal, the Large IOUs argue their position as follows:[165]

> Allowing a project that intentionally chooses not to abide by the limits to continue to Supplemental Review with its LGP unchanged is counter to the goal of streamlining the generator interconnection process. For this reason, the Joint Utilities request that the Commission dismiss IREC's proclamation that the Joint Utilities' approach is "unjust" and "unreasonable."
>
> As discussed at LGP Workshop 4, and generally acknowledged by IREC itself, it takes significantly more computational effort and time to perform time-series power flow analysis to address each constraint violation associated with a proposed LGP schedule. For example, if the interconnecting generator submitted LGP values that exceeded 90% of the ICA Static Grid results (incorrect values), and chose not to update the incorrect values, the interconnection engineer would need to perform power flow analysis for all hours having incorrect values. If criteria violations were identified for any of the incorrect values, the interconnection engineer would then need to evaluate the appropriate mitigation and re-run the power flow analysis for those hours. This cycle would repeat until the appropriate mitigation is identified.
>
> Even if only a small number of LGP values exceeded 90% of ICA Static Grid results, the amount of analysis required would exceed that of a typical interconnection study. This is a problem, especially considering the much tighter interconnection process timelines that apply to Fast Track interconnections. IREC's approach defeats the purpose of having a streamlined interconnection process and will almost certainly lead to delays that further challenge the utilities' ability to meet established deadlines.

We find that the Large IOUs make a compelling argument on the difficulties of implementing IREC's proposed approach. We agree with the Large IOUs that allowing projects that have an LGP that exceeds 90% of the ICA-SG values is counter to the intent of the LGP option.

[165] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 5-6.

We adopt the Large IOUs proposal without modification—projects with LGP values exceeding the 90% ICA-SG values must either revise the LGP or proceed to Supplemental Review to be studied using the generator Gross Nameplate Rating.

Disposition #12: Tariff Language and New Mm5 Option 12 (E-5230 Topic B, Issue 2)

Based on the discussions for use of Generator Nameplate Rating and modifications to Rule 21 Tariff language as discussed in Dispositions #10 and #11, the Large IOUs propose edits to the Rule 21 Tariff that were also discussed by the non-IOU parties in the workshops and commented upon in their protests.

The Large IOUs propose to add a 12th option under Section Mm5 for Screen I to provide better clarity and minimize the number of required tariff revisions.[166] All parties agreed on this approach.

IREC proposes several redlines to the Large IOUs proposal for this 12th option,[167] two of which the Large IOUs agreed with, as discussed below. In relation to the Tariff language, IREC also disagrees with language on use of Generator Nameplate Rating in Supplemental Review, which is discussed in Disposition #11. Based on Disposition #11 we find no language changes are required related to Supplemental Review. The two IREC proposals that we adopt are as follows:

1. IREC proposes adding "according to a set schedule" after "generator nameplate" in the first paragraph.[168] The Large IOUs agree and the language is modified to read:

> 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 generator nameplate rating according to a set schedule. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

[166] Joint May LGP AL at 8-9.
[167] IREC Protest to the Joint May LGP AL at 5-7.
[168] IREC Protest to the Joint May LGP AL at 5.

2. IREC notes an inconsistency in the language for Screen O applicability in two different parts of the Large IOUs proposal; the Large IOUs agree and made the necessary correction. The correction made is: "Screen O: Use ~~the requested LGP values~~ the maximum LGP value."[169]

IREC also makes four proposals for language changes that we reject:

1. IREC proposes adding a reference in Screen I to the newly proposed LGP option, which the Large IOUs initially agreed with, but later stated that the entire "Mm5 – Option 12" language, including its title, should be located within Section Mm5, thus making a reference to Section Mm5 redundant.

2. IREC proposes modifying the first minimum requirement to read: "Use a PCS that is certified to the UL 1741 Supplement SE.[170] The Nationally Recognized Testing Lab (NRTL) evaluation must have determined that the PCS conforms to the export limiting scheduling functionality.[171] We agree with the Large IOUs that this requirement should be finalized only after PCS standards have been incorporated into UL 1741 revisions.

3. IREC proposes adding one additional minimum requirement: "Use a PCS that is certified to implement the schedule configuration requested in the Interconnection Request."[172] The Large IOUs do not believe that this added minimum requirement is necessary. They state that given this section describes the minimum requirements of the PCS, its unnecessary to reference the "schedule configuration." The Large IOUs note that the PCS needs to implement a "schedule" per the LGP attachment to the "Interconnection Agreement," not a "schedule configuration" per the "Interconnection Request."[173] Thus, we reject the IREC proposed additional minimum requirement.

4. IREC proposes that Rule 21 should also describe how screens will be applied for other acceptable (non-PCS) export control options, including relays with automation controllers, and proposes adding an additional Option 13 and Mm6 for the relay with

[169] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 5.
[170] UL 1741 Supplement SE is a forthcoming certification standard for Power Control Systems (PCS).
[171] IREC Protest to the Joint May LGP AL at 6.
[172] IREC Protest to the Joint May LGP AL at 6.
[173] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 3.

automation controller option.[174] We reject adding language on relay with automation controller into Rule 21 Tariff language and discuss this issue further in Disposition #14 on Use of Non-Certified Devices.

Given the above accepted and rejected revisions to the Large IOUs proposed language for Mm5: Option 12, and also incorporating the findings from Dispositions #10 and #11 on use of Generator Nameplate Rating, we modify the final Rule 21 Tariff language for Mm5 Option 12 to be as provided in Appendix B.

We adopt the Rule 21 Tariff language for Section Mm5 – Option 12 as provided in Appendix B. We note, however, that after PCS standards have been incorporated into UL 1741 revisions, the Large IOUs may need to propose revised language.

Disposition #13: Reductions to Limited Generating Profiles (E-5230 Topic B, Issue 3)

Resolution E-5230 states that this topic was addressed in Resolution E-5211."[175]

We find no need for any disposition in relation to Resolution E-5230 and have already disposed of this topic in Dispositions #1 through #9 for Resolution E-5211.

Disposition #14: Use of Non-Certified Devices for LGP by Mutual Agreement (E-5230 Topic B, Issue 4)

Resolution E-5230 found that the use of non-certified devices for LGP is not mandatory and is allowed by mutual agreement between the interconnection customer and the utility.[176] The use of non-certified devices was neither addressed in the Rule 21 Working Group Two Final Report nor in D.20-09-035.

One specific non-certified device option, relay with automation controller, was discussed in workshops and considered by the Large IOUs and other parties. IREC states there is concern about whether large generating facilities could make use of UL CRD PCS certified devices given the more complex design and configuration of those systems. IREC asserts that Rule 21 should also clearly describe how screens will be

[174] IREC Protest to the Joint May LGP AL at 11
[175] Joint May LGP AL at 10.
[176] Resolution E-5230 at 19

applied for other acceptable (non-PCS) export control options, including relays with automation controllers, a proposal we reject in Disposition #12.

The Large IOUs argue that this option is still untested and premature for inclusion in the Rule 21 Tariff, and note that this option is available by mutual agreement with the utility:

> Given that the relays and real-time automation controllers in this option will not go through certification testing to confirm the design and configuration would work, it is not possible to simply select a relay and a real-time automation controller from a list and have confidence they would immediately work with one another. Review of the equipment, and potentially complicated architecture and communication files, are necessary to ensure these types of equipment can be installed safely and function as intended on the distribution system. The creation of a list that includes "relay with real-time automation controller" options is not feasible and would be misleading to customers as there is no certainty these options would work. [177]

We find that sufficient consideration was given in the workshops to technical options allowing use of non-certified devices. We find that while there was consensus to utilize the option of relay with automation controller for larger generating facilities, we agree with the Large IOUs that this option is still premature, untested, and is already available by mutual agreement with the utility. Further, we find that the scheduling function for an automation controller is out-of-scope for this resolution because it does not involve use of smart inverter functionalities.

We therefore reject the proposal by IREC to add an Mm6 Option 13 to the Rule 21 Tariff for relay with automation controller and affirm that this option is available by mutual agreement with the utility.

Disposition #15: Alignment of the Timelines for OP 15 and OP 51 (E-5230 Topic B, Issue 5)

[177] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 6-7.

Resolution E-5230 found the timelines updating Rule 21 for OP 15 and OP 51 of D.20-09-035 have been aligned by mutual agreement.[178] The timing for updates to Rule 21 once PCS certification standards are approved shall be within 60 days, and implementation of the LGP option shall begin 9 months following approval of PCS certification standards.

IREC takes issue with these adopted timelines, stating that there is no need to wait. IREC re-states the Ordering Paragraphs:

> Ordering paragraph 15 indicates that Rule 21 shall be modified to allow applicants to propose an LGP within their application. Ordering paragraph 51, on the other hand, indicates that a proposal (A-B #3) related to export limiting according to a schedule, shall not be implemented "until nine months after the technical specifications standards, and a certification scheme for a Limited Generation Profile have been approved by the standards approving bodies."[179]

IREC notes that standards for the agreed option for LGP, a PCS certified by UL to control scheduling of export, is expected to be finalized by the end of 2023, and encourages the Commission to adopt a new timeline that allows the LGP to be effective as soon as Rule 21 tariff language is adopted, rather than the nine-month timeline established in Resolution E-5230.[180]

The Large IOUs, however, express concern with IREC's suggestion. They argue they will need time to perform certain functions to implement. These actions include developing business processes and training materials that implement what is approved; building and/or modifying online interconnection application portals and building infrastructure for customers to develop LGP profiles; implementing changes to interconnection application forms and interconnection agreements; and writing up new procedures and training employees on those procedures.

[178] Resolution E-5230 at 21-22.
[179] IREC Protest to Joint May LGP AL at 14.
[180] SDG&E, Joint IOU Reply to IREC Protest to Joint May LGP AL, at 7.

We find the Larger IOUs concern reasonable, and also note that the adopted data monitoring and reporting requirements of Disposition #8 have not been contemplated by the Large IOUs and will likely take some time to establish.

We find no cause to modify the timelines as set forth in Resolution E-5230.

Disposition #16: Publication of Technical Requirements (E-5230 Topic B, Issue 5)

Resolution E-5230 noted that PG&E and SCE committed to publishing technical requirements after real-world installations are performed.[181]

We support this commitment and direct the Large IOUs to discuss with the SIWG the need for publication of, and the specific technical requirements needed by, interconnection customers. Because the detailed requirements may change over time, we find it would be unduly burdensome to continuously update Rule 21, so such requirements shall be published on the Large IOUs Rule 21 interconnection web site, or otherwise appropriate web site, for developers to use as reference.

Disposition #17: Clarification of the Interconnection Process for LGP Projects (E-5230 Topic C)

Resolution E-5230 directed the Large IOUs to discuss the interconnection process proposals step-by-step over the course of the workshops and SIWG meetings.[182] We find the Large IOUs have complied with this requirement.

The Large IOUs summarize the workshop discussions and append the updated proposal as Appendix A to the Joint May LGP AL. The Large IOUs' Appendix A is copied in this Resolution as Appendix F. The Large IOUs state they discussed the interconnection process proposals step-by-step over the course of the workshops and SIWG meetings.

Appendix F gives details of the Large IOUs proposal for the phases and steps of the interconnection process, including customer preparation, interconnection request, technical evaluation, interconnection agreement and permission to operate, and

[181] Resolution E-5230 at 22.
[182] Resolution E-5230 Ordering Paragraphs 2 and 3.

operation performance phase. There was consensus on this proposal with the exception of IREC's proposals lodged as part of Topic B Issue 2 on Supplemental Review of LGP Projects and Topic B Issue 4 on the Use of Non-Certified Devices, both of which proposals by IREC are rejected in Dispositions #11 and #14. We therefore adopt in whole the Large IOUs proposal in Appendix F.

We adopt the Large IOUs process proposals given in Appendix F without modification.

Disposition #18: IOUs' Proposed Tariff and Process Proposal Language Alignment (E-5230 Topic D)

The Large IOUs have agreed on using consistent language in their tariff and process proposals and there were no protests or comments by other parties on this agreement.

We have reviewed the proposed process in Appendix F and confirm the Large IOUs utilize consistent language.

Disposition #19: Implementation of LGP Using Current Smart Inverter Functions (E-5230 Topic E)

Resolution E-5230 directed the Large IOUs to discuss the possibility and challenges with implementing the LGP-option before standards are approved, listing five requirements to be met to address this issue:[183]

> *1. To expedite the use of available hosting capacity it is prudent, for the Large IOUs to discuss any challenges to implement Issue 9 and Proposal A-B 3 using current smart inverter settings.*
>
> *2. The Large IOUs shall elaborate on challenges and concerns as stated in the Working Group Reports and discuss and propose solutions.*

[183] Resolution E-5230 at 33.

3. The Large IOUs shall determine which functional elements are already present in commercially available inverters, and which are not, to establish LGP functionality prior to the approval of standards.

4. Should implementation of Issue 9 and Proposal A-B 3 be feasible before approval of standards, the Large IOUs shall outline a clear process and the requirements, including technical, to be considered in the implementation of the LGP option.

5. The Large IOUs shall also establish a mechanism for validating proposed profiles. If the implementation of this mechanism is not feasible, the Large IOUs shall clearly articulate the reasons.

We find that the Large IOUs have complied with all five requirements.

In response to the first three requirements, the Large IOUs report on workshop discussions in their Joint May 2023 LGP Advice Letters. Several operational options and methods were considered in the discussions and provided in a summary table as "Methods A-G."[184]

Six of the seven presented methods provide ways to implement LGP using current smart inverter functions via a remote Common Smart Inverter Profile (CSIP)-certified gateway[185] or an inverter with a built-in CSIP-certified gateway. These six methods are not yet viable, however, according to the Large IOUs, as they claim the smart inverter industry is either not actively pursuing these options or that further validation and testing would be needed.

Only the seventh method (Method G), which employs a UL PCS with integrated schedule, was deemed viable and recommended by the Large IOUs. Implementation of this method must await the completion of a standard for UL PCS with integrated schedule. We expect that such a standard, which was originally targeted for the second half of 2023 but appears delayed, will still be completed in early 2024.

[184] Joint May LGP AL at 19.

[185] The SunSpec Common Smart Inverter Profile (CSIP) describes configuration requirements for an IEEE 2030.5 interface that meets CA Rule 21 smart inverter Phase 2 requirements. Rule 21 requires that Distributed Energy Resources within Investor-Owned Utilities must utilize the IEEE™ 2030.5-2018 networking standard in the manner described in the SunSpec CSIP.

The Large IOUs state that consensus has been achieved on Resolution E-5230 Topic E.[186] "IREC does not take issue with the Joint Utilities' proposal for this Topic, aside from reiterating IREC's concern with how the [Large IOUs] propose to conduct Supplemental Review and Screen N."[187] (A concern which is discussed in Disposition #11)

IREC believes that:

> Use of a Common Smart Inverter Profile (CSIP) enabled gateway may be a viable option for implementing a limited export schedule, but is comfortable proceeding with only the two options already discussed (a UL certified PCS and a relay with automation controller). As more experience is gained with the use of smart inverters and CSIP gateways, the Commission could consider expanding the list of options.[188]

We conclude that there was consensus on the seventh method (Method G) to employ a UL PCS with integrated schedule and that this method, along with relay with automation controller, are the only options fully viable at the present time.

We find the fourth requirement not applicable in view of the conclusion that there was consensus on the seventh method (Method G), and also in view of the rejection of the proposal to add relay with automation controller to the Rule 21 Tariff, as discussed in Disposition #14.

In response to the fifth requirement, the Large IOUs have proposed six steps to validate proposed LGPs in the absence of a standard.[189] Given the above conclusion that no solution to use smart inverter functions is fully viable at the present time, we find this proposal unnecessary.

We find that no options are, as yet, fully viable for utilizing current smart inverter functions in conjunction with a remote CSIP-certified gateway or CSIP-certified gateway integrated with a smart inverter. We find that LGP implementation must await the completion of a standard for UL PCS with integrated schedule.

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[186] Joint May LGP AL at 17.
[187] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 10.
[188] IREC Protest to the Joint May LGP AL at 16
[189] Joint May LGP AL at 18

D. Discussion Background on E-5230 Topic F Scheduling and Implementing More Than 12 LGP Values

Resolution E-5230 ordered discussion on the question of how many unique LGP values per year should be implemented and scheduled by LGP facilities. The number of unique LGP values and the time periods those values represent is called an "LGP configuration" (see terminology definitions following). The disposition of this question is ultimately a choice of which LGP configurations(s) to adopt for the LGP option. We first note that no prior determination on this question has been made. Resolution E-5230 stated:

> The Decision [D.20-09-35] 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... The Large IOUs are therefore directed to discuss the 288-hour format and how it may allow for more than one value per month. …. propose how implementation of more than one value per month may be accomplished to better take advantage of the available [hosting] capacity on a circuit to accomplish the goals of Issue 9.[190]

To address this topic, we must define some terminology as follows. Along with this terminology, Figures 3 through 8 in Appendix A provide graphical illustrations of four specific LGP configurations and an example ICA-SG violation.

LGP value. Each LGP value represents the maximum export limit of an LGP project for a specific hourly time period during a specific month or block of months. This export limit is 90% of the minimum ICA-Static Grid (ICA-SG) hourly value across all hours in that time period and across the entire month or block of months. That is, 90% of the single lowest ICA-SG hourly value considering all individual hours within the time period for any day of the given month or block of months.

LGP configuration. The number of unique LGP values per year together with the hourly time periods and months or blocks of months that each LGP value represents. An example configuration is "18-23-fixed," which represents one unique LGP value for the time period from 6pm to midnight during January, a second unique LGP value for the

[190] Resolution E-5230 at 34

time period midnight to 6pm during January, and 22 additional unique values for those same time periods during each of the other eleven months of the year – representing a total of 24 unique values.[191] A second example is "12-monthly", which represents one unique LGP value for all hours inclusive during January, and 11 other unique LGP values for all hours inclusive during each of the other 11 months of the year. Further details of specific LGP configurations are given in Table 2 in the following section.

Number of LGP values. The total number of unique LGP values per year that result from a given LGP configuration. As noted above, the 18-23-fixed configuration contains a total of 24 unique values. The maximum number of unique LGP values is 288. This provides for up to 24 unique values each month for up to 12 unique monthly periods.

ICA-SG value. Integration Capacity Analysis--Static Grid (ICA-SG) values are calculated to conservatively estimate the amount of generation that can be installed at a given location without any thermal, voltage, or protection violations occurring, not considering operational flexibility, at the time the ICA-SG calculations were performed. ICA-SG values consider line section load and identify the specific hour of the year in which generation has the most risk of causing such violations. An ICA-SG value represents the amount of generation able to export power to the grid at the worst-case hour of the year.

Calculated ICA-SG criteria violations. ICA-SG criteria violations (also called ICA-SG violations, ICA violations, or simply "violations") are violations calculated by comparing a first year of LGP values against ICA-SG data for a second year on the same line section. If the first-year LGP value for any given hour is greater than the second-year ICA-SG value, then a violation is called for that hour. ICA violations can be separated into voltage, thermal, and protection constraints, based on how much generation would cause a computed violation of each limiting criterion for a given ICA-SG hour. In this case, the violation may be deemed a "voltage violation," "thermal violation," or "protection violation."

It is important to state that a lack of calculated ICA-SG violations is a reasonable proxy for safety and reliability being maintained, while the reverse is not necessarily true. A

[191] The designation "18-23" stands for the time period starting with the hour 1800-1900 and ending with the hour 2300-0000 in 24-hour clock nomenclature.

calculated violation does not necessarily mean there are physical grid impacts that compromise safety and reliability, because ICA-SG values represent worst-case limits across an entire year and because safety and reliability depend on a range of real-world conditions. In contrast to ICA-SG violations, Rule 21 interconnection application screens are the established practice of ensuring safety and reliability when evaluating a generator interconnection.

Energy Division Data Request as Supplemental to the Joint May LGP Advice Letters

Energy Division issued a Data Request to better ensure consistent comparisons and analyses of the different LGP configurations and to better understand the degree to which ICA violations coincide with "pass" and "fail" results of Rule 21 interconnection screens and with any physical grid impacts that might compromise safety and reliability. The Data Request focused on several LGP configurations that had been proposed and discussed in the workshops, as well as a baseline configuration of 12 monthly values. The Data Request was first issued on June 27, 2023 and subsequently updated and re-issued three times to refine and extend the analysis.[192]

The Data Request consisted of three parts:

- The first part asked for analysis of five feeders in each of the Large IOUs' respective service territories showing the exported energy and power values of LGP configurations using five different LGP configuration configurations, along with any violations that occur for the given configuration configurations, using the previous year's ICA data for each feeder as the reference case against which to compare violations. The Large IOUs were required to follow similar methodologies as they had employed for analyzing and presenting their 12-monthly configuration results in the workshops.
- The second part asked for the Rule 21 screen results for Screens A-P for each of the five LGP configurations. The IOUs were directed to assume that many of the screens passed and to focus on only a selected subset of screens. The selected subset of screens was chosen to further analyze real grid impacts from the ICA violations.

[192] See the Background section of this Resolution for details of the Data Request updates and responses.

- The third part asked for adding a comparison pre-LGP case for limiting DER system size (and therefore export limits) to the analyses, and also for calculating the average maximum power for an LGP project under the five configurations, on each of the analyzed circuits.

The five LGP configurations included in the Data Request are shown in Table 3, along with the 288-value LGP configuration for reference. Summaries of the data provided by the Large IOUs' in response to the Data Request are provided in Appendix H, which contains an assessment by Energy Division of the 24-value configurations.

Table 3: LGP Configurations Included in the Energy Division Data Request

Configuration name	Number of unique LGP values	Monthly or seasonal values	Hourly values	Values for blocks of evening peak load hours and non-peak hours	Description of LGP values
"12-monthly"	12	X			One value for each month using the monthly minimum of ICA-SG
"24-hourly"	24		X		One value for each hour of the day across all 12 months using 90% of the minimum ICA-SG values for each hour's lowest monthly value over the 12 months
"Block"	24	X (four seasonal blocks: Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec)		X (six hourly blocks: 5pm-9pm, 9pm-1am, 1am-5am, 5am-9am, 9am-1pm, 1pm-5pm)	One value for each pairing of a seasonal block and an hourly block. Divides the year into blocks of 3-month intervals and each day into blocks of 4-hour intervals. Uses 90% of the minimum ICA-SG value for each pairing of month-block and hour-block (lowest month and hour)
"18-23-fixed"	24	X		X (two hourly blocks: 6pm-12am, 12am-6pm	One value for each of two different block intervals each day: 6pm-12am and 12am-6pm, uniquely for each month of the year. Uses 90% of minimum ICA-SG value for each block interval.
"16-21-hourly"	84	X	X	X	One value for each hour during the period 4pm-10pm, plus a

			(six unique hours 4pm-10pm only)	(one off-peak hourly block 10pm-4pm only)	single value for the block interval 10pm-4pm, for each month of the year. Uses 90% of ICA-SG for each hour 4pm-10pm; uses 90% of the monthly minimum of ICA-SG for the block interval 10pm-4pm.
For Reference					
"288-LGP"	288	X	X		One value for each combination of hour of the day and month of the year, for each of two separate 24-hour periods during each month, using 90% of minimum ICA-SG values for each hour.

Disposition #20: Choice of LGP Configuration(s) to Adopt (E-5230 Topic F)

We find there was a lack of consensus between the Large IOUs and non-IOU parties as to the acceptable LGP configurations and the number of unique LGP values to adopt for implementation of the LGP option. In summary, the Large IOUs argue for a single 12-value configuration, while the non-IOU parties argue for several different configurations ranging from 24 values to 288 values.

The Large IOUs propose to utilize a configuration of 12 unique values, repeated 24 times per month, to produce a 288-hour annual configuration. The Large IOUs assert that their analyses of circuit load configurations and ICA Static Grid (ICA-SG) results support their position to adopt 12 unique LGP values per year, one unique value for each month. The IOUs also claim this proposal is consistent with Resolution E-5230.

The Joint May LGP Advice Letters summarize the presentations of the IOUs during Workshops #2, #3, and #4, in which they presented analyses on ICA criteria violations resulting from LGP configurations of greater than 12 values, in comparison with violations for their proposed configuration of 12 monthly values. A summary of these analyses, and of the non-IOU parties protests related to these analyses, are included in Appendix G. We refer back to these analyses and protests when disposing of the question of which LGP configuration(s) to use later in this section.

Based on their analyses, the Large IOUs assert that there is an increased risk of safety and reliability issues when LGP values are allowed to include up to 288 unique values

per year as compared to one unique value for each month. SCE found that some analyzed circuit nodes showed higher risk of causing a criteria violation for all configurations greater than 12 values. SDG&E analyzed circuit load variability for one actual circuit over two distinct 12-month periods and stated that such variability coupled with increased LGP granularity can result in ICA violations. PG&E concluded that the risk of violating power system safety design criteria (protection, thermal, and voltage) increased using more granular LGPs.

The IOUs state:

> Generation ICA uses 12 months of historical loading information as an input, which is not an accurate predictor of real-time grid conditions at a granular level 100% of the time. The IOUs highlighted that the lowest ICA Static Grid value will be closely correlated with the lowest circuit load. Therefore, if the real-time load on the circuit is less than it was assumed to be when ICA was performed, for any given hour, the circuit **could be** [emphasis added] exposed to a criteria violation.[193]

The Joint May LGP Advice Letters also acknowledge the non-consensus of parties on this question, and describes the Large IOUs view of "basis for lack of consensus" as follows:[194]

> Some stakeholders contend that allowing a maximum of 12 unique LGP values per year, one per month, will not provide benefits to the interconnecting generators that are large enough to justify selection of the LGP option. These stakeholders believe that increasing the number of unique LGP values allowed each year will result in greater energy exports at the PCC and thereby provide (i) anticipated benefits to interconnecting generators that are large enough to cause the interconnecting generators to select the LGP option, and (ii) accompanying benefits to ratepayers.
>
> Some stakeholders suggested that there is a "sweet spot" whereby the maximum number of allowed unique LGP values per year could be increased to a number

[193] Joint May LGP AL at 21.
[194] Joint May LGP AL at 27-29.

larger than 12 based on the extent to which safety and/or reliability risks increased. Different options were suggested for increasing the number of unique values. For example, an LGP could be created that allows four unique LGP values during each month, for example one value for hours-ending 1 through 17 and 21 through 24, and three values for the peak hours of 18 through 20 (a total of 48 unique values each year). Stakeholders did not propose any specific mechanism by which such a "sweet spot" would be identified.

The IOUs question whether developers will actually choose not to select the LGP option if the maximum number of unique annual LGP values is limited to 12. The IOUs suspect that the contention by some stakeholders that developers will not select the LGP option if a maximum of 12 unique values per year is allowed, is commercially motivated posturing.

The IOUs note that stakeholders have not provided any concrete evidence as to the magnitude of the benefits that ratepayers are expected to receive as a result of increasing the maximum allowed unique LGP values each year to a number greater than 12. Other than demonstrating that more energy could be exported, no evidence was provided to show that the economic value of these increased exports would accrue to ratepayers rather than to the developers.

Finally, while the IOUs understand the intuitive appeal of finding a "sweet spot," the reality is that such a "sweet spot" necessarily means increased safety and reliability risk, something the IOUs are unwilling to accept. Moreover, stakeholders have offered no objective proposal by which an acceptable tradeoff between increased safety/reliability risk and increased LGP exports would be found.

Non-IOU parties presented their own proposals for LGP configurations during the SIWG meetings and workshops. During the January 19, 2023 SIWG Meeting, Cal Advocates presented analysis based on 288 unique LGP values. During LGP Workshop #4, IREC presented a 24-value "Block" configuration. Non-IOU parties also protest the Large IOUs proposal for a 12-value LGP configuration. Cal Advocates writes:[195]

[195] Cal Advocates protest to Joint May LGP AL at 2.

> [The Joint May LGP Advice Letters] document the participation by the IOUs in workshops required by Resolution E- 5230 but fail to propose a reasonable implementation of LGPs. Specifically, the IOUs rely on questionable integration capacity analysis (ICA) data to justify limiting configurations to 12 values per year (i.e., a single limit in each month, or "monthly values") through at least 2026, without any identified independent evaluation of the risks and benefits of LGP.
>
> The IOUs incorrectly claim that limiting LGPs to monthly values is necessary to ensure safe and reliable service; PG&E's analysis shows that a 24-hour configuration (i.e., one value for each hour of the day regardless of day of the year, "hourly values") has lower risk and increased benefits compared to monthly values. The Commission should direct the IOUs to allow customers to choose between LGPs with monthly values and LGPs with hourly values.

Cal Advocates argues that the Large IOUs have not been willing to consider more than 12 values and protests that their assessments lack merit because they are based on small samples of circuits that are not statistically valid. Cal Advocates took exception to the Large IOUs position that a "statistically valid" analysis "would not change the Large IOUs' position that any increase in safety and/or reliability risks is unacceptable."[196] Cal Advocates also faults the analyses provided by the Large IOUs as containing potential errors that could exaggerate the risks of violations, as detailed in Appendix G.

IREC points out some methodological shortcomings and considerations about the types of analyses being performed by the Large IOUs (see Appendix G). IREC states:

> It is important to keep in mind that both IREC and the utilities' analyses are based on a miniscule data set when one considers the overall number of nodes on these systems. It is difficult to know whether this sample, which is far from statistically significant, is going to be representative of broader trends on the system. Furthermore, as will be explained below, while changes in an ICA calculation from year to year can stand as a reasonable proxy for "risks," it is

[196] Ibid at 4.

> important to recognize that this analysis did not look at any actual impacts on the system.[197]

IREC also replicates the Large IOUs' analysis for the 288-value configuration to validate its own analysis and then produced parallel results with the Large IOUs for the other configurations. IREC states its own analyses confirms that the PG&E analysis "reflects a reasonable characterization of the number of potential ICA violations." However, IREC concurs with Cal Advocates that errors in SCE's underlying ICA data exaggerate the maximum magnitude of violations in the SCE analysis. (Note: these issues were subsequently corrected by SCE in responding to the Data Request; see below.)

IREC argues that (a) the Commission should adopt a 24-value configuration; (b) the Commission should understand the factors, beyond the purely quantitative analyses conducted, that point to why many violations can be minor, infrequent, and readily subject to mitigations; (c) that voltage violations may not rise to the need for mitigations, already occur routinely, and are already mitigated by smart inverter functions; and (d) impacts of short-duration thermal violations can arise with any varying distribution grid conditions and also with 12-value-configuration LGP projects. IREC provides an extended argument for more than 12 values:[198]

> Each of the three analyses on this tiny sample of nodes show that even a 12-value LGP can potentially cause violations of hosting capacity limits. Where the 12-value LGP would produce the fewest violations, relatively few violations are also seen in LGPs with more than 12 values. There is a demonstrated increased occurrence of violations for LGPs with higher numbers of values. Depending on the severity, if these violations arise in real life, they may need to be mitigated. There are mitigation measures to address potential steady-state voltage, voltage variation, and thermal violations for any style of LGP. Crucially, LGP configurations with more than 12 values (or even a 12-value LGP, but structured differently) have a much greater potential to export more energy during the hours it is most needed, and better align with Commission energy and climate policy and project economics.

[197] IREC Protest to the Joint May LGP AL at 25.
[198] IREC Protest to the Joint May LGP AL at 23-25.

With this understanding, it is important to first ask whether the ICA violations are likely to translate to actual system violations in the field simply because the LGP exceeds the ICA limits? The Commission must keep in mind that DERs are unlikely to be producing at full limited output every hour, meaning a violation is less likely to arise in reality. For instance, a PV plus storage system may choose to charge batteries until they are full and would only export power after the batteries are full. Depending on the weather, that action may take longer on some days than others, leading to different times and amounts that the PV would export. Additionally, there is already some conservatism built into the ICA, given that the 24-hour configuration within each month represents assumptions built on the worst-case hour of the month (e.g., the most lightly loaded hour at that time of the day for all 31 days, regardless of the day of the week). Those worst- case scenarios may be unlikely to recur many times within a month, reducing the risk that actual system violations occur.

Secondly, the severity (magnitude and duration) of the violation and the type of violation will dictate whether it would constitute a condition that would need to be mitigated. For instance, steady-state voltage violations of ANSI C84.1 Range A or B are allowed and occur regularly on the grid today, but do not generally rise to the need for mitigation as long as they are of short duration (which is a relative term, but can mean hours-long events for smaller excursions). Since smart inverters in the utilities' territories have the volt-var function activated, this can help mitigate voltages outside the normal limits. If the voltage exceeds Range B, the volt-watt function will start to activate and curtail active power until voltage comes back toward the limit… Voltage variation may be mitigated if the DER is a PV system, or by using ramp rates if it is energy storage. Therefore, voltage violations are likely to be much less of an issue in real life.

Thermal violations could have more meaningful consequences because, if they are of sufficient magnitude and duration, conductors or other distribution system equipment could be damaged. At shorter durations, however, conductors can typically endure significant overloads (on the order of two times their rating), and can endure smaller overloads for longer durations without damage. The utilities may need to be aware of these situations and take corrective action if

> thermal events reach the level of emergency. This is the case with a 12-value LGP or even traditional full export interconnections today, so monitoring and procedures that address those cases could be extended to apply to LGPs with more than 12 values as well.

In conclusion, IREC writes that the Commission should "reject the utility's extremely limited and unproductive proposal for a 12-value monthly configuration. In its place, the Commission should allow applicants to propose LGPs, based upon the ICA at the point of interconnection, so long as it does not exceed 24 values. If the Commission would like to place more limits around the 24 values, it should direct the use of a configuration that allows for blocks that vary during the day, but also on a monthly or quarterly basis. This approach will allow projects to design configurations that take advantage of the specific daily and seasonal peak periods that arise at the project's proposed location on the grid."[199]

The Large IOUs respond to Cal Advocates, saying that benefits have not been quantified and thus the Cal Advocates claim that utilities are ignoring the benefit-risk balance is false:

> To date, none of the analysis, including the analysis presented by Cal Advocates, have shown that the "benefits" provided by an alternative to the Joint Utilities' proposal, would offset the consequences of the associated risks. Indeed, while there is a general expectation that increased exports will provide "benefits," no party has quantified the economic value of these benefits nor the share, if any, of this economic value that will accrue to ratepayers rather than to the owners of the interconnecting generators.[200]

The Large IOUs dismiss Cal Advocates assertion that that their proposal is "unjust and unreasonable," stating that this characterization is based on the fact that particular 24-value configurations on particular circuits show reduced risk compared to the 12-value configuration, but that does not invalidate the Large IOUs' conclusions or positions.

[199] IREC Protest to the Joint May LGP AL at 28.
[200] SDG&E, Joint Utilities 'Reply to Cal Advocates Protest of the Joint May LGP AL, at 2.

The Large IOUs respond to the IREC protest, stating that some of their analyses do represent a large and statistically significant data sample:

> The Joint Utilities disagree with IREC that "both IREC and the utilities' analyses are based on a miniscule data set when one considers the overall number of nodes on these systems." PG&E performed analysis on more than 10% of PG&E circuits, around 339 circuits comprised of 155,000 line-sections. This equates to about 44 million line-section-hours, which is a statistically significant data sample.[201]

The Large IOUs strongly oppose IREC's proposal to "allow applicants to propose LGPs, based upon the ICA at the point of interconnection, so long as it does not exceed 24 values." The Large IOUs state that there are an enormous number of possible LGPs under IREC's "free style" 24-value proposal, almost none of which have been assessed at a system-wide level. Absent analysis, at least as rigorous as PG&E's, each "free style" 24-value configurations would constitute "unquantified" risk.

The Large IOUs dispute IREC's contention, from IREC's own analysis of 24-value configurations, that at least some 24-value configurations do not increase risks. The Large IOUs state that IREC's analysis of one 24-value configuration shows increased risks and that one of the five nodes analyzed by SCE also shows increased violations.

We now turn to dispose of which LGP configuration to adopt and the number of unique LGP values. We find that the data and analysis provided by the Large IOUs in the Joint May LGP Advice Letters and in the associated Protests, taken together with the additional data provided in the Large IOUs Supplemental Advice Letters and Responses to the Energy Division Data Request, provide a sufficient basis to evaluate the risks and benefits of the different LGP configurations considered and to determine which LGP configuration to adopt for the LGP option.

Fundamentally, the determination of which LGP configuration to adopt should balance safety and reliability risks against the benefits of increased energy and power exports from LGP projects, particularly at peak-load times when the grid especially benefits from added generation capacity. Such increased energy and power exports benefit both

[201] SDG&E, Joint IOU Reply to IREC's Protest of Joint May LGP AL, at 10.

interconnection customers and ratepayers. Further, such benefits can incentivize more DERs, and such DERs if exporting under the Net Billing Tariff will export power at the Avoided Cost Calculator (ACC) rate that considers benefits to ratepayers.

We base our determination of which LGP configuration should be adopted on the following five criteria: An LGP configuration should: (1) maximize the available hosting capacity (with the adopted 10% buffer); (2) minimize risk to safety and reliability; (3) have a low likelihood of causing upgrades should grid loading shift following interconnection. (4) maximize power output from LGP projects; and (5) maximize aggregate annual energy output from LGP projects;

Given the limited data set used in the analysis and the lack of real-world experience using LGP configurations and the ICA for interconnection purposes, we note there remains much to be learned on how the differing LGP configurations will perform to meet the criteria stated above. The adoption of LGP projects and the data monitoring and reporting ordered in this Resolution should inform the Commission on how the LGP option will be modified during its second iteration. Due to these limitations, we rely not only on purely analytical determinations, but also an objective judgement to choose the LGP configurations to meet our five criteria.

The analyses provided by the Large IOUs in the Joint May LGP Advice Letters, in the Advice Letter Supplements, and in their responses to the Data Request, showed significantly elevated numbers of violations for both the 288-value ("288-LGP") and the 84-value ("16-21-hourly") configuration, when compared with the LGP configurations of 12 or 24 values. We find that data persuasive and therefore reject the use of an LGP configuration of more than 24 unique values per year.

We agree with IREC's arguments that (a) the Commission should adopt a 24-value configuration (24 unique values per year); (b) the Commission should understand the factors, beyond the purely quantitative analyses conducted, that point to why many violations can be minor, infrequent, and readily subject to mitigations; (c) voltage violations may not rise to the need for mitigations, already occur routinely, and are already mitigated by smart inverter functions; and (d) impacts of short-duration thermal violations can arise with any varying distribution grid conditions and also with 12-value-configuration LGP projects.

We find, therefore, that based on all the data provided and our five criteria above, it is reasonable to adopt a 24-value configuration for the LGP option. We conclude that 24-value configurations are most likely to result in voltage violations that can be corrected with low-cost mitigations as discussed in Disposition #4 as part of Resolution E-5211, and that any thermal or protection violations are likely to be much less frequent, and of short duration, and may not require upgrades.

In finding in favor of 24-value configurations, we also note that an absence of an ICA violation indicates circumstances that are deemed safe but the converse is not necessarily true and must be analyzed further. Computed ICA-SG criteria violations do not necessarily indicate physical grid impacts compromising safety and reliability. Such impacts only become apparent when additional power flow studies are run on the specific hour(s) of the year when violations occur. The location and magnitude of the violation, along with the specific grid conditions present at that location at that time, largely determine whether the violation can result in physical grid impacts. And ICA-SG values are themselves conservative and reflect annual worst-case conditions. Computed violations of ICA-SG values that do not occur under worst-case conditions may have no physical impact or implications. And violations of ICA-SG values can occur at any time from any interconnected generator, whether an LGP project or not. Violations of voltage, thermal, and protection limits occur routinely on distribution systems in any case and are routinely handled by utilities.

Turning to the question of which 24-value configuration(s) to adopt, Energy Division staff conducted an assessment of the three 24-value LGP configurations (24-hourly, Block, and 18-23-fixed), based on the data provided in response to the Data Request as given in the Advice Letter Supplements and responses to the Data Request. The details of this assessment are provided in Appendix H.

Based on this assessment, we conclude that no one configuration of the three 24-value configurations performs significantly better or significantly worse than the other two considering our four criteria. However, on the basis of maximizing power output from LGP projects during peak load hours of the day, as well as minimizing thermal violations, the 18-23-fixed configuration does perform better than either 24-hourly or Block. All three show some low but present risk of necessitating grid upgrades should sustained load reduction occur following interconnection.

We adopt all three 24-value configurations; 24-hourly, Block, and 18-23-fixed; as a final resolution to Topic F, and find that customers should have the choice of specifying and using any one of these three 24-value configurations in an LGP interconnection application.

Disposition #21: Assessment of LGP Configurations After Three Years

Given the LGP option is new, we believe it is prudent to conduct some assessment of real-world experience with LGP configurations to re-assess and refine our findings in the future. The Large IOUs also imply such assessment with a "phased approach," although starting from a baseline of using the 12-LGP configuration. They state:

> ... the Joint IOUs have repeatedly emphasized and as nearly all stakeholders acknowledge, even the 12 unique value LGP profile proposed by the Joint Utilities results in some level of increased risk compared to building the distribution upgrades that will allow an interconnecting generator to export up to its nameplate rating. Hence, the Joint Utilities' phased approach for considering expanded LGP flexibility, which allows learning based on 12 unique values, is reasonable and prudent.[202]

In adopting these three 24-value configurations, we acknowledge along with the Large IOUs that LGP configurations of any type, including the 12-value configuration, pose some degree of uncertainty and risk. Uncertainties can include: (a) the degree to which computed ICA-SG violations result in physical grid impacts compromising safety and reliability, (b) whether individual feeders exhibit more or less risk, and (c) magnitude and character of any sustained load reductions that could reduce hosting capacity.

We find that the Large IOUs shall provide assessments of the LGP option within one month after the LGP option has been effective for three years, and again after six years and nine years, including better understanding of the uncertainties and risks associated with any LGP facility, especially related to sustained load reductions; and that these assessments should incorporate and benefit from actual data of physical grid impacts and conditions rather than calculated ICA-SG violations.

[202] SDG&E Reply to IREC's Protest of Joint May LGP ALs at 10-11.

Disposition #22: Data Format of LGP values to be Submitted by Customers

The Large IOUs propose a data format of LGP values to be submitted by customers along with their interconnection application, given in Appendix I.[203] We note that wording of this proposal is specific to the 12-monthly configuration. Thus, we find the description of the proposed format will need to be modified in accordance with the actual configurations adopted under this resolution. We also suggest the data format may need to be reconsidered to align with any naming or scheduling convention in the forthcoming UL PCS standard for scheduling functionality.

We find the proposed data format in Appendix I reasonable but require modification of the language to be consistent with the LGP configurations 24-hourly, Block, and 18-23-fixed, and also possible modification to align with any naming or scheduling convention in the forthcoming UL PCS standard for scheduling functionality.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review.

Please note that comments are due 30 days from the mailing date of this resolution. Ordinarily, protests or comments regarding an Advice Letter are due within 20 days of the filing of the Advice Letter. (G.O. 96-B, General Rule 7.4.1.) Here, Staff observes that this is an unusually lengthy and complex Advice Letter as the AL itself is 90 pages and involves 22 dispositions. Staff are authorized to consider late-filed protests or responses to Advice Letters. (General Rule 7.4.4.) Because of this complexity and in order to avoid the need for parties to submit comments that are not as thorough as is appropriate and helpful, Staff extend the comment period to 30 days without the need to request an extension of the comment period. (See General Rule 1.3, which provides in part, the "Rules shall be liberally construed to secure a just, speedy, and inexpensive handling of informal matters . . .")

Section 311(g)(2) provides that this 30-day review period and ordinary 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

[203] Joint May LGP AL at 20.

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

FINDINGS

1. The Large IOUs have complied with all requirements of OP 2 of Resolutions E-5211 and OP 2 of Resolution E-5230 for participation in workshops and Smart Inverter Working Group meetings to discuss the ordered LGP topics.

2. Rule 21 Section D.9 applies to both LGP and non-LGP facilities.

3. A sustained load reduction on a circuit resulting from business wind-downs and/or the unanticipated addition of energy efficiency or other load management technologies is a reasonable LGP-specific circumstance for temporary curtailment of an LGP facility beyond the circumstances already specified in Rule 21 Section D.9, given the unique characteristics of LGP facilities relative to non-LGP facilities.

4. Other than the LGP-specific circumstance of sustained load reduction, there is a lack of evidence that any other circumstance is cause for curtailment of an LGP facility, beyond the circumstances already specified in Rule 21 Section D.9.

5. Under the LGP-specific circumstance of curtailment due to sustained load reduction, D.20-09-035 allows the Large IOUs to reduce the approved Limited Generation Profile level to the lowest ICA-SG value identified at the time of the Interconnection Application. If such curtailment is insufficient to ensure safety and reliability, the utility is already allowed to curtail any interconnection customer to any level, which in its judgement best ensures safety and reliability, in accordance with existing Rule 21 Section D.9.

6. Current practice requires the Large IOUs to undertake any required mitigations or upgrades to allow the Limited Generation Profile level to be restored to the approved level in the facility’s Generator Interconnection Agreement, if curtailment of an LGP facility occurs due to the circumstances already specified in Rule 21 Section D.9.

7. If curtailment of an LGP facility occurs due to the LGP-specific circumstance of sustained load reduction, it is reasonable that current practice also applies, for the Large IOUs to undertake any required mitigations or upgrades to allow the Limited Generation Profile level to be restored to the approved level in the facility's Generator Interconnection Agreement.

8. There is a lack of evidence that any sustained load reductions on a distribution circuit have occurred in recent years, or that if they have, that any distribution system operating criteria violation has occurred in a manner to compromise safety and reliability, or that any mitigations or upgrades have been required.

9. Current practice assures that grid upgrades are paid for by ratepayers for any circumstances arising after an interconnection agreement has been executed. The proper venue for any changes to this practice is Phase II of proceeding R.17-07-007.

10. Resolution E-5211 does not preclude disparate treatment of cost responsibility of LGP facilities versus non-LGP facilities in exceptional cases.

11. There is a lack of evidence that disparate treatment of cost responsibility of LGP facilities versus non-LGP facilities will impact ratepayer costs.

12. Low-cost mitigations will likely be sufficient in the large majority of LGP curtailment cases to partially or fully reverse curtailment and restore export values of an LGP facility to the LGP values in the interconnection agreement.

13. It is reasonable to define, for purposes of the LGP option, low-cost mitigations as those that are routine or minor in nature and have historically been performed on the order of days, weeks, or a few months for design, procurement, and construction; that low-cost mitigations can be considered as efforts classified in the GRC as maintenance functions that are part of ordinary distribution system operations; that low-cost mitigations are expected to cost in the range of thousands or tens of thousands of dollars as a general guideline; that low-cost mitigations include items as defined by the Large IOUs in the Joint January LGP Advice Letters, and as those items called out in Rule 21 as solutions that may be available to mitigate the impact of a failed screen.

14. Current practices and cost principles from the GRC provide that low-cost mitigations are covered through ordinary operations and maintenance budgets.

15. Available evidence suggests that grid upgrades required to restore curtailed LGP facility exports to the values in the original Interconnection Agreement, in the LGP-specific circumstance of sustained load reduction, are likely to be rare and that most curtailments can be addressed through low-cost mitigations.

16. Given the long-term uncertainties concerning the risks and costs of the LGP option, it is nevertheless prudent that there should be some options for the Large IOUs to safeguard ratepayer interests against unreasonable costs of upgrades in circumstances of LGP curtailment due to sustained load reduction.

17. It is prudent to allow the Large IOUs to propose reconsideration of cost responsibility for LGP-specific curtailments in circumstances of sustained load reduction if, during the first three years of the LGP option being effective, cumulatively more than 10% of actual LGP facility curtailments, due strictly to the LGP-specific circumstance of sustained load reduction, have required grid upgrades to restore curtailed LGP export values.

18. The Large IOUs have the option under existing Commission rules to apply for a tariff deviation if they believe that undertaking an upgrade is not a reasonable use of ratepayer funds or is unreasonably costly in a particular case.

19. This resolution does not and cannot change cost causation principles.

20. The Large IOUs proposed 3-step procedure for LGP facility curtailment, as described in Appendix C, is inconsistent with our findings on cost responsibility. It is reasonable to require that this language be made consistent with our findings.

21. To inform future refinements to the LGP option, it is reasonable to require some level of data monitoring and reporting requirements, to apply only to each LGP interconnection customer whose LGP values have been curtailed due to the LGP-specific circumstance of sustained load reductions on a circuit. It is reasonable that these requirements apply to any such curtailment at any time after the Interconnection Agreement has been signed, regardless of how long the curtailment lasted and whether or not the curtailment remains in effect.

22. Disparate treatment of LGP facilities is not "discriminatory" under Rule 21.

23. There is agreement on the Large IOUs language, as modified by IREC's edit, for Rule 21 Tariff language in Section J.5, as described in Appendix B.

24. There is agreement on the following use of Gross Nameplate Rating in Rule 21 Initial Review screens: Screens F, F1, G, and H: Gross Nameplate Rating will be used; Screen P: Gross Nameplate Rating will be used solely for aspects involving fault current calculations; Screens D, J, K, M, N, and O: Gross Nameplate Rating will not be used.

25. Supplemental Review of LGP projects with LGP values exceeding 90% ICA-SG values is burdensome and unreasonable for the Large IOUs. It is prudent that such projects be studied using Gross Nameplate Rating in Supplemental Review.

26. It is reasonable to adopt the Rule 21 Tariff language in Appendix B for a new Section Mm5 – Option 12. However, the language may need to be modified once PCS standards have been incorporated into UL 1741 revisions.

27. It is premature to add an Mm6 Option 13 to the Rule 21 Tariff for relay with automation controller because of the lack of industry experience and testing requirements. This option is available by mutual agreement with the utility.

28. The timelines for updating the Rule 21 Tariff and implementing the LGP option, per OP 15 and OP 51 of D.20-09-035, have been aligned by mutual agreement.

29. It would be burdensome to continuously update Rule 21 with LGP technical requirements; it is reasonable to allow technical requirements to be published on Large IOUs' interconnection web sites for developers to use as reference.

30. It is reasonable to adopt the Large IOUs LGP proposal clarifying the five-phase interconnection process for LGP facilities, as described in Appendix F.

31. No options are, as yet, fully viable for utilizing current smart inverter functions in conjunction with a remote CSIP-certified gateway or CSIP-certified gateway integrated with a smart inverter. LGP implementation must await the completion of a UL certification standard for UL PCS with integrated schedule.

32. It is not prudent to accept the use of an LGP configuration of more than 24 values due to the risks of higher numbers of calculated ICA-SG violations, which may in turn increase the risk of physical grid impacts compromising safety and reliability.

33. When modeling the impact of an LGP facility with specific LGP configuration and LGP values, the lack of calculated ICA-SG criteria violations is a reasonable proxy for safety and reliability being maintained, while the reverse is not necessarily true; a calculated ICA-SG criteria violation does not necessarily mean that there are physical grid impacts that compromise safety and reliability.

34. Based on all the data available and an assessment by Energy Division, it is reasonable to adopt one or more 24-value configuration(s) for the LGP option.

35. Based on Energy Division's assessment, no one 24-value configuration of those studied performs significantly better or significantly worse than the others in relation to criteria for maximizing available hosting capacity, minimizing risk to safety and reliability, low likelihood of causing upgrades, and maximizing power output and annual energy output from LGP facilities.

36. It is reasonable to adopt three 24-value configurations: 24-hourly, Block, and 18-23-fixed; and to require that customers have a choice of specifying and using any one of these three 24-value configurations in an LGP interconnection application.

37. It is prudent to require the Large IOUs to provide assessments of the LGP option after three years from the date the LGP option becomes effective, to provide better understanding of the uncertainties and risks associated with any LGP facility, especially those related to sustained load reductions on circuits, and that these assessments should incorporate and benefit from actual data of physical grid impacts and conditions rather than calculated ICA-SG violations.

38. The LGP data format of LGP values to be submitted by customers that the Large IOUs proposed requires modification to be consistent with the three 24-value LGP configurations being adopted (24-hourly, Block, and 18-23-fixed), and further may possibly need to be modified to align with any naming or scheduling convention in the forthcoming UL certification standard for UL PCS scheduling functionality.

THEREFORE IT IS ORDERED THAT:

1. This Resolution approves in part as modified the utility requests included in Pacific Gas and Electric Company's Advice Letters 6816-E, 6816-E-A, 6929-E & 6929-E-A, Southern California Edison Company's Advice Letters 4941-E, 4941-E-A, 5025-E, 5025-E-A & 5025-E-B, and San Diego Gas & Electric Company's Advice Letters 4138-E, 4138-E-A, & AL 4215-E.

2. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to submit via Advice Letter changes to their Rule 21 Tariffs in accordance with the language described in Appendix B, within 60 days of formal adoption of a standard for UL PCS with integrated schedule.

3. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to adopt the process and steps for curtailing LGP projects in accordance with the language described in Appendix C including modifications therein, and to adopt the process for implementing LGP projects in accordance with the language given in Appendix F, within 9 months of completion of a standard for UL PCS with integrated schedule.

4. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to adopt the data monitoring and reporting requirements on LGP facility curtailments described in Appendix E, and submit a Tier 2 Advice Letter with the required data within one month after the LGP option has been effective for three years, and again after six years and nine years.

5. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to submit a Tier 2 Advice Letter specifying the data format and requirements of LGP values to be submitted by customers, within 60 days of completion of a standard for UL PCS with integrated schedule. The data format and requirements shall allow any of the three 24-value LGP configurations 24-hourly, Block, and 18-23-fixed. The data format shall also consider possible modification of the language to align with any naming or scheduling convention in the forthcoming UL PCS standard for scheduling functionality.

6. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to develop a plan for conducting assessments after three years following LGP becoming effective. The plan shall be designed to provide better understanding of the uncertainties associated with LGP configurations and shall emphasize actual data of physical grid impacts and conditions of LGP facilities. The plan shall be provided in a Tier 2 Advice Letter after 18 months from the date the LGP option becomes effective.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed, and adopted at a conference of the Public Utilities Commission of the State of California held on March 21, 2024; the following Commissioners voting favorably thereon:

_____
RACHEL PETERSON
Executive Director