

PUBLIC UTILITIES COMMISSION

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December 22, 2022

Advice Letter 5915-E-B

Sidney Bob Dietz II
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San Francisco, California 94177
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SUBJECT: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 120 Days from Issuance) for Ordering Paragraphs 5, 6, 8 and 11.

Dear Mr. Dietz:

Pacific Gas and Electric Company Advice Letter 5915-E-B is effective as of June 23, 2022, per Resolution E-5172.

Sincerely,

A handwritten signature in black ink that reads "Leuwam Tesfai".

Leuwam Tesfai
Deputy Executive Director for Energy and Climate Policy/
Director, Energy Division
California Public Utilities Commission

November 4, 2021

Advice 5915-E-B

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: Second Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 120 Days from Issuance) for Ordering Paragraphs 6 and 11.

Purpose

Pacific Gas and Electric Company (PG&E) hereby submits this supplemental Tier 2 Advice Letter (AL) to update Electric Rule 21 - *Generating Facility Interconnections* - in compliance with the California Public Utilities Commission (CPUC, Commission) Decision (D.) D.20-09-035¹ (WG 2 & 3 Decision) addressing the unresolved ordering paragraphs (OPs) in the following advice letters:

- (1) **AL 6014-E-A²** - the “**60 day**” supplemental submitted June 25, 2021 did not resolve OPs 2,12, and 23;
- (2) **AL 5915-E³** - the “**120 days**” – a supplemental to AL 5915-E was later submitted but it was protested.

Except for D. 20-09-035, OPs 5 and 8, which were addressed in AL 6363-E, and based on Energy Division’s guidance, this advice letter addresses the other remaining issues in the above two advice letters.⁴ PG&E submitted supplemental advice letter AL 5915-E-A to replace AL 5915-E in its entirety. This second supplemental adopts changes that

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

² [AL 6014-E-A](#) - *Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 60 Days from Issuance).*

³ [AL 5915-E](#) - *Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 120 Days from Issuance) for Ordering Paragraphs 5, 6, 8 and 11* – submitted January 28, 2021.

⁴ PG&E submitted and based on Energy Division Guidance, subsequently withdrew [AL 6287-E](#) - *Modifications to Electric Rule 21 Pursuant to Decision 20-09-035 Addressing Remaining Ordering Paragraph Issues in Working Group 2 and 3*, and replaced it with supplemental AL 5915-E-A.

PG&E along with the other IOUs, agreed to make in the joint IOU⁵ protest response to IREC protest of PG&E Advice Letter 5915-E-A. This second supplemental replaces AL 5915-E-A in its entirety.

Background

Rulemaking 17-07-007

On July 13, 2017, The Commission adopted Order Instituting Rulemaking (R.) 17-07-007 to consider refinements to Electric Tariff Rule 21 of Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) (jointly, Utilities) regarding the interconnection of distributed energy resources.⁶

ACR Scoping Memo

On October 2, 2017, the Commission issued Scoping Memo of Assigned Commissioner and Administrative Law Judge (Scoping Memo) set forth the scope and schedule of the proceeding. It established the working group process, whereby resolution of the technical issues of the proceeding would be proposed by Working Groups One through Six. In addition, four issues were assigned to the Smart Inverter Working Group, including issues 5 and 6.⁷

Working Group 1 and D. 19-03-013

Working Group One led to various advice letters being submitted⁸ that were protested and were ultimately resolved by Resolution E-5035.

⁵ The IOUs or Independently Operated Utilities consist of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E)

⁶ The Rule 21 tariff describes the interconnection, operating, and metering requirements for certain generating and storage facilities seeking to connect to the electric distribution system. Rule 21 provides customers access to the electric grid to install generating or storage facilities while protecting the safety and reliability of the distribution and transmission systems at the local and system levels. (See R.17-07-007 at p2.)

⁷ The Smart Inverter Working Group (SIWG) grew out of a collaboration between the Commission and the California Energy Commission in early 2013. The collaboration identified the development of advanced inverter functionality as an important strategy to mitigate the impact of high penetrations of distributed energy resources. [as explained in footnote 2 in D. 20-09-035]

⁸ [AL 5553-E](#) *Modification to Rule 21 Pursuant to the Working Group 1 D. 19-03-013*. The Rule 21 changes in AL 5553-E is still pending approval. Two other Advice letters (AL 5583-E, and AL 5584-E) were also submitted for Working Group 1 but they did not impact Rule 21. E-5035 resolved issues with the aforementioned advice letters, and required the submission of AL 6154-E, 6154-E-A, AL 6155-E and AL 6155-E-A.

Working Group 2

On February 14, 2018, a Ruling directed that Working Group Two would begin on March 15, 2018 and required that it subsequently file its recommendations report on September 15, 2018. The Ruling also reassigned Issue 6 to Working Group Two.

On August 15, 2018, the Administrative Law Judge issued a Ruling allowing additional time for Working Group Two to resolve issues, including sub-issues encountered, and delaying the filing of the recommendations report to October 31, 2018.

On October 31, 2018, the Working Group 2 final report was issued.⁹

On November 7, 2018, the Administrative Law Judge facilitated a workshop to discuss the recommendations provided in the Working Group 2 Final Report.

On December 7, 2018, in response to the November 7, 2018, workshop on the Working Group Two Report, and parties were directed to respond to questions on the report.

On February 1, 2019, responses to the questions, along with comments on the Working Group Report, were filed by the various parties

On February 22, 2019, replies were filed by the various parties.

Amended Scoping Memo and Working Group 3

On November 16, 2018, a Scoping Memo and Ruling (Amended Scoping Memo) delayed the start of Working Group Three until December 1, 2018 and required Working Group Three to file its recommendations report on June 14, 2019. The Amended Scoping Memo also decreased the number of working groups and redistributed issues across two working groups and the Interconnection Discussion Forum¹⁰ such that Working Group Three was assigned issues 12, 15, 16, 20, 22, 23, 24, 27, 28, and New Issues A and B.

On June 13, 2019, the Working Group Three Final Report¹¹ was issued followed by a workshop.

A November 27, 2019 Ruling directed parties to respond to questions on the Working Group Three Report.

⁹ Working Group Two Final [Report](#) filed jointly by the Utilities.

¹⁰ In Resolution Administrative Law Judge-347, the Commission established the Interconnection Discussion Forum (formerly known as the Rule 21 Working Group) as a venue to encourage discussion and collaboration between the Utilities and developers. [as explained in footnote 3 in D. 20-09-035]

¹¹ Working Group Three Final [Report](#) filed by SDG&E.

On January 13, 2020, the various parties filed responses to the questions contained in the November 27, 2019, ruling, along with comments to the Working Group Three Report.

On January 27, 2020, various parties filed replies to the responses and Working Group Three Report comments

Decision 20-09-035

On August 20, 2020, a proposed decision was issued on Working Groups Two and Three. On September 9, 2020 comments were received. On September 22, 2020, replies were received.

On September 24, 2020, the Commission voted out D.20-09-035. D. 20-09-035 addressed the recommendations of Working Groups Two and Three and the Vehicle-to-Grid Alternating Current Interconnection Subgroup (V2G AC Subgroup).

Decision 21-01-027

On January 21, 2021, the CPUC issued D. 21-01-027¹² *Correcting Errors in Decision 20-09-035*. It corrected references to various ordering paragraph.

AL 6014-E and AL 6014-E-A

On November 30th, PG&E submitted Tier 2 AL 6014-E¹³ 60 days after the issuance of D. 20-09-035, as ordered by that decision. That advice letter was protested. Supplemental AL 6014-E-A¹⁴ was submitted June 25, 2021, addressing OPs 1, 3, 4, 17 and 18, but OPs 2, 12, and 23 were not addressed there.

AL 5915-E

On January 28, 2021, PG&E submitted the original advice letter AL 5915-E.¹⁵ 120 days after the issuance of D. 20-09-035, as ordered by that decision. That advice letter was protested.

AL 6058-E

Concurrent with AL 5915-E, pursuant to D. 20-09-025 OP 15 and 16 (pertaining to the use of a Limited Generation Profile for interconnection) PG&E submitted Tier 3 AL 6058-E.

¹² See [D. 20-09-035](#) OP1 Table labeled *Decision 20-09-035 Ordering Paragraph Corrections*, last line under OP 55.

¹³ [AL 6014-E](#) *Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3* (due 60 Days from Issuance)

¹⁴ [AL 6014-E-A](#) - *Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3* (due 60 Days from Issuance)

¹⁵ See footnote 3

AL 6287-E

AL 6287-E¹⁶ was submitted on August 6, 2021, based on Energy Division's initial guidance, and AL 6287-E addressed the remaining issues in the above two advice letters AL 5915-E and AL 6014-E-A. However, subsequent additional feedback from Energy Division requested PG&E withdraw AL 6287-E and instead submit it as a supplemental advice letter for AL 5915-E.

AL 5915-E-A and IREC Protest

On September 3, 2021, PG&E submitted supplemental AL 5915-E-A addressing the unresolved ordering paragraphs (OPs) in advice letters AL 6014-E-A (the "60 day" supplemental) for OPs 2, 12, and 23 and AL 5915-E (the "120 days" AL) addressing additional change to OPs 5, 6, 8 and 11. This AL was subsequently protested by IREC on September 10, 2021. The joint IOUs submitted a protest response on September 17, 2021. This advice letter incorporates changes the utilities agreed to make in that protest response, based on guidance from Energy Division.

AL 6363-E

On October 15, 2021, PG&E submitted AL 6363-E¹⁷ based on Energy Division guidance for OPs 5 and 8.

Overview

D. 20-09-035 OP 55 (as corrected by D. 21-01-027¹⁸) requires:

"55. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall update their respective Electric Rule 21 Tariff and, where necessary, Rules 2, 15, and 16 Tariffs, in compliance with the Ordering Paragraphs of this decision by submitting three advice letters pursuant to the table below. The table provides the list of the ordering Paragraphs (OP) in this decision requiring changes to Rule 21. The table also indicates whether the advice letter associated with each ordering paragraph is required to be Tier 1 or Tier 2 and provides the deadline for submitting the Advice Letter."

Distilling down the referenced table at the end referred to in OP 55 (as corrected) to only include the items germane to this Advice Letter, the following Ordering Paragraphs will be addressed. However, the table appears to have incorrect references¹⁹ based on the context of discussion as noted in the red text.

¹⁶ See footnote 4.

¹⁷ [AL 6363-E](#) Modifications to Electric Rule 21 Pursuant to Decision 20-09-035 Ordering Paragraphs 5 and 8.

¹⁸ [D. 21-01-027](#) - Order Correcting Errors In Decision 20-09-035 – issued January 21, 2021.

¹⁹ As corrected in D. 21-01-07.

AL Section	OP From earlier AL	OP	Description
1		various	New Integration Capacity Analysis Definitions
2	AL 6014-E-A ("60 day")	2	Initial Review to Use ICA and Share Results (Proposal 8b)
Addressed in AL 6363-E		5	Proposal 8f1 Creating Screen F1 for Short Circuit Contribution > 1.2/unit (adds new ICA definitions)
3	AL 5915-E ("120 day")	6	Screens F, G, H & J for < 30 kVA Projects
Addressed in AL 6363-E		8 ²⁰	Modify Screen L to Include Transmission Overvoltage and Anti-islanding Tests
4	AL 5915-E ("120 day")	11	Add 10% Buffer on ICA-SG & ICA OF Profiles
5	AL 5915-E	various	Rule 21 Flow Chart Update based on OP Changes Above
6	AL 6014-E-A ("60 day")	12	Screen N Thermal Overload (Proposal 8n)
7	AL 6014-E-A ("60 day")	23	Standard Design & Construction 60 / 60 BD Timeline (Issue 23, Proposal 12c)
8			Other miscellaneous changes

Therefore, based on the above identified Ordering Paragraphs, PG&E proposes the tariff revisions addressed below.

Tariff Changes

1. ICA Definitions

IREC proposed the following language:

Generation Profile: The active power output of a Generating Facility over a period of time. The Generation Profile may be less than the Gross Nameplate Capacity at certain times, for example when using a typical PV Generation Profile or a Limited Generation Profile.

Integration Capacity Analysis – Operational Flexibility (ICA-OF) Values: The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, protection, and operational flexibility ICA Values.

²⁰ This ordering paragraph applies to PG&E only.

Integration Capacity Analysis – Operational Flexibility (ICA-OF) 576

Profile: Annual Profile composed of 576 hours where each hour is represented by its ICA-OF Value.

To support other change below, and based on utility discussions with IREC, PG&E, in alignment with the other utilities, proposes the following definitions related to the Integration Capacity Analysis (ICA) be added to Rule 21:

Term Defined	Basis for Revision
Generation Profile	IREC proposed this definition in 120-day advice letter protest
Integration Capacity Analysis (ICA) Values:	IREC proposed PG&E's definition in 60-day advice letter protest, but the utilities add/maintain inclusion of the word "safety." Subsequently, it was agreed the word "safety" could be included in parentheses instead of "operational flexibility"
Integration Capacity Analysis – Static Grid (ICA-SG) Values	IREC proposed SDG&E's definition in 60-day advice letter protest.
Integration Capacity Analysis – Operational Flexibility (ICA-OF) Values	IREC proposed this definition in 120-day advice letter protest.
Integration Capacity Analysis – Operational Flexibility 576 (ICA-OF 576) Profile	IREC proposed this definition in 120-day advice letter protest.
Integration Capacity Analysis – Static Grid 576 (ICA-SG 576) Profile	IREC proposed SCE's definition in 60-day advice letter protest.

Based on this, the following definitions are proposed for including in Rule 21 Section C - *Definitions*

Generation Profile: The active power output of a Generating Facility over a period of time. The Generation Profile may be less than the Gross Nameplate Capacity at certain times, for example when using a typical PV Generation Profile or a Limited Generation Profile.

...

Inadvertent Export: The unscheduled and uncompensated export of real power* from a Generating Facility (GF) for a limited duration as specified in Sections M, and Mm and Mm3.

* For the purposes of Rule 21, real power is the same as active power.

...

Integration Capacity Analysis (ICA) Values: Values which represent the maximum capacity that can be interconnected at a given Point of Interconnection without exceeding Distribution Provider equipment thermal limits or any of the Distribution System voltage, power quality, protection, and operational flexibility (safety) limits, each of which is independently calculated.

Integration Capacity Analysis – Operational Flexibility 576 (ICA-OF 576) Profile: Annual Profile composed of 576 hours where each hour is represented by its ICA-OF Value.

Integration Capacity Analysis – Operational Flexibility (ICA-OF) Values: The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, protection, and operational flexibility ICA Values.

Integration Capacity Analysis – Static Grid 576 (ICA-SG 576) Profile: Annual Profile composed of 576 hours where each hour is represented by its ICA-SG Value.

Integration Capacity Analysis – Static Grid (ICA-SG) Values: The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, and protection ICA Values.

...

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## 2. Ordering Paragraph 2 - Initial Review to Use ICA and Share Results (Proposal 8b)

Ordering Paragraph 2 requires:

*2. Proposal 8b is adopted.*

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall **use the Initial Review process to determine if Integration Capacity Analysis values** at the proposed Point of Interconnection need to be updated using the Integration Capacity Analysis tool on the specific electrical node into the Initial Review process or running the Integration Capacity Analysis on all the electrical nodes in the circuit.*

*Utilities shall not perform additional Integration Capacity analyses as part of the interconnection process of projects with less than 30 kilovolt amperes nameplate capacity.*

*Utilities shall **share the results of any Integration Capacity Analysis updates with the interconnecting generator** and provide an explanation of changes to grid conditions or the interconnection queue.*

*Utilities shall comply with confidentiality provisions and data reduction policies.*

[Formatting and emphasis added]

Tied with the above OP, OP 11 involves applying a buffer on the Integration Capacity Analysis-Static Grid. OP 54 (as corrected) lists OP 11 as being addressed in a Tier 2 AL due 120 day after the issuance of the decision. As OP 11 was addressed in a subsequent advice letter submitted after the original of this AL, until that advice letter is made effective, it limits how much of these ICA changes can be implemented in this advice letter.

*11. Option B of Proposal 8m is adopted with modification.*

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall apply a 10 percent buffer to the Integration Capacity Analysis-Static Grid profile and to the Integration Capacity Analysis Operational Advice 6014-E-A - 11 - June 25, 2021 Flexibility profile during review of Screen M of the Rule 21 Interconnection Application Process.*

*The need for the 10 percent buffer to the Integration Capacity Analysis-Operational Flexibility profile will be revisited by the Commission.*

*Utilities shall collect data on the effectiveness of the 10 percent Integration Capacity Analysis-Operational Flexibility buffer (after consulting with the Commission's Energy Division) and provide the data and a recommendation on whether to retain the buffer or adjust it, in the Advice Letter on buffers for Issue 9, as required by Ordering Paragraph 15.*

[Formatting and emphasis added]

In the Joint Utilities' Reply to IREC Protest - September 17, 2021 it was agreed to make the following changes:

#### **IV. The Utilities Agree to Correct Minor Inconsistencies.**

IREC request the Utilities use consistent wording in Rule 21.

##### **A. Ordering Paragraph 2: Using the Initial Review Process to Determine if**

**ICA Values Need to Be Updated.**

IREC notes SCE should include “of.”

SCE agrees to add “of” in a supplemental advice letter

[This change did not affect PG&E]

Based on the above, PG&E proposes to make the following addition to Section F.2.a: (original sheet 78)

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont’d.)****2. FAST TRACK INTERCONNECTION REVIEW PROCESS****a. Initial Review**

Upon receipt of a complete and valid Interconnection Request, Distribution Provider shall perform Initial Review using the process in Section G.1. The Initial Review determines if (i) the Generating Facility qualifies for Fast Track Interconnection through Initial Review, or (ii) the Generating Facility requires a Supplemental Review. Absent extraordinary circumstances, Distribution Provider shall notify Applicant in writing of the results of Initial Review within fifteen (15) Business Days following validation of an Interconnection Request.

As part of the evaluation of Screen M, when Integration Capacity Analysis Values are available at the requested Point of Interconnection, Distribution Provider will determine if Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated. If Distribution Provider determines that the Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated, the Distribution Provider will update the values for the proposed Point of Interconnection using the Integration Capacity Analysis tool on the specific electrical node or by running the Integration Capacity Analysis on all the electrical nodes in the circuit. Distribution Provider shall not perform additional Integration Capacity Analysis as part of the interconnection process of projects with less than 30 kilovolt amperes nameplate capacity. Distribution Provider shall share the results of any Integration Capacity Analysis updates with the Applicant and provide an explanation of changes to grid conditions or the interconnection queue which led to the need to obtain updated Integration Capacity Analysis Values. Distribution Provider shall comply with confidentiality provisions and data redaction policies.

For all Interconnection Requests that pass Initial Review and do not require Interconnection Facilities or Distribution Upgrades, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of providing notice of



Initial Review results. For Interconnection Requests that pass Initial Review but do require Interconnection Facilities or Distribution Upgrades, within fifteen (15) Business Days of providing notice of Initial Review results, Distribution Provider shall provide Applicant with a non-binding cost estimate of the Interconnection Facilities or Distribution Upgrades. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.

...

### 3. Ordering Paragraph 6 – Screens F, G, H & J for < 30 kVA Projects

Ordering Paragraph 6 requires:

*6. Modification 1 of Proposals 8f, 8g, 8h, and 8j is adopted.*

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall **modify Interconnection Rule 21 to allow interconnection projects less than 30 kilowatt volt amperes to bypass Screens F, G, H, and J.***

[emphasis and formatting added]

Note that, within the Working Group Two Report, these proposals contemplated changing the tariff language to state that these screens do not apply to Generating Facilities with a Gross Rating of “30 kVA **or less**.”<sup>21</sup>

OP 6, however, provides that the Utilities are to modify Rule 21 to allow interconnection projects “**less than 30 kilowatt volt amperes**” to bypass Screens F, G, H, and J. The Decision references both approaches.<sup>22</sup>

<sup>21</sup> Working Group Two Report at p. 52.

<sup>22</sup> Compare Decision at p. 22 (describing Modification 1 as allowing “projects less than 30 kVA” to bypass Screens F, G, H, and J) to Decision at pp. 43-44 (referencing “raising the threshold” to 30 kVA).

Within the Working Group Two Report these proposals contemplated changing the tariff language to state that these screens do not apply to Generating Facilities with a Gross Rating of “30 kVA or less.”<sup>23</sup> OP 6, however, provides that the Utilities are to modify Rule 21 to allow interconnection projects “less than 30 kilowatt volt amperes” to bypass these screens. The Decision references both approaches.<sup>24</sup>

In IREC’s protest to AL 5915-E, it asserted that the IOUs should adhere to the Working Group Two consensus agreement and exempt small generators with capacities of 30 kVA or less from screens F, G, H, and J. The IOUs agreed to adopt IREC language, and the Energy Division confirmed that we should proceed with 30 kVA “or less” instead of the OP language.

To comply with OP 6, PG&E proposes to change the tariff to allow projects 30 kVA **or less** to bypass these screens.

For the changes to Screens F, G, H and J, PG&E proposes the following changes to sheets 6 and 151-157 in section G.1.f, g, h, and j. PG&E also proposes to modify the following language to Section G.1.j as shown below.

In the Joint Utilities’ Reply to IREC Protest - September 17, 2021 it was agreed to make the following changes:

#### **B. Ordering Paragraphs 5 and 6: Screen F and Adding Screen F1**

IREC notes SDG&E omits the word “circuit.”

SDG&E agrees to add the word “circuit” in a supplemental advice letter.

[This change did not affect PG&E]

IREC writes, in the Screen F “significance” note, PG&E uses “Distribution System’s” while SCE and SDG&E use “Distribution Provider’s Distribution System.” The language should be identical across the three utilities.

PG&E agrees to use language consistent with that of SCE and SDG&E in a supplemental advice letter.

[PG&E addressed this OP 5 issue in AL 6363-E]

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<sup>23</sup> Working Group Two Report at p. 52.

<sup>24</sup> Compare Decision at p. 22 (describing Modification 1 as allowing “projects less than 30 kVA” to bypass Screens F, G, H, and J) to Decision at pp. 43-44 (referencing “raising the threshold” to 30 kVA).

In Screen F1, the Utilities use different language in their footnotes. IREC recommends that the footnote to Screen F1 read:

The protection limit is one of the components of the ICA Value that pertains to sensing faults on the grid.

The Utilities agree to adopt IREC's proposed language as a footnote in a supplemental advice letter.

[PG&E addressed this OP 5 issue in AL 6363-E. It also added in the language from screens F and F1]

### **C. Ordering Paragraph 6: Screens F, G, H & J for < 30 kVA Projects**

IREC requests that SDG&E use the language proposed by PG&E and SCE: "a Gross Rating of 30 kVA or less."

SDG&E agrees to adopt this language in a supplemental advice letter.

[This change did not affect PG&E]

PG&E also updates the Technical Framework in section 7 of this advice letter to reflect all of these changes.

#### TABLE OF CONTENTS (Cont'd.)

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

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

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Screen J: Is the Gross Rating of the Generating Facility ~~3044~~ kVA or less?

...

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

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

##### f. Screens F and F1:

Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits?

- If Yes (pass), continue to Screen F1.
- If No (fail), continue to Screen F1 pursuant to Section G.1.

Note: This Screen does not apply to Generating Facilities with a Gross Rating of ~~4430~~ kVA or less.

When measured at primary side (high side) of the Dedicated Distribution Transformer serving a Generating Facility, the sum of the Short Circuit Contribution Ratios of all Generating Facilities connected to Distribution Provider's Distribution System circuit that serves the Generating Facility must be less than or equal to 0.1.

Significance: If the Generating Facility passes this Screen, it can be expected that it will have no significant impact on Distribution Provider's Distribution System's short circuit duty, fault detection sensitivity, relay coordination or fuse-saving schemes.

Screen F1: Is the per unit Short Circuit Current Contribution under allowable levels?

Is the short circuit current contribution less than or equal to 1.2 per unit or is the Generating Facility Gross Nameplate Rating multiplied by its per unit contribution less than the protection ICA Value\* multiplied by 1.2 per unit?

- If Yes to either (pass), continue to Screen G.
- If No to both (fail), continue to Screen G pursuant to Section G.1.

Significance: Generating systems with a per unit short circuit contribution of 1.2 or less can bypass this screen and directly use the ICA because ICA calculations assume that Generating Facilities have a per unit short circuit contribution of 1.2. For Generating Facilities with a per unit short circuit contribution greater than 1.2, the Distribution Provider will use the protection ICA Value at the point of interconnection in conjunction with the Generating Facility's per unit short circuit contribution to determine whether the facility passes Screen F1.

...

\* The protection limit is one of the components of the ICA Value that pertains to sensing faults on the grid.

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

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

#### g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?

Does the proposed Generating Facility, in aggregate with other Generating Facilities on the distribution circuit, cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Request equipment on the system to exceed 87.5 % of the short circuit interrupting capability; or is the Interconnection proposed for a circuit that already exceeds 87.5 % of the short circuit interrupting capability?

- If Yes (fail) continue to Screen H pursuant to Section G.1.
- If No (pass), continue to Screen H

Note: This Screen does not apply to Generating Facilities with a Gross Rating of ~~44~~30 kVA or less.

Significance: If the Generating Facility passes this screen, it can be expected that it will not cause any of Distribution Provider's equipment to be overstressed.

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

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

#### h. Screen H: Is the line configuration compatible with the Interconnection type?

- If Yes (pass), continue to Screen I.
- If No (fail), continue to Screen I pursuant to Section G.1.

Note: This Screen does not apply to Generating Facilities with a Gross Rating of ~~44~~30kVA or less.

Line Configuration Screen: Identify primary distribution line configuration that will serve the Generating Facility. Based on the type of Interconnection to be used for the Generating Facility, determine from Table G.1 if the proposed Generating Facility passes

the Screen.

Table G-1 Type of Interconnection

| Primary Distribution Line Type Configuration                                                     | Type of Interconnection to be made to Primary Distribution Line | Result/Criteria                                                                                                     |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Three-phase, three-wire                                                                          | Any type                                                        | Pass Screen                                                                                                         |
| Three-phase, four-wire                                                                           | Single-phase, line-to-neutral                                   | Pass Screen                                                                                                         |
| Three-phase, four-wire<br>(For any line that has such a section OR mixed three-wire & four-wire) | All others                                                      | To pass, aggregate Generating Facility nameplate rating must be less than or equal to 10% of Line Section peak load |

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

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

- If Yes, Continue to Screen J. This includes Options 5, and 6, 9, 10, and 11.
- If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate one of the first four options shown Options 1, 2, 3, 4, 7, or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If Option 8 is used, see section Mm2 to determine screen application.

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

time delay. For multiple tariff interconnections refer to Section J.8.

G. ENGINEERING REVIEW DETAILS (Cont'd.)

1. INITIAL REVIEW SCREENS (Cont'd.)

Screen J: Is the Gross Rating of the Generating Facility ~~4130~~ kVA or less?

- If Yes (pass), skip Screens K, L and M; Initial Review is complete.
- If No (fail), continue to Screen K.<sup>i</sup>

Significance: The Generating Facility will have a minimal impact on fault current levels and any potential line overvoltages from loss of Distribution Provider's Distribution System neutral grounding.

#### 4. Ordering Paragraph 11 – Add 10% Buffer on ICA-SG & ICA OF Profiles

Ordering Paragraph 11 requires:

*11. Option B of Proposal 8m is adopted with modification.*

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) **shall apply a 10 percent buffer to the Integration Capacity Analysis-Static Grid profile and to the Integration Capacity Analysis Operational Flexibility profile during review of Screen M** of the Rule 21 Interconnection Application Process.*

*The need for the 10 percent buffer to the Integration Capacity Analysis-Operational Flexibility profile will be revisited by the Commission.*

***Utilities shall collect data** on the effectiveness of the 10 percent Integration Capacity Analysis-Operational Flexibility buffer (after consulting with the Commission's Energy Division) and provide the data and a recommendation on whether to retain the buffer or adjust it, in the Advice Letter on buffers for Issue 9, as required by Ordering Paragraph 15.*

[formatting and emphasis added]



IREC's protest states that Screen M should use defined terms and its questions should be phrased consistently.

- Tariff language should use defined terms when suitable.
- Rule 21 should define the term "Generation Profile" to distinguish between screens that evaluate the impact of a Generating Facility exporting its entire Gross Nameplate Rating versus a more limited amount.
- Screen M's questions and answers should be phrased consistently.

IREC also contends that Screen M should be modified in each of the Rule 21 tariffs to read as follows:

Screen M: Does the Generating Facility pass the ICA or is aggregate generation less than 15% of line section peak load?

When ICA Values are available at the requested Point of Interconnection, the Distribution Provider shall compare the ICA Values to the Gross Nameplate Rating or typical PV Generation Profile.

For Interconnection Requests based on Gross Nameplate Rating:

- a. Is the Generating Facility aggregate Gross Nameplate Rating less than or equal to 90% of the lowest value in the ICA-SG 576 Profile?

or

- b. Is the Generating Facility aggregate Gross Nameplate Rating less than or equal to 90% of the lowest value in the ICA-OF 576 Profile?

- If Yes to both (pass), Initial Review is complete.
- If No to either (fail), Supplemental Review is required.

For Interconnection Requests based on typical PV Generation Profile:

- a. Is the Generating Facility's Generation Profile based on PV Watts or equivalent less than or equal to 90% of the ICA-SG 576 Profile in any hour?
- b. Is the Generating Facility's Generation Profile based on PV Watts or equivalent less than or equal to 90% of the ICA-OF 576 Profile in any hour?

- If Yes to both (pass), Initial Review is complete.
- If No to either (fail), Supplemental Review is required.

When ICA Values are not available at the requested Point of Interconnection, Screen M should be evaluated as follows:

Is the aggregate Generating Facility capacity on the Line Section less than 15% of Line Section peak load for all line sections bounded by automatic sectionalizing devices?

- If Yes (pass), Initial Review is complete.
- If No (fail), Supplemental Review is required.

In the Joint Utilities' Reply to IREC Protest - September 17, 2021 it was agreed to make the following changes:

#### Screen M Modifications and Defined Terms

##### **A. Utilities Agree to Align Screen M Title**

For Screen M, the three Utilities have different titles.

IREC recommends using the following, a modified title for Screen M, in Rule 21's Table of Contents, the flowchart, and the screen language:

*Does the Generating Facility pass the ICA-OF or is aggregate generation less than 15% of line section peak load?*

The Utilities agree to use consistent language but propose to use the following (which includes an additional phrase):

*Does the Generating Facility pass the ICA as required in G.1.m or is aggregate generation less than 15% of line section peak load for all line sections bounded by automatic sectionalizing devices?*

Also, IREC recommends deleting the footnote that appears in different parts of Screen M for each Utility because it is outdated, and it fails to mention that each Utility's addition of Sections Mm1 through Mm4 sets new rules and allows the use of more types of systems beyond inadvertent export.

The Utilities agree to keep only the last footnote:

*\*Non-Export AC/DC Converter installations that have a complete and valid Interconnection Request will be eligible to bypass screens B through D and F through M. If the Generating Facility meets the conditions in Screen I below (Section G.1.i) skip Screens K, L and M.*

**B. Utilities Agree to Use Defined Terms in Screen M**

IREC notes the Utilities' tariff language uses the undefined term "ICA information" where it is appropriate to use the defined term "ICA Values."

The Utilities agree to make this change.

IREC notes the Utilities' tariff language uses the undefined term "output Profile" and "real power production" where the defined term "Generation Profile" is suitable.

**C. Utilities Agree to Clarify Real/Active Power in Relation to the Generation Profile Definition**

IREC proposed, and the Utilities agree in these advice letters, to define the term "Generation Profile" to mean a facility's active power output, which can be less than its full Gross Nameplate Rating. The Utilities instead use the term "real power production" in their proposed tariff language (industry today uses the term "active power" instead of "real power").

The Utilities agree to add a footnote in Rule 21 to "real power" that states: For the purposes of Rule 21, real power is the same as active power.

[See Section 1 on definitions – a new footnote is added to Inadvertent Export.]

IREC recommends modifying Screen M to accommodate the pending implementation of Limited Generation Profiles, so there is no need to revisit Screen M again in a matter of weeks after the Commission implements "Limited Generation Profiles."

The Utilities do not agree to change because the application of Limited Generation has not yet been approved and thus updated to the tariff would be determined based on future Commission ruling.

**D. Utilities Agree to Rephrase Screen M Questions and Response Options Consistently but not all IREC's Proposed Changes Are Valid**

IREC proposes to modify the new ICA questions such that any negative answer means that the project fails the screen or, alternatively, modify the existing question, as long as the questions are phrased consistently so that a negative answer produces the same result for all the questions in Screen M.

The Utilities agree and will revise accordingly in a consistent manner.

IREC notes the Advice Letters state that a project “must be evaluated under the Supplemental Review or Detailed Study” (emphasis added). A project that fails Supplemental Review will go to Detailed Study, but the direct result of failing Screen M is that the project first goes to Supplemental Review. IREC recommends that the new questions and answers include the same description of what occurs after a project passes or fails that is currently found in Screen M.

Utilities agree to strike the “Detailed Study” language

IREC also states that SCE’s description of what occurs after a project passes or fails the 15% screen is not consistent with its existing tariff, or PG&E and SDG&E’s proposal. SCE is not clear as to what this section of the protest is referring. SCE did not make any modifications to the language that follows when a project passes or fails the 15% screen.

#### **E. For Future Flexibility, the Utilities Believe Screen M Should Still Address Both ICA-SG 576 and ICA-OF 576 Profiles**

IREC points out the Utilities propose language for Screen M that asks if the Generating Facility’s Generation Profile is less than or equal to 90% of the ICA-SG 576 Profile and the ICA-OF 576 Profile. However, IREC maintains that only a question concerning the ICA-OF is needed because the ICA-OF encompasses the ICA-SG criteria.

IREC’s proposed language does not follow the requirements of OP 11, which require that the Utilities “apply a 10 percent buffer to the Integration Capacity Analysis-Static Grid profile and to the Integration Capacity Joint Utilities’ Reply to Protest Analysis-Operational Flexibility profile during review of Screen M of the Rule 21 Interconnection Application Process.”

The Utilities further note the structure should be kept for future modifications to ICA-OF. The proposed language will not be consistent with the working group report and will lead to confusion as to the source of the change. Having the language as it is now (i) does not affect how a project is evaluated, (ii) was the language agreed on in the working group report and (iii) will allow the Utilities to make additional modifications to ICA-OF as may be determined in the future.

#### **F. Proposed Language for Screen M**

IREC claims the first sentence proposed by the Utilities in Screen M is grammatically awkward because it does not have a subject.

Screen M: When ICA information is available at the requested Point of Interconnection, Screen M should be evaluated in accordance

with the Gross Nameplate Rating or typical PV output profile.  
[PG&E's version]

IREC proposes:

When ICA Values are available at the requested Point of Interconnection, the Distribution Provider shall compare the ICA Values to the Gross Nameplate Rating or typical PV Generation Profile.

Utilities agree with the proposed language.

Also, SCE also omits the word "the." SCE agrees with the proposed language.

IREC notes that in the questions evaluating the Gross Nameplate Rating, the advice letters use the term "lower." IREC recommends using the term "lowest."

Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lower value in the ICA-SG 576 Profile?  
[PG&E's language]

IREC recommends:

For Interconnection Requests based on Gross Nameplate Rating:  
Is the Generating Facility aggregate Gross Nameplate Rating less than or equal to 90% of the lowest value in the ICA-OF 576 Profile?

The Utilities agree to use "lowest."

[PG&E along with the other utilities, makes this change in one other location as well]

Lastly, IREC notes the flowchart's box for Screen M should read as follows so that it is clear to those using the flow chart what that screen is evaluating:

|                                                                                                                                                          |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Does the Generating Facility pass the ICA OF as required in G.1.m, or is aggregate generation less than 15% of line section peak load? [PG&E's language] | M |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---|

IREC recommends:

|                                                                                                                  |   |
|------------------------------------------------------------------------------------------------------------------|---|
| Does the Generating Facility pass the ICA OF or is aggregate generation less than 15% of line section peak load? | M |
|------------------------------------------------------------------------------------------------------------------|---|

The Utilities do not support using only ICA-OF as indicated above. Instead, the Utilities will use the language as indicated in I.A above.

See Section 5 of this Advice Letter describing changes to the Technical Framework.

Based on the above PG&E proposes to add the following defined terms to language to the beginning of Section G.1.m (original sheets 158-159):

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

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

Screen M: When ICA Values are available at the requested Point of Interconnection, the Distribution Provider shall compare the ICA Values to the Gross Nameplate Rating or typical PV Generation Profile.

For Interconnection Requests based on Gross Nameplate Rating:

- a. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-SG 576 Profile? or
- b. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-OF 576 Profile?

If the response is “yes” to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

For Interconnection Requests based on typical PV Generation Profile:

- a. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-SG 576 value in any hour? or
- b. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-OF 576 value in any hour?

If the response is “yes” to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

Is the aggregate Generating Facility capacity on the Line Section less than 15% of Line Section peak load for all line sections bounded by automatic sectionalizing devices?<sup>ii</sup>

- If Yes (pass), Initial Review is complete.

- If No (fail), Supplemental Review is required.

When ICA Values are not available at the requested Point of Interconnection, Screen M should be evaluated as follows:

Significance:

1. Low penetration of Generating Facility capacity will have a minimal impact on the operation and load restoration efforts of Distribution Provider's Distribution System,
2. The operating requirements for a high penetration of Generating Facility capacity may be different since the impact on Distribution Provider's Distribution System will no longer be minimal, therefore requiring additional study or controls.

The purpose of this Screen is solely to identify if the Generating Facility needs additional study and is not intended as justification for limiting the penetration of generation on a line section.

## 2. SUPPLEMENTAL REVIEW SCREENS

The Supplemental Review consists of Screens N through P. If any of the Screens are not passed, a quick review of the failed Screen(s) will determine the requirements to address the failure(s) or that Detailed Studies are required. In certain instances, Distribution Provider may be able to identify the necessary solution and determine that Detailed Studies are unnecessary. Some examples of solutions that may be available to mitigate the impact of a failed Screen are:

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

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~~<sup>ii</sup> Inadvertent Export systems that meet the requirements specified in Section Mm are processed under Screen M as described in Section Mm.~~



## **5. Rule 21 Technical Framework Flow Chart Update based on OP Changes Above**

In the Joint Utilities' Reply to IREC Protest - September 17, 2021 it was agreed to make the following changes:

### **D. The Flowcharts' Note on Non-Export Converters Should Be Identical**

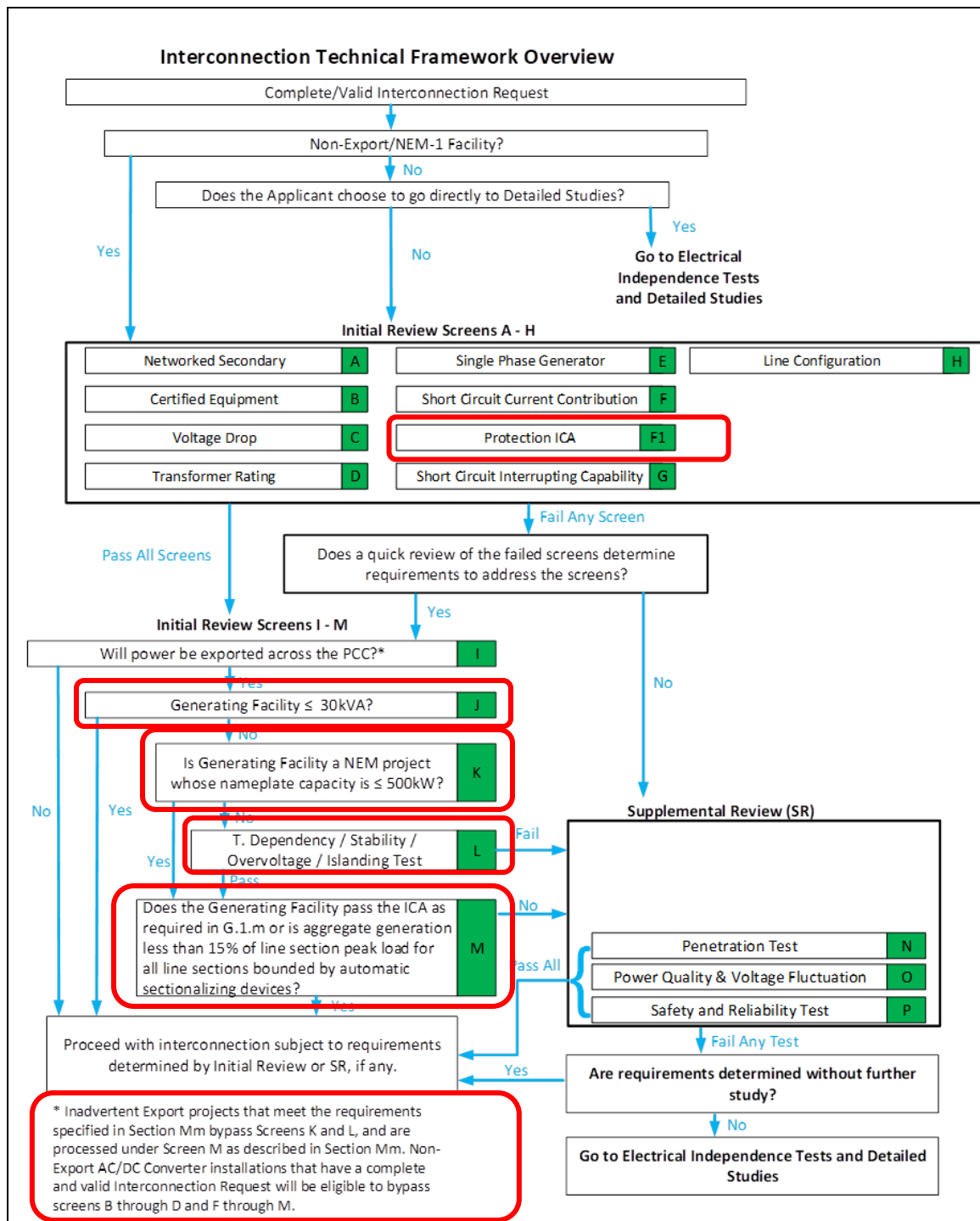
IREC points out the Utilities have different notes to discuss non-export converters in the flowchart.

IREC proposes as follows:

**\*\* Non-Export AC/DC Converter installations that have a complete and valid Interconnection Request will be eligible to bypass screens B through D and F through M.**

**The Utilities agree to adopt IREC's proposed language changes in a supplemental advice letter.**

PG&E updates the Engineering Review Details flow chart (original sheet 145) consistent with the OP changes above. Additions circled in Red.



## 6. Ordering Paragraph 12 - Screen N Thermal Overload (Proposal 8n)

Ordering Paragraph 12 requires:

12. Proposal 8n is adopted.

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall update Screen N of the Rule 21 Interconnection Application Process to account for thermal overload, while adjusting for the following three scenarios:*

*i) when the Interconnection Request is below the updated Integration Capacity Analysis value and passes Screen F1;*

*ii) when the Interconnection Request is above the updated Integration Capacity Analysis value or fails Screen F1; and*

*iii) when Integration Capacity Analysis information is not available.*

[Formatting and emphasis added]

PG&E proposes to add the following language to Section G.2.a (original sheet 160). In order to make the Energy Division Staff deadline of August 6 for this Advice Letter, PG&E is submitting it with the language below. The language is still being discussed with stakeholders, and may need to be resolved in a subsequent supplement, based on Energy Division guidance.

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

#### 2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)

##### a. Screen N: Penetration Test

If Integration Capacity Analysis Values are available at the requested Point of Interconnection, evaluate Screen N as follows:

##### i) Penetration Level Using Generating ICA Profile:

For Interconnection Requests based on Gross Nameplate Rating: Is the Generating Facility aggregate Gross Nameplate Rating equal to or below 90% of the lowest value in the ICA-SG 576 Profile?

For Interconnection Requests based on typical PV Generation Profile: Is the Generating Facility Generation Profile, based on PV Watts or equivalent, equal to or below 90% the ICA-SG value at each hour in the ICA-SG 576 Profile?

ii) Screen F1: Did the Interconnection Request pass Screen F1?

If yes to both of the above (pass), continue to Screen O.

If “no” to either or both of the above (fail), a quick review of the failure within Supplemental Review may determine the requirements to address the failure; otherwise Electrical Independence Tests or Detailed Studies are required.

- If the failure(s) that cannot be addressed in Supplemental Review, the Distribution Provider will conduct a review to identify the reasons why further studies are required.
- If the failure(s) cannot be addressed in Supplemental Review, and generation is 100% or less of the applicable ICA value (lowest value of the ICA-SG profile or lowest value at each hour) the Distribution Provider must identify a reason why a specific technical constraint is not captured by the ICA and the why the project must proceed to Electrical Independence Tests and Detailed Studies.
- If voltage is a prevailing constraint, then the smart inverter default volt/var function will be used in power flow analysis for the evaluation of the proposed project. This will reveal if the proposed project causes any voltage impacts of concern. If concerns related to steady state voltage, thermal, or protection exist and the Distribution Provider can identify simple upgrades through power flow analysis (e.g., installation of voltage regulator devices or protection devices to mitigate reduction of reach), then the Distribution Provider will determine the mitigation requirements within Screen N. When larger upgrades or complex protection evaluation is required, Screen N will fail, and the technical evaluation will be conducted under the Detailed Study process.
- If no reason for further study is identified, or if requirements to address the failure can be identified in screen N, proceed to Screen O.
- Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens if Applicant elects to proceed.
- If Integration Capacity Analysis Values are not available, evaluate Screen N as follows:

Where 12 months of line section minimum load data is available, can be calculated, can be estimated from existing data, or determined from a power flow model, is the aggregate Generating Facility capacity on the Line

Section less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility?

...

## **7. Ordering Paragraph 23 - Standard Design & Construction 60 / 60 Business Day Timeline (Issue 23, Proposal 12c)**

Ordering Paragraph 23 requires:

*23. Proposal 12c is adopted, establishing a standard timeline for design and construction of interconnection-related distribution upgrades as follows:*

- i) 60 business days for design and 60 business days for construction, or*
- ii) design and construction timelines as agreed with the customer.*

*The 60-day clock commences upon payment and after the customer has done everything necessary on their end to prepare for construction.*

[Formatting and emphasis added]

The Working Group handbook

## **F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

### **8. DESIGN AND CONSTRUCTION TIMELINE**

Subject to emergencies, delays from other agencies, and other reasons, the standard timeline for design and construction of interconnection-related Distribution Upgrades is as follows:

- i) 60 business days for design and 60 business days for construction, or
- ii) Design and construction timelines as agreed to between Applicant and Distribution Provider.

The 60-day clock commences upon payment and after Applicant has done everything necessary on its end to prepare for construction.

## 8. Other Miscellaneous Changes

- a. Update table of contents to reflect changes.
- b. In the beginning of Section Hh (original sheet 187)

The Smart Inverter default settings and default activation states may be modified upon mutual agreement between Applicant or **Producer** and Distribution Provider.

For convenience of the reader, PG&E has included “track-change” or “redline” revisions of Rule 21 in Attachment 2. PG&E implemented the use of the “(P)” symbol for Electric Rule 21 to signify material subject to change under a pending advice letter. The redlines in Attachment 2 are color coded to the specific advice letter. See Attachment 2 cover sheet for more details.

### Protests

**\*\*\*Due to the COVID-19 pandemic, PG&E is currently unable to receive protests or comments to this advice letter via U.S. mail or fax. Please submit protests or comments to this advice letter to EDTariffUnit@cpuc.ca.gov and PGETariffs@pge.com\*\*\***

Any party wishing to protest this submittal may do so by letter sent via U.S. mail, facsimile or E-mail, no later than November 24, 2021, which is 20 days after the date of this submittal. Protests must be submitted to:

CPUC Energy Division  
ED Tariff Unit  
505 Van Ness Avenue, 4<sup>th</sup> Floor  
San Francisco, California 94102

Facsimile: (415) 703-2200  
E-mail: EDTariffUnit@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest shall also be sent to PG&E either via E-mail or U.S. mail (and by facsimile, if possible) at the address shown below on the same date it is mailed or delivered to the Commission:

Sidney Bob Dietz II  
Director, Regulatory Relations  
c/o Megan Lawson  
Pacific Gas and Electric Company  
77 Beale Street, Mail Code B13U  
P.O. Box 770000  
San Francisco, California 94177

Facsimile: (415) 973-3582  
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name, telephone number, postal address, and (where appropriate) e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

### **Effective Date**

Pursuant to Decision 20-09-035 Ordering Paragraph 55 (as corrected), this advice letter is submitted with a Tier 2 designation. PG&E requests that this advice submittal become effective 180 to 240 days after it is approved, to allow to time to implement the Screen M ICA changes and related screen L changes, train staff and notify applicants of the changes.

### **Notice**

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

/S/

---

Sidney Bob Dietz II  
Director, Regulatory Relations



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

**Attachments:**

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

**Attachment 2** – Redline Tariff Revisions



# ADVICE LETTER SUMMARY

## ENERGY UTILITY



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

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

Utility type:

☒ ELC ☐ GAS ☐ WATER  
☐ PLC ☐ HEAT

Contact Person: Kimberly Loo

Phone #: (415)973-4587

E-mail: PGETariffs@pge.com

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

### EXPLANATION OF UTILITY TYPE

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

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 5915-E-B

Tier Designation: 2

Subject of AL: Second Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 120 Days from Issuance) for Ordering Paragraphs 6 and 11.

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

AL Type: ☐ Monthly ☐ Quarterly ☐ Annual ☒ One-Time ☐ Other:

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

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: 6287-E

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

Confidential treatment requested? ☐ Yes ☒ No

If yes, specification of confidential information:

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

Resolution required? ☐ Yes ☒ No

Requested effective date:

No. of tariff sheets: 223

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

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

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

Tariff schedules affected: See Attachment 1

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

Pending advice letters that revise the same tariff sheets: 6014-E-A, 6286, -E, 6363-E

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

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

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

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

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

Clear Form

| <b>Cal P.U.C.<br/>Sheet No.</b> | <b>Title of Sheet</b>                                                    | <b>Cancelling<br/>Cal P.U.C.<br/>Sheet No.</b> |
|---------------------------------|--------------------------------------------------------------------------|------------------------------------------------|
| 51706-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 4  | 50320-E                                        |
| 51707-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 5  | 50321-E                                        |
| 51708-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 6  | 50812-E                                        |
| 51709-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 7  | 50813-E                                        |
| 51710-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 8  | 50814-E                                        |
| 51711-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 9  | 50815-E                                        |
| 51712-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 10 | 50816-E                                        |
| 51713-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 11 | 50817-E                                        |
| 51714-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 12 | 50818-E                                        |
| 51715-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 13 | 50819-E                                        |
| 51716-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 14 | 50820-E                                        |
| 51717-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 23 | 42320-E                                        |
| 51718-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 24 | 50821-E                                        |
| 51719-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 25 | 42322-E                                        |

| <b>Cal P.U.C.<br/>Sheet No.</b> | <b>Title of Sheet</b>                                                    | <b>Cancelling<br/>Cal P.U.C.<br/>Sheet No.</b> |
|---------------------------------|--------------------------------------------------------------------------|------------------------------------------------|
| 51720-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 26 | 50332-E                                        |
| 51721-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 27 | 50333-E                                        |
| 51722-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 28 | 42325-E                                        |
| 51723-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 78 | 50348-E                                        |
| 51724-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 79 |                                                |
| 51725-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 80 | 50349-E                                        |
| 51726-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 81 | 50350-E                                        |
| 51727-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 82 | 50351-E                                        |
| 51728-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 83 | 50352-E                                        |
| 51729-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 84 | 50353-E                                        |
| 51730-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 85 | 50354-E                                        |
| 51731-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 86 | 50355-E                                        |
| 51732-E                         | ELECTRIC RULE NO. 21<br>GENERATING FACILITY INTERCONNECTIONS<br>Sheet 87 | 50356-E                                        |
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**C. DEFINITIONS (Cont'd.)**

**Field Testing:** Testing performed in the field to determine whether equipment meets Distribution Provider's requirements for safe and reliable Interconnection.

**Function:** Some combination of hardware and software designed to provide specific features or capabilities. Its use, as in Protective Function, is intended to encompass a range of implementations from a single-purpose device to a section of software and specific pieces of hardware within a larger piece of equipment to a collection of devices and software.

**Generating Facility:** All Generators, electrical wires, equipment, and other facilities, excluding Interconnection Facilities, owned or provided by Producer for the purpose of producing electric power, including storage.

**Generating Facility Capacity:** The net capacity of the Generating Facility and the aggregate net capacity of the Generating Facility where it includes multiple Generators.

**Generation Profile:** The active power output of a Generating Facility over a period of time. The Generation Profile may be less than the Gross Nameplate Capacity at certain times, for example when using a typical PV Generation Profile or a Limited Generation Profile.

(N)  
|  
(N)

**Generator:** A device converting mechanical, chemical, or solar energy into electrical energy, including all of its protective and control functions and structural appurtenances. One or more Generators comprise a Generating Facility.

**Generator Interconnection Agreement:** An agreement between Distribution Provider and Producer providing for the Interconnection of a Generating Facility that gives certain rights and obligations to effect or end Interconnection. For the purpose of this Rule, Net Energy Metering or power purchase agreements authorized by the Commission are also defined as Generator Interconnection Agreements.

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**C. DEFINITIONS (Cont'd.)**

**Good Utility Practice:** Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

**Governmental Authority:** Any federal, state, local or other governmental regulatory or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, or other governmental authority having jurisdiction over the Parties, their respective facilities, or the respective services they provide, and exercising or entitled to exercise any administrative, executive, police, or taxing authority or power; provided, however, that such term does not include Interconnection Customer, Distribution Provider, or any Affiliate thereof.

**Gross Rating; Gross Nameplate Rating; Gross Capacity or Gross Nameplate Capacity:** The total gross generating capacity of a Generator or Generating Facility as designated by the manufacturer(s) of the Generator(s).

**Host Load:** The electrical power, less the Generator auxiliary load, consumed by the Customer, to which the Generating Facility is connected.

**Inadvertent Export:** The unscheduled and uncompensated export of real power\* from a Generating Facility (GF) for a limited duration as specified in Sections M, Mm and Mm3.

(T)  
(P)

**Independent Study Process:** The interconnection study process set forth in Section F.3.d.

**Initial Review:** See Section F.2.a.

**In-rush Current:** The current determined by the In-rush Current Test.

(L)

**In-Service Date:** The estimated date upon which Applicant reasonably expects it will be ready to begin use of Distribution Provider's Interconnection Facilities.

(L)

\* For the purpose of Rule 21, real power is the same as active power.

(N)

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

Sheet 25

**C. DEFINITIONS (Cont'd.)**

**Integration Capacity Analysis (ICA) Values:** Values which represent the maximum capacity that can be interconnected at a given Point of Interconnection without exceeding Distribution Provider equipment thermal limits or any of the Distribution System voltage, power quality, protection, and operational flexibility (safety) limits, each of which is independently calculated.

**Integration Capacity Analysis – Operational Flexibility 576 (ICA-OF 576) Profile:** Annual Profile composed of 576 hours where each hour is represented by its ICA-OF Value.

**Integration Capacity Analysis – Operational Flexibility (ICA-OF) Values:** The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, protection, and operational flexibility ICA Values.

**Integration Capacity Analysis – Static Grid 576 (ICA-SG 576) Profile:** Annual Profile composed of 576 hours where each hour is represented by its ICA-SG Value.

**Integration Capacity Analysis – Static Grid (ICA-SG) Values:** The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, and protection ICA Values.

**Interconnection; Interconnected:** The physical connection of a Generating Facility in accordance with the requirements of this Rule so that Parallel Operation with Distribution Provider's Distribution or Transmission System can occur (has occurred).

**Interconnection Agreement:** See Generator Interconnection Agreement.

**Interconnection Customer:** See Applicant.

**Interconnection Facilities:** The electrical wires, switches and related equipment that are required in addition to the facilities required to provide electric Distribution Service to a Customer to allow Interconnection. Interconnection Facilities may be located on either side of the Point of Common Coupling as appropriate to their purpose and design. Interconnection Facilities may be integral to a Generating Facility or provided separately. Interconnection Facilities may be owned by either Producer or Distribution Provider.

(L)  
(N)

(N)

(L)  
|  
(L)

(Continued)



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

Sheet 26

**C. DEFINITIONS (Cont'd.)**

**Interconnection Facilities Study:** A study conducted by Distribution Provider for an Interconnection Customer under the Independent Study Process to determine a list of facilities (including Distribution Provider's Interconnection Facilities, Distribution Upgrades, and Network Upgrades as identified in the Interconnection System Impact Study), the cost of those facilities, and the time required to interconnect the Generating Facility with Distribution Provider's Distribution or Transmission System. The scope of the study is defined in Section G.3.c.

(L)

**Interconnection Financial Security:** Any of the financial instruments listed in Section F.4.a.

(L)

**Interconnection Request:** An Applicant's request to interconnect a new Generating Facility, or to increase the capacity of, or make a Material Modification to the operating characteristics of, an existing Generating Facility that is interconnected with Distribution Provider's Distribution or Transmission System.

**Interconnection Study:** A study to establish the requirements for Interconnection of a Generating Facility with Distribution Provider's Distribution System or Transmission System, pursuant to this Rule.

**Interconnection System Impact Study:** An engineering study conducted by Distribution Provider for an Interconnection Customer under the Independent Study Process that evaluates the impact of the proposed interconnection on the safety and reliability of Distribution Provider's Distribution and/or Transmission System and, if applicable, an Affected System. The scope of the study is defined in Section G.3.c.i.

**Island; Islanding:** A condition on Distribution Provider's Distribution System in which one or more Generating Facilities deliver power to Customers using a portion of Distribution Provider's Distribution System that is electrically isolated from the remainder of Distribution Provider's Distribution System.

**Large Generating Facility:** A Generating Facility having a Generating Facility Capacity of more than 20 MW.

**Like for like:** For inverters, like-for-like means certified, same nameplate or smaller, same fault current or smaller. For solar panels, like-for-like means certified, same CEC-AC rating of the system or smaller. For batteries, like-for-like means same or less kWh & kW rating and same operating profile. For transformers, like-for-like means same connection type, same or smaller impedance and capacity.

(L)

(Continued)



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

Sheet 27

**C. DEFINITIONS (Cont'd.)**

**Line Section:** That portion of Distribution Provider's Distribution or Transmission System connected to a Customer bounded by automatic sectionalizing devices or the end of the distribution line.

(L)

**Local Furnishing Bond:** Tax-exempt bonds utilized to finance facilities for the local furnishing of electric energy, as described in Internal Revenue Code, 26 U.S.C. § 142(f).

**Local Furnishing Distribution Provider:** Any Distribution Provider that owns facilities financed by Local Furnishing Bonds.

(L)

**Mandatory Operation:** The Smart Inverter operates at maximum available current without tripping during Distribution Provider's Transmission or Distribution System excursions outside the region of continuous operation. Any functions that protect the Smart Inverter from damage may operate as needed.

**Material Modification:** Those modifications that have a material impact on cost or timing of any Interconnection Request with a later queue priority date or a change in Point of Interconnection. A Material Modification does not include a change in ownership of a Generating Facility, (ii) a modification described in Table F.1, nor (iii) a modification described in Tables Ee.1, 2 or 3 that does not require a new interconnection request.

**Metering:** The measurement of electrical power in kilowatts (kW) and/or energy in kilowatt-hours (kWh), and if necessary, reactive power in kVAR at a point, and its display to Distribution Provider, as required by this Rule.

**Metering Equipment:** All equipment, hardware, software including meter cabinets, conduit, etc., that are necessary for Metering.

**Momentary Cessation:** The Smart Inverter momentarily reduces current output to the Distribution Provider's Transmission or Distribution System to below 10% of the maximum continuous output current rating. The Smart Inverter is allowed to increase current output to the Distribution Provider's Transmission or Distribution System without any intentional reconnection delay once voltage exits the Momentary Cessation region and enters a Permissive Operation region or Continuous Operation region.

(L)

(L)

(Continued)





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

Sheet 78

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS**

**a. Initial Review**

Upon receipt of a complete and valid Interconnection Request, Distribution Provider shall perform Initial Review using the process in Section G.1. The Initial Review determines if (i) the Generating Facility qualifies for Fast Track Interconnection through Initial Review, or (ii) the Generating Facility requires a Supplemental Review. Absent extraordinary circumstances, Distribution Provider shall notify Applicant in writing of the results of Initial Review within fifteen (15) Business Days following validation of an Interconnection Request.

As part of the evaluation of Screen M, when Integration Capacity Analysis Values are available at the requested Point of Interconnection, Distribution Provider will determine if Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated. If Distribution Provider determines that the Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated, the Distribution Provider will update the values for the proposed Point of Interconnection using the Integration Capacity Analysis tool on the specific electrical node or by running the Integration Capacity Analysis on all the electrical nodes in the circuit. Distribution Provider shall not perform additional Integration Capacity Analysis as part of the interconnection process of projects with less than 30 kilovolt amperes nameplate capacity. Distribution Provider shall share the results of any Integration Capacity Analysis updates with the Applicant and provide an explanation of changes to grid conditions or the interconnection queue which led to the need to obtain updated Integration Capacity Analysis Values. Distribution Provider shall comply with confidentiality provisions and data redaction policies

(N)

(N)

(L)

(L)

(Continued)



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

Sheet 79

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

(L)

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd)**

**a. Initial Review (Cont'd)**

For all Interconnection Requests that pass Initial Review and do not require Interconnection Facilities or Distribution Upgrades, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of providing notice of Initial Review results. For Interconnection Requests that pass Initial Review but do require Interconnection Facilities or Distribution Upgrades, within fifteen (15) Business Days of providing notice of Initial Review results, Distribution Provider shall provide Applicant with a non-binding cost estimate of the Interconnection Facilities or Distribution Upgrades. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.

For all Interconnection Requests that pass Initial Review, refer to Section F.2.e for cost responsibility and time frames for completing the Generator Interconnection Agreement.

(L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted  
Effective  
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November 4, 2021





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

Sheet 80

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS**

**a. Initial Review (Cont'd.)**

For Interconnection Requests that fail Initial Review, Distribution Provider shall provide the technical reason, data and analysis supporting the Initial Review results in writing and provide Applicant the option to either attend an Initial Review results meeting or proceed directly to Supplemental Review. NEM-1 and  $\leq 1$  MW NEM-2 Applicants covered under Section D.13.a, and Applicants that pre-pay for the Supplemental Review (such as concurrently with the Interconnection Request Fee), shall proceed directly to Supplemental Review without an Initial Review results meeting. Applicant shall notify Distribution Provider within ten (10) Business Days following such notification whether to (i) proceed to an Initial Review results meeting, (ii) proceed to Supplemental Review, or (iii) withdraw the Interconnection Request. Applicant may request one extension of no more than ten (10) Business Days to respond. If Applicant fails to notify Distribution Provider within ten (10) Business Days of such notification, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn.

No changes may be made to the planned Point of Interconnection or Generating Facility size included in the Interconnection Request during the Fast Track Process, except as provided in Table F.1 below, or unless such changes are agreed to by Distribution Provider. Where agreement has not been reached, Applicants choosing to change the Point of Interconnection or Generating Facility size, except as provided for in Table F.1, must reapply and submit a new Interconnection Request.

Applicants that elect to proceed to Supplemental Review, unless the Applicant has pre-paid, shall provide a nonrefundable Supplemental Review fee set forth in Section E.2.c with their response. The Supplemental Review fee shall be waived for Interconnection Requests requesting Interconnection of NEM-1 or  $\leq 1$  MW NEM-2 Generating Facilities and for solar-powered non-NEM  $\leq 1$  MW Generating Facilities that do not sell power to Distribution Provider, per Commission D.01-07-027.

(L)

(Continued)



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

Sheet 81

F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)

(L)

2. FAST TRACK INTERCONNECTION REVIEW PROCESS

a. Initial Review (Cont'd.)

TABLE F.1 – MODIFICATION TO PENDING APPLICATIONS (D. 19-03-013 Type I Changes)

| <b>Modifications to Interconnection Applications Under the Fast Track Modifications to Interconnection Applications Under the Fast Track</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------|
| <ol style="list-style-type: none"> <li>The number of modification requests per Interconnection Request is limited to one.</li> <li>D.19-03-013 gives Distribution Provider the discretion to allow additional modification requests. Distribution Provider is encouraged to exercise this discretion in instances when Distribution Provider has caused the need for an additional modification request.</li> <li>From the date of the proposed modification request is received, the Distribution Provider shall process the request within: <ol style="list-style-type: none"> <li>ten (10) Business Days if no re-study is required</li> <li>twenty (20) Business Days if a re-study is required</li> </ol> </li> <li>Except as allowed in Section E.4 for NEM customers, if a project downsizes, the revised shall not affect the cost responsibility or timing of interconnection of other projects.</li> <li>Additional changes outside of the modification types identified herein will not be accepted under the Fast Track process.</li> </ol> |                                    |                    |
| Description of Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Application Modifications Allowed? | Fee                |
| "Like-for-like" <sup>1</sup> equipment replacements meeting the following criteria: <ul style="list-style-type: none"> <li>Does not increase facility size<sup>2</sup>;</li> <li>No size decrease exceeding 20%; and</li> <li>No identified upgrades or mitigations.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                | n/a                |
| Size reductions meeting the following criteria: <ol style="list-style-type: none"> <li>No size reduction exceeding 20%; and</li> <li>Identified upgrades or mitigations are paid for by the customer</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                | n/a                |
| Size reductions to avoid upgrades meeting the following criteria: <ol style="list-style-type: none"> <li>The re-study determines that the modification affects no other distributed energy resource</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                                | \$300 <sup>3</sup> |
| Other types of modifications outside of those listed in this table will not be accepted without a new application.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No                                 |                    |

<sup>1</sup> Like-for-like is defined in Section C

<sup>2</sup> System size pursuant to D.19-03-013, footnote 43 on p.22 is defined as the follows:

| For solar systems                                                                      | For energy storage systems                                                                                                       | For all other generation types              |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| the lesser of inverter nameplate capacity (kW) or maximum solar output (CEC-AC rating) | both the inverter nameplate capacity (kW) and the capacity of the storage device (kWh) are considered in the definition of size. | the gross nameplate rating of the generator |

<sup>3</sup> Pursuant to D.19-03-013, p.22

(L)

(Continued)





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

Sheet 82

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Optional Initial Review Results Meeting**

Within five (5) Business Days of Applicant's request for an Initial Review results meeting, Distribution Provider shall contact Applicant and offer to convene a meeting at a mutually acceptable time to review the Initial Review screen analysis and related results to determine what modifications, if any, may permit the Generating Facility to be connected safely and reliably without Supplemental Review.

In the event the Applicant has pre-paid the Supplemental Review fee (such as concurrently with the Interconnection Request Fee), the Distribution Provider will proceed, if necessary, with Supplemental Review upon completion of Initial Review and shall not be required to offer an Initial Review results meeting.

If modifications that obviate the need for Supplemental Review are identified, and Applicant and Distribution Provider agree to such modifications, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of the Initial Review results meeting if no Interconnection Facilities or Distribution Upgrades are required. If Interconnection Facilities or Distribution Upgrades are required, Distribution Provider shall provide Applicant with a non-binding cost estimate of any Interconnection Facilities or Distribution Upgrades within fifteen (15) Business Days of the Initial Review results meeting. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.

For all Interconnection Requests that pass Initial Review, refer to Section F.2.e for cost responsibility and time frames for completing the Generator Interconnection Agreement.

(L)

(Continued)



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

Sheet 83

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Optional Initial Review Results Meeting (Cont'd.)**

If Applicant and Distribution Provider are unable to identify or agree to modifications that enable Applicant to pass Initial Review, Applicant shall notify Distribution Provider within ten (10) Business Days of the Initial Review results meeting whether it would like to proceed with Supplemental Review or withdraw its Interconnection Request. Applicant may request one extension of no more than ten (10) Business Days to respond. If Applicant fails to notify Distribution Provider within ten (10) Business Days of the Initial Review results meeting, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn.

**c. Supplemental Review**

- i) If Applicant requests Supplemental Review and submits a nonrefundable Supplemental Review fee, if required, Distribution Provider shall complete Supplemental Review within twenty (20) Business Days, absent extraordinary circumstances, following authorization and receipt of the fee. Supplemental Review determines if (i) the Generating Facility qualifies for Fast Track Interconnection, or (ii) the Generating Facility requires Detailed Study.
- ii) If the Applicant pre-paid the Supplemental Review fee (such as concurrently with the Interconnection Request Fee), Distribution Provider will complete the Supplemental Review, if required, within twenty (20) Business Days from the completion of the Initial Review.
- iii) If the Applicant chooses to move to Supplemental Review or has pre-paid the non-refundable Supplemental Review fee, they have the option to elect that the Distribution Provider provide a fault current study as part of the Supplemental Review. This fault current study would extend the Supplemental Review time by up to ten (10) Business Days, and would require an additional nonrefundable fee of \$1,000.

This fault current study will determine if the Generating Facility can detect phase and ground faults on the Distribution Provider's Distribution System or the distribution feeder breaker where the Applicant proposes to connect the Generating Facility.

(L)

(Continued)



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

Sheet 84

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**c. Supplemental Review (Cont'd.)**

- iii) The result of the fault current study will determine if direct transfer trip (DTT) will be required from the Distribution System to the Generating Facility site. Note that for Applicants proposing to interconnect to the Distribution System where there is expected to be power backfeed to the Transmission System, DTT from the transmission may still be required and a Detailed Interconnection Study will be required to make this determination (Cont'd).

(L)

Should the Applicant request a Supplemental Review results meeting, as described in Section F.2d, the optional fault current study analysis and related results shall, at the Applicant's request, be reviewed to determine what modifications, if any, may permit the Generating Facility to be connected safely and reliably.

The Applicant must provide the following data to Distribution Provider when requesting Supplemental Review in order to select this option:

**Generator:**

MVA Rating  
kV Rating  
Base MVA  
Base kV  
Xd" (direct axis subtransient reactance)  
Xd' (direct axis transient reactance)  
Xd (Synchronous reactance)  
X2 (Negative Sequence reactance)  
X0 (Zero Sequence reactance)

**XFMR Data:**

Winding configuration (delta-Wye grd or Wye grd-Delta)  
MVA Rating  
KV Rating  
Base MVA  
Base KV  
Z1 HV-LV  
Z0 HV-LV

(L)

(Continued)



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

Sheet 85

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Supplemental Review (Cont'd.)
- iii) Line Data:
- Impedance data for line from XFMR to POI (if applicable)
- Z1
- Z0
- POI Location
- iv) For Interconnection Requests that pass Supplemental Review and do not require Interconnection Facilities or Distribution Upgrades, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of providing notice of Supplemental Review results. For Interconnection Requests that pass Supplemental Review and do require Interconnection Facilities or Distribution Upgrades, within fifteen (15) Business Days of providing notice of Supplemental Review results, Distribution Provider shall provide Applicant with a non-binding cost estimate of any Interconnection Facilities or Distribution Upgrades. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.
- For all Interconnection Requests that pass Supplemental Review, refer to Section F.2.e for cost responsibility and time frames for completing the Generator Interconnection Agreement. (L)

(Continued)



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

Sheet 86

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Supplemental Review (Cont'd.)
- v) For Interconnection Requests that fail Supplemental Review, Distribution Provider shall provide the technical reason, data and analysis supporting the Supplemental Review results in writing, including, if Distribution Provider can make the determination, which Detailed Study track Applicant qualifies for, and provide Applicant the option to attend a Supplemental Review results meeting or proceed directly to Detailed Study. Applicant shall notify Distribution Provider within fifteen (15) Business Days following such notification whether to (i) proceed to a Supplemental Review results meeting, (ii) proceed to Detailed Study, or (iii) withdraw the Interconnection Request. Applicant may request one extension of no more than fifteen (15) Business Days to respond. If Applicant fails to notify Distribution Provider within fifteen (15) Business Days of such notification, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn.
- Applicants that elect to proceed to Detailed Study shall provide the applicable study deposit set forth in Section E.3.a with their response. Detailed Study fees for solar Generating Facilities up to 1 MW interconnecting to the Distribution System that do not sell power to Distribution Provider will be waived up to the amount of \$5,000. Except as provided for in Section F.3.d, NEM-1 and ≤1 MW NEM-2 Generating Facilities are exempt from any costs associated with Detailed Studies.
- (L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution



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

Sheet 87

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- d. Optional Supplemental Review Results Meeting
- Within five (5) Business Days of Applicant's request for a Supplemental Review results meeting, Distribution Provider shall contact Applicant and offer to convene a meeting at a mutually acceptable time to review the Supplemental Review screen analysis and related results to determine what modifications, if any, may permit the Generating Facility to be connected safely and reliably without Detailed Study.
- If modifications that obviate the need for Detailed Study are identified and Applicant and Distribution Provider agree to such modifications, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of the Supplemental Review results meeting if no Interconnection Facilities or Distribution Upgrades are required. If Interconnection Facilities or Distribution Upgrades are required, Distribution Provider shall provide Applicant with a non-binding cost estimate of any Interconnection Facilities or Distribution Upgrades within fifteen (15) Business Days of the Supplemental Review results meeting. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.
- For all Interconnection Requests that pass Supplemental Review, refer to Section F.2.e for cost responsibility and time frames for completing the Generator Interconnection Agreement. (L)

(Continued)





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

Sheet 88

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- d. Optional Supplemental Review Results Meeting (Cont'd.)
- If Applicant and Distribution Provider are unable to identify or agree to modifications, Applicant shall notify Distribution Provider within twenty (20) Business Days of the Supplemental Review Results Meeting whether it would like to proceed with Detailed Study or withdraw its Interconnection Request. Applicant may request one extension of no more than twenty (20) Business Days to respond. If Applicant fails to notify Distribution Provider within twenty (20) Business Days of the Supplemental Review results meeting, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn. Applicants that elect to proceed to Detailed Study shall provide the applicable study deposit set forth in Section E.3.a.
- e. Execution of the Generator Interconnection Agreement
- For Interconnection Requests where Applicant has not selected the Cost Envelope Option, Following the receipt of a cost estimate for any Distribution Upgrades and/or Interconnection Facilities that have been identified, Applicant shall notify Distribution Provider within fifteen (15) Business Days whether Applicant: (i) requests a Generator Interconnection Agreement, or (ii) withdraws its Interconnection Request. Applicant may request one extension of no more than fifteen (15) Business Days to respond. If Applicant fails to notify Distribution Provider within fifteen (15) Business Days, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn. If Applicant elects to proceed to a Generator Interconnection Agreement, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement for Applicant's signature within fifteen (15) Business Days of Applicant's request. (L)

(Continued)



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

Sheet 89

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- e. Execution of the Generator Interconnection Agreement (Cont'd.)
- For those Interconnection Requests where Applicant has selected the Cost Envelope Option and has provided the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Distribution Provider shall complete and issue to Applicant the Cost Envelope Estimate within twenty (20) Business Days following Distribution Provider's receipt of the Cost Envelope Option deposit in accordance with F.7.d. Once the Cost Envelope Estimate is issued, Applicant shall notify Distribution Provider within fifteen (15) Business Days of notification whether Applicant: (i) requests a Generator Interconnection Agreement, or (ii) withdraws its Interconnection Request. Applicant may request one extension of no more than fifteen (15) Business Days to respond. If Applicant fails to notify Distribution Provider within fifteen (15) Business Days, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn. If Applicant elects to proceed to a Generator Interconnection Agreement, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement for Applicant's signature within fifteen (15) Business Days of Applicant's request.
- Upon receipt of a draft Generator Interconnection Agreement, Applicant has ninety (90) Calendar Days to sign and return the Generator Interconnection Agreement. Applicant shall provide written comments, or notification of no comments, to the draft Generator Interconnection Agreement and appendices within thirty (30) Calendar Days. At the request of Applicant, Distribution Provider shall begin negotiations with Applicant at any time after Distribution Provider provides Applicant with the draft Generator Interconnection Agreement, which contains in its appendices the cost estimate for any Distribution Upgrades and/or Interconnection Facilities that have been identified by Distribution Provider. Distribution Provider and Applicant (L)

(Continued)





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

Sheet 90

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
- e. Execution of the Generator Interconnection Agreement (Cont'd.)
- shall negotiate concerning the cost estimate, or any disputed provisions of the appendices to a draft Generator Interconnection Agreement, for not more than ninety (90) Calendar Days after Distribution Provider provides Applicant with the Generator Interconnection Agreement. If Applicant determines that negotiations are at an impasse, it may request termination of the negotiations and initiate Dispute Resolution procedures pursuant to Section K. If Applicant fails to sign the Generator Interconnection Agreement or initiate Dispute Resolution within ninety (90) Calendar Days, the Interconnection Request shall be deemed withdrawn.
- After Applicant, or a Producer where those are different entities, has executed the Generator Interconnection Agreement, Distribution Provider will commence design, procurement, construction and installation of Distribution Provider's Distribution Upgrades and/or Interconnection Facilities that have been identified in the Generator Interconnection Agreement. Distribution Provider and Producer will use good faith efforts to meet schedules in accordance with the requirements of the Generator Interconnection Agreement and estimated costs as appropriate. Producer is responsible for all applicable costs associated with Parallel Operation to support the safe and reliable operation of the Distribution System and Transmission System as set forth in Section E.4.
- Distribution Provider and Producer shall negotiate in good faith concerning a schedule for the construction of Distribution Provider's Interconnection Facilities and Distribution Upgrades. (L)
- Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider shall schedule a mitigation work scoping meeting no later than 10 business days after receiving the payment for the engineering advance. (P)
- Distribution Provider shall provide quarterly updates on substation upgrades to Producers whose projects are dependent on a substation upgrade. (P)

(Continued)



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

Sheet 91

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS**

**a. Detailed Study Track Selection Process**

For all Detailed Study Applicants, as well as Applicants that have failed Fast Track initial review and/or supplemental review, the specific Detailed Study track for which Applicant is eligible will be determined by the application of Screens Q and R. For Applicants that require application of Screens Q and R, absent extraordinary circumstances, within twenty (20) Business Days following validation of an Interconnection Request and receipt of the appropriate study deposit set forth in Section E.3.a, Distribution Provider will apply Screen Q, and if applicable, Screen R and provide Applicant with the screen results as set forth below.

If Applicant fails Screen Q, Distribution Provider shall provide the data and analysis supporting Screen Q results in writing. The Interconnection Request will be processed in accordance with Section F.3.d below.

(L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution



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

Sheet 92

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- a. Detailed Study Track Selection Process (Cont'd.)
- If Applicant passes Screen Q, but fails Screen R, Distribution Provider shall provide data and analysis supporting the Screen R results in writing. Applicant shall notify Distribution Provider within twenty (20) Business Days following such notification whether it would like to (i) proceed to the Distribution Group Study Process or (ii) withdraw the Interconnection Request. Applicant may request one extension of no more than twenty (20) Business Days to respond. However, Applicant's decision must be received prior to the close of a given Distribution Group Study window, to participate in that Distribution Study Group. If the decision is received after the close of a particular Distribution Group Study window, then Applicant's Interconnection Request will be included in the next available Distribution Group Study window.
- If Applicant fails to notify Distribution Provider within twenty (20) Business Days of receiving Screen R results, or at the end of the extension, if one was requested, the Interconnection Request shall be deemed withdrawn.
- If Applicant elects to proceed to the Distribution Group Study Process, the Interconnection Request will be processed in accordance with Section F.3.c below.
- A Distribution Study Group will be comprised of all Interconnection Requests that are determined to be electrically interdependent based on results of Screen R. A Distribution Study Group may contain only one Interconnection Request.
- Applicant(s) that opt to proceed to the Distribution Group Study Process will be re-evaluated under Screen Q. If the Distribution Study Group fails Screen Q, the Applicants will be required to withdraw and move to the WDT Transmission Cluster Process.
- If Applicant passes Screens Q and R, the Interconnection Request will be processed in accordance with Section F.3.b below.
- If Applicant elects to proceed to the WDT Transmission Cluster Study Process, Interconnection Request will be processed in accordance with Section F.3.d. (L)

(Continued)



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

Sheet 93

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Independent Study Process**

**i) Scoping Meeting**

Within five (5) Business Days after Distribution Provider notifies Applicant that the Interconnection Request has passed Screens Q and R and is thus eligible for the Independent Study Process, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant and Distribution Provider for a scoping meeting. Distribution Provider shall inform Applicant of the Detailed Study start date.

The purpose of the scoping meeting shall be: (i) to discuss reasonable Commercial Operation Dates and alternative interconnection options; (ii) to exchange information, including any transmission data that would reasonably be expected to impact Applicant's interconnection options; (iii) to analyze such information; and (iv) to determine feasible Points of Interconnection and eliminate alternatives given resources and available information.

Distribution Provider will bring to the scoping meeting, as reasonably necessary to accomplish its purpose, such already available technical data, including, but not limited to; (i) general facility loadings, (ii) general instability issues, (iii) general short circuit issues, (iv) general voltage issues, and (v) general reliability issues.

Applicant will bring to the scoping meeting, in addition to the technical data in Attachment A of the Rule 21 Exporting Generating Facility Interconnection Request form, any system studies previously performed. Distribution Provider, the CAISO, if applicable, and Applicant will also bring to the meeting personnel and other resources as may be reasonably required to accomplish the purpose of the meeting in the time allocated for the meeting. On the basis of the meeting, Applicant shall designate its Point of Interconnection. The duration of the meeting shall be only what is sufficient to accomplish its purpose.

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

Sheet 94

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- b. Independent Study Process (Cont'd.)
- i) Scoping Meeting (Cont'd.)
- Within fifteen (15) Business Days after the scoping meeting, Distribution Provider shall provide Applicant with a Detailed Study Agreement, which shall contain an outline of the scope of the Interconnection System Impact Study and Interconnection Facilities Study, contain a non-binding good faith estimate of the cost to perform such studies, and shall specify that Applicant is responsible for the actual cost of the Interconnection Studies, including reasonable administrative costs. Applicant shall execute and deliver to Distribution Provider the Detailed Study Agreement no later than thirty (30) Business Days after the scoping meeting, or the Interconnection Request shall be deemed withdrawn.
- ii) Timing of the Interconnection System Impact Study Results
- Absent extraordinary circumstances, Distribution Provider shall complete and issue a final Interconnection System Impact Study report within sixty (60) Business Days after the execution of a Detailed Study Agreement. If the System Impact Study indicates a need for Network Upgrades on the Transmission System, Distribution Provider will share applicable study results with the CAISO for review and comment and will incorporate comments into the final Interconnection System Impact Study report.
- At any time Distribution Provider determines that it will not meet the required time frame for completing the Interconnection System Impact Study, Distribution Provider shall notify Applicant in writing as to the status of the Interconnection System Impact Study and provide an estimated completion date with an explanation of the reasons why additional time is required. (L)

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

Sheet 95

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- b. Independent Study Process (Cont'd.)
- ii) Timing of the Interconnection System Impact Study Results (Cont'd.)
- Upon request, Distribution Provider shall provide Applicant all relevant supporting documentation, workpapers and pre-Interconnection Request and post-Interconnection Request power flow, short circuit and stability databases, and currently planned Distribution Upgrades relevant to the Interconnection Request for the Interconnection System Impact Study. Applicant may be required to sign a non-disclosure agreement with terms consistent with Section D.7 regarding Confidentiality.
- iii) Interconnection System Impact Study Results Meeting
- Applicant shall request a results meeting within ten (10) Business Days of the issuance of the final Interconnection System Impact Study report. This results meeting, if requested, shall be held among Distribution Provider, the CAISO, if applicable, and Applicant to discuss the results of the Interconnection System Impact Study, including assigned cost responsibility. Within five (5) Business Days of the request, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant, Distribution Provider and the CAISO, if applicable, for the results meeting.
- If Applicant does not request a results meeting within the specified time above, the results meeting will be deemed waived. (L)

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

Sheet 96

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (L) |
| 3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
| b. Independent Study Process (Cont'd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |
| iv) Initial Posting of Interconnection Financial Security                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |
| Applicant shall make its initial posting of Interconnection Financial Security in accordance with the requirements of Section F.4.b, within sixty (60) Calendar Days after issuance of the final Interconnection System Impact Study report, or its Interconnection Request shall be deemed withdrawn. The initial posting of Interconnection Financial Security will be based on the cost responsibility for Network Upgrades, Distribution Upgrades, and Distribution Provider's Interconnection Facilities set forth in the final Interconnection System Impact Study report.                                                                                                                                                                                  |     |
| v) Modifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |
| At any time during the course of the Interconnection Studies, Applicant, Distribution Provider, or the CAISO, as applicable, may identify changes to the planned Interconnection that may improve the costs and benefits (including reliability) of the Interconnection, and the ability of the proposed change to accommodate the Interconnection Request. To the extent the identified changes are acceptable to Distribution Provider, the CAISO, as applicable, and Applicant, such acceptance not to be unreasonably withheld, Distribution Provider shall modify the Point of Interconnection and/or configuration in accordance with such changes without altering the Interconnection Request's eligibility for participating in Interconnection Studies. |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (L) |

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

Sheet 97

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Independent Study Process (Cont'd.)**

**v) Modifications (Cont'd.)**

At the Interconnection System Impact Study results meeting, Applicant should be prepared to discuss any desired modifications to the Interconnection Request. After the issuance of the final Interconnection System Impact Study report, but no later than five (5) Business Days following the Interconnection System Impact Study results meeting, Applicant shall submit to Distribution Provider, in writing, (i) modifications to any information provided in the Interconnection Request, including that information required for the Cost Envelope Option, if applicable, or (ii) confirmations of no modifications. Distribution Provider will forward Applicant's request for modification to the CAISO, if applicable, within two (2) Business Days of receipt. If no Interconnection System Impact Study results meeting is held, Applicant shall submit to Distribution Provider any requested modifications within twenty-five (25) Business Days of the receipt of the final Interconnection System Impact Study report.

Modifications permitted under this Section F.3.b.v shall include specifically: (a) a decrease in the electrical output (MW) of the proposed Generating Facility; (b) modifying the technical parameters associated with the Generating Facility technology or the Generating Facility step-up transformer impedance characteristics; and (c) modifying the interconnection configuration. For any modifications other than those permitted above, Distribution Provider, in coordination with CAISO, if applicable, will evaluate whether the proposed modification to the Interconnection Request constitutes a Material Modification. Distribution Provider will inform Applicant in writing whether the modifications would constitute a Material Modification (i) for Interconnection Requests that have not elected the Cost Envelope Option, within ten (10) Business Days of receipt of the proposed request for modification, and (ii) for Interconnection Requests that have elected the Cost Envelope Option, within twenty (20) Business Days of receipt of the proposed request for modification.

(L)

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

Sheet 98

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- b. Independent Study Process (Cont'd.)
- v) Modifications (Cont'd.)
- Any change to the Point of Interconnection, except for that specified by Distribution Provider in an Interconnection Study or otherwise allowed under this Section F.3.d.v, shall constitute a Material Modification.
- If the proposed modification is determined to be a Material Modification, Applicant may either withdraw the proposed modification or proceed with a new Interconnection Request for such modification. Applicant shall make such determination within ten (10) Business Days after being provided the Material Modification determination results.
- Proposed modifications determined not to be Material Modifications may still necessitate the need to re-evaluate the System Impact Study to determine modifications to the Interconnection Facilities and Distribution Upgrades, or to update the Cost Envelope Estimate, if applicable, in accordance with Section F.7. Distribution Provider will provide Applicant an estimate of time to complete the re-evaluation and the associated incremental cost required to complete the re-evaluation. Applicant may either accept the additional time and cost to complete the reevaluation, withdraw the proposed modification request, or proceed with a new Interconnection Request for such modification. Applicant shall make such determination within ten (10) Business Days after being provided the Material Modification results. (L)

(Continued)



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

Sheet 99

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- b. Independent Study Process (Cont'd.)
- vi) Scope and Purpose of the Interconnection Facilities Study and Study Deposit
- Within ten (10) Business Days of Applicant's confirmation of no modifications or Distribution Provider's determination that the Interconnection System Impact Study does not require reevaluation, Applicant shall submit to Distribution Provider the data required by Distribution Provider, including the completed form of Attachment B to the Detailed Study Agreement, if applicable. For Generating Facilities 5 MW or less, Applicant shall also submit the Interconnection Facilities Study deposit, as set out in Section E.3.a, unless the Interconnection Facilities Study will be waived in accordance with Section F.3.b.vii.
- For NEM Generating Facilities and Solar  $\leq 1$  MW Generating Facilities that have elected the Cost Envelope Option, Applicant must (i) submit to Distribution Provider the Cost Envelope Option deposit within ten (10) Business Days of Applicant's confirmation of no modifications or Distribution Provider's determination that the Interconnection System Impact Study does not require reevaluation, or (ii) provide Distribution Provider written notice that it elects to withdraw its request for the Cost Envelope Option, in accordance with Section F.7. Should Applicant fail to provide the required Cost Envelope Option deposit or provide written notice within such timeframe, Applicant's request for the Cost Envelope Option shall be deemed withdrawn, and the Interconnection Request shall continue to be processed in accordance with the Independent Study Process. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 100

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.) |
- b. Independent Study Process (Cont'd.) |
- vii) Waiver of the Interconnection Facilities Study |
- The Interconnection Facilities Study may be waived if Distribution Provider and Applicant mutually agree to such waiver within either (i) five (5) Business Days following the Interconnection System Impact Study results meeting, or (ii) within twenty-five (25) Business Days of the issuance of the final Interconnection System Impact Study report if no Interconnection System Impact Study results meeting is held. If Distribution Provider and Applicant agree to waive the Interconnection Facilities Study for an Interconnection Request where Applicant has selected the Cost Envelope Option, the Interconnection Request shall not be eligible for the Cost Envelope Option and Applicant's request for the Cost Envelope Option shall be deemed withdrawn. The Interconnection Facilities Study may not be waived for Interconnection Requests that have selected the Cost Envelope Option and for which the Applicant elects to proceed with Distribution Provider's preparation of the Cost Envelope Estimate. |
- Within thirty (30) Calendar Days after Distribution Provider and Applicant mutually agree to waive the Interconnection Facilities Study, Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices, to Applicant. If Applicant chooses to forgo the Interconnection Facilities Study and move directly to a Generator Interconnection Agreement, Applicant must agree in writing to be responsible for all actual costs of all required facilities deemed necessary by Distribution Provider. Applicant is responsible for all applicable costs associated with Parallel Operation to support the safe and reliable operation of the Distribution and Transmission System as set forth in Section E.4. Refer to Section F.3.e for cost responsibility and time frames for completing the Generator Interconnection Agreement. | (L)

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

Sheet 101

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- b. Independent Study Process (Cont'd.)
- viii) Timing of the Interconnection Facilities Study
- The Interconnection Facilities Study shall be completed and provided to Applicant within sixty (60) Business Days after Applicant posts the initial Interconnection Financial Security in accordance with Section F.4.b where Distribution Upgrades or Network Upgrades are identified and, for Generating Facilities with a Gross Nameplate Rating of 5 MW or less, Applicant submits the Interconnection Facilities Study deposit in accordance with Section E.3.a and F.3.b.vi. In cases where no Distribution Upgrades and/or Network Upgrades are identified and the required facilities are limited to Distribution Provider's Interconnection Facilities only, the Interconnection Facilities Study shall be completed within forty-five (45) Business Days after Applicant posts the initial Interconnection Financial Security and, for Generating Facilities with a Gross Nameplate Rating of 5 MW or less, Applicant submits the Interconnection Facilities Study deposit.
- If applicable, Distribution Provider will share the study results with the CAISO for review and comment, and will incorporate CAISO comments, if any, into the study report prior to issuing a final Interconnection Facilities Study report to Applicant.
- Within thirty (30) Calendar Days after Distribution Provider issues the final Interconnection Facilities Study report to Applicant, or within thirty (30) Calendar Days of an Interconnection Facilities Study results meeting, if requested, Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices. Refer to Section F.3.e for cost responsibility and time frames for completing the Generator Interconnection Agreement.
- At any time Distribution Provider determines that it will not meet the required time frame for completing the Interconnection Facilities Study, Distribution Provider shall notify Applicant in writing as to the status of the Interconnection Facilities Study and provide an estimated completion date with an explanation of the reasons why additional time is required. (L)

(Continued)



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

Sheet 102

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Independent Study Process (Cont'd.)**

**ix) Interconnection Facilities Study Results Meeting**

If requested by Applicant, a results meeting shall be held among Distribution Provider, the CAISO, if applicable, and Applicant to discuss the results of the Interconnection Facilities Study, including assigned cost responsibility. Within five (5) Business Days of the request, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant, Distribution Provider and the CAISO, if applicable, for the results meeting.

Within thirty (30) Calendar Days after the Interconnection Facilities Study results meeting, Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices, to Applicant.

**x) Second and Third Postings of Interconnection Financial Security**

Applicant will post its second and third postings of Interconnection Financial Security as set forth in Sections F.4.c and F.4.d based on the cost responsibility for Network Upgrades, Distribution Upgrades, and Distribution Provider's Interconnection Facilities set forth in the final Interconnection Facilities Study, or the final Interconnection System Impact Study if the Interconnection Facilities Study is waived in accordance with Section F.3.b.vii.

**c. Distribution Group Study Process**

**i) Initiation of Distribution Study Process**

Applicants that apply for the Independent Study Process that pass Screen Q but fail Screen R will be eligible for inclusion in a Distribution Study Group. Applicant must submit all materials required to complete their Interconnection Request no later than ten (10) Business Days after the close of the relevant Distribution Group Study window. This includes notification from Applicant that they want to proceed with the Distribution Group Study Process, if applicable, in accordance with Section F.3.a. Distribution Provider shall inform Applicant of the Detailed Study start date.

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

Sheet 103

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- i) Initiation of Distribution Study Process (Cont'd.)
- Distribution Provider shall perform a Screen Q analysis for the Distribution Study Group within thirty (30) Business Days of the close of the window, using best available information about projects that have entered the Distribution Group Study Process under Rule 21 and the WDT.
- If the Distribution Study Group fails Screen Q, the Distribution Provider will deem the projects withdrawn from Rule 21 and notify Applicants. Applicants may elect to proceed with the WDT Transmission Cluster Study Process pursuant to Section F.3.d.
- In order to be eligible to participate in the DGS Phase I Interconnection Study, the scoping meeting must be complete and the Applicant must execute the Detailed Study Agreement prior to the start date of the DGS Phase I Interconnection Study.
- ii) Scoping Meeting
- Within five (5) Business Days after Distribution Provider performs the Electrical Independence Test, it will contact the Applicant(s) to notify them that the Interconnection Request has passed Screen Q and failed Screen R and is thus eligible for the Distribution Group Study Process, and establish a date agreeable to Applicant and Distribution Provider for a scoping meeting.
- The Distribution Provider, in coordination with the CAISO, if applicable, shall determine whether the Interconnection Request is at or near the boundary of an Affected System(s) so as to potentially impact such Affected System(s). If a determination of potential impact is made, the Distribution Provider shall invite the Affected System Operator(s) to the scoping meeting by informing them of the time and place of the scheduled scoping meeting as soon as practicable. (L)

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

Sheet 104

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- ii) Scoping Meeting (Cont'd.)
- The purpose of the scoping meeting shall be: (i) to discuss reasonable Commercial Operation Dates and alternative interconnection options; (ii) to exchange information, including any transmission data that would reasonably be expected to impact Applicant's interconnection options; (iii) to analyze such information; (iv) to determine feasible Points of Interconnection and eliminate alternatives given resources and available information; and (v) to advise Applicant of the expected start date of the DGS Phase I Interconnection Study.
- Distribution Provider will bring to the scoping meeting, as reasonably necessary to accomplish its purpose, such already available technical data, including, but not limited to: (i) general facility loadings, (ii) general instability issues, (iii) general short circuit issues, (iv) general voltage issues, and (v) general reliability issues.
- Applicant will bring to the scoping meeting, in addition to the technical data in Attachment A of the Rule 21 Exporting Generating Facility Interconnection Request form, any system studies previously performed. Distribution Provider, the CAISO, if applicable, and Applicant will also bring to the meeting personnel and other resources as may be reasonably required to accomplish the purpose of the meeting in the time allocated for the meeting.
- During the meeting, Applicant shall confirm its Point of Interconnection. The duration of the meeting shall be only what is sufficient to accomplish its purpose. (L)

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

Sheet 105

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- ii) Scoping Meeting (Cont'd.)
- Within fifteen (15) Business Days after the scoping meeting, Distribution Provider shall provide Applicant with a Detailed Study Agreement, which shall contain an outline of the scope of the DGS Phase I Interconnection Study and DGS Phase II Interconnection Study, contain a non-binding good faith estimate of the cost to perform such studies, and shall specify that Applicant is responsible for the actual cost of the Interconnection Studies, including reasonable administrative costs. Applicant shall execute and deliver to Distribution Provider the Detailed Study Agreement no later than thirty (30) Business Days after the scoping meeting or the start date of the DGS Phase I Interconnection Study, whichever is earlier, or the Interconnection Request shall be deemed withdrawn.
- iii) Grouping of Interconnection Requests for a Distribution Group Study
- The results of Screen R will determine the Interconnection Requests to be grouped together for each Distribution Group Study. An Interconnection Request that failed Screen R will be grouped with other projects that are determined to be electrically interdependent through the application of Screen R. No later than the date a DGS Phase I Interconnection Study begins, Distribution Provider may send to each Applicant in a Distribution Study Group a list of the Interconnection Requests in its Distribution Study Group.
- At the Distribution Provider's option, an Interconnection Request received during a particular Distribution Group Study Application window may be studied individually (Independent Study Process) or in a Distribution Group Study for the purpose of conducting one or more of the analyses forming the Interconnection Studies. For each Interconnection Study received within the same Distribution Group Study Application window, the Distribution Provider may develop one or more Distribution Study Groups. (L)

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

Sheet 106

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- iv) Timing of the DGS Phase I Interconnection Study
- Absent extraordinary circumstances, Distribution Provider shall complete and issue a final DGS Phase I Interconnection Study report within sixty (60) Business Days from the start of the study. If the DGS Phase I Interconnection Study indicates a need for Network Upgrades, Distribution Provider will share applicable study results with the CAISO for review and comment and will incorporate comments into the final DGS Phase I Interconnection Study report.
- At any time Distribution Provider determines that it will not meet the required time frame for completing the DGS Phase I Interconnection Study, Distribution Provider shall notify all Applicants in the Distribution Study Group as to the status of the DGS Phase I Interconnection Study and provide an estimated completion date with an explanation of the reasons why additional time is required.
- Upon request, Distribution Provider shall provide any Applicant in the Distribution Study Group all relevant supporting documentation, workpapers and pre-Interconnection Request and post-Interconnection Request power flow, short circuit and dynamic/stability databases, and currently planned Distribution Upgrades relevant to the Interconnection Request for the DGS Phase I Interconnection Study. Applicant may be required to sign a non-disclosure agreement with terms consistent with Section D.7 regarding Confidentiality.
- If applicable, Distribution Provider will share the applicable study results with the CAISO for review and comment, and will incorporate CAISO comments, if any, into the study report prior to issuing a final DGS Phase I Interconnection Study report to Applicants in the Distribution Study Group. (L)

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

Sheet 107

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- v) DGS Phase I Interconnection Study Results Meeting
- If requested by an Applicant in a Distribution Study Group or Distribution Provider, a results meeting shall be held among Distribution Provider, the CAISO, if applicable, and the Applicant to discuss the results of the DGS Phase I Interconnection Study, including assigned cost responsibility. Within five (5) Business Days of such request, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant, Distribution Provider and the CAISO, if applicable, for the results meeting. If the Applicant or Distribution Provider has requested a results meeting, it must be completed within thirty (30) Calendar Days after issuance of the final DGS Phase I Interconnection Study report, unless otherwise agreed upon by the Distribution Provider and Applicant.
- At the Phase I Interconnection Study results meeting, the Applicant shall provide a schedule outlining key milestones including environmental survey start date, expected environmental permitting submittal date, expected procurement date of project equipment, back-feed date for project construction, and expected project construction date. This will assist the parties in determining if proposed Commercial Operation Dates are reasonable. If large-scale Distribution Provider's Interconnection Facilities or Distribution Upgrades for the Generating Facility have been identified in the DGS Phase I Interconnection Study, such as telecommunications equipment, distribution feeders to support back feed, a new substation, and/or expanded substation work, permitting and material procurement lead times may result in the need to alter the proposed Commercial Operation Date, the Applicant and Distribution Provider may agree to a new Commercial Operation Date. In addition, where an Applicant intends to establish Commercial Operation separately for different Electric Generating Units or project phases at its Generating Facility, it may only do so in accordance with an implementation plan agreed to in advance by the Distribution Provider and the CAISO, if applicable, which agreement shall not be unreasonably withheld. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 108

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- v) DGS Phase I Interconnection Study Results Meeting (Cont'd.)
- Where the parties cannot agree to a revised Commercial Operation Date, the Commercial Operation Date determined reasonable by the Distribution Provider will be used for the DGS Phase II Interconnection Study, or the Generator Interconnection Agreement (in accordance with Section F.3.e.iii) if the DGS Phase II Interconnection Study is waived in accordance with Section F.3.c.ix, where the revised Commercial Operation Date is needed to accommodate the anticipated completion, assuming Reasonable Efforts by the Distribution Provider of necessary Distribution Upgrades and/or Distribution Provider's Interconnection Facilities, pending the outcome of any relief sought by the Applicant under Sections F.1.d or K. The Applicant must notify the Distribution Provider within five (5) Business Days following the Results Meeting if it is initiating dispute procedures under Sections F.1.d or K.
- Within five (5) Business Days following the DGS Phase I Interconnection Study results meeting, the Applicant shall submit to the Distribution Provider all requested information. If no DGS Phase I Interconnection Study results meeting is held, Applicant shall submit to Distribution Provider any requested information within thirty (30) Calendar Days of the receipt of the final DGS Phase I Interconnection Study report.
- vi) Initial Posting of Interconnection Financial Security
- Each Applicant in a Distribution Study Group shall make its initial posting of Interconnection Financial Security in accordance with the requirements of Section F.4.b, within sixty (60) Calendar Days after being provided with the final DGS Phase I Interconnection Study report, or its Interconnection Request shall be deemed withdrawn. The initial posting of Interconnection Financial Security will be based on the cost responsibility for Network Upgrades, Distribution Upgrades, and Distribution Provider's Interconnection Facilities set forth in the final DGS Phase I Interconnection Study report. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 109

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- vii) Modifications
- At any time during the course of the Interconnection Studies, Applicant, Distribution Provider, or the CAISO, as applicable, may identify changes to the planned Interconnection that may improve the costs and benefits (including reliability) of the Interconnection, and the ability of the proposed change to accommodate the Interconnection Request. To the extent the identified changes are acceptable to Distribution Provider, the CAISO, as applicable, and Applicant, such acceptance not to be unreasonably withheld, Distribution Provider shall modify the Point of Interconnection and/or configuration in accordance with such changes without altering the Interconnection Request's eligibility for participating in Interconnection Studies.
- At the DGS Phase I Interconnection Study results meeting, if elected by Applicant or Distribution Provider, Applicant should be prepared to discuss any desired modifications to the Interconnection Request. After the publication of the final DGS Phase I Interconnection Study report, but no later than five (5) Business Days following the DGS Phase I Interconnection Study results meeting, Applicant shall submit to Distribution Provider, in writing, modifications to any information provided in the Interconnection Request. Distribution Provider will forward Applicant's request for modification to the CAISO, if applicable, within two (2) Business Days of receipt.
- If no DGS Phase I Interconnection Study results meeting is held, Applicant shall submit to Distribution Provider any requested modifications within thirty (30) Calendar Days of the receipt of the final Phase I Interconnection Study report. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 110

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- vii) Modifications (Cont'd.)
- Modifications permitted under this Section F.3.c.vii shall include specifically: (a) a decrease in the electrical output (MW) of the proposed Generating Facility; (b) modifying the technical parameters associated with the Generating Facility technology or the Generating Facility step-up transformer impedance characteristics; and (c) modifying the interconnection configuration. For any modifications other than those permitted above, Distribution Provider, in coordination with CAISO, if applicable, will evaluate whether the proposed modification to the Interconnection Request constitutes a Material Modification. Distribution Provider will inform Applicant in writing whether the modifications would constitute a Material Modification within ten (10) Business Days of receipt of the proposed request for modification. Any change to the Point of Interconnection, except for that specified by Distribution Provider in an Interconnection Study or otherwise allowed under this Section F.3.c.vii, shall constitute a Material Modification.
- If the proposed modification is determined to be a Material Modification, Applicant may either withdraw the proposed modification or proceed with a new Interconnection Request for such modification. Applicant shall make such determination within ten (10) Business Days after being provided the Material Modification determination results.
- Proposed modifications determined not to be Material Modifications may still necessitate the need to re-evaluate the DGS Phase I Interconnection Study to determine modifications to the Interconnection Facilities and Distribution Upgrades. Such re-evaluation will occur during the DGS Phase II Interconnection Study. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 111

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- viii) Scope and Purpose of the DGS Phase II Interconnection Study and Study Deposit
- Within either (i) five (5) Business Days following the DGS Phase I Interconnection Study results meeting, or (ii) within thirty (30) Calendar Days of the receipt of the final DGS Phase I Interconnection Study report if no DGS Phase I Interconnection Study results meeting is held, Applicant shall submit to Distribution Provider the data required by Distribution Provider. Within thirty (30) Business Days of the issuance of the final DGS Phase I Interconnection Study report, for Generating Facilities 5 MW or less, Applicant shall submit the DGS Phase II Interconnection Study deposit, as set out in Section E.3.a, unless the DGS Phase II Interconnection Study is waived in accordance with Section F.3.
- ix) Waiver of the DGS Phase II Interconnection Study
- The DGS Phase II Interconnection Study may be waived if Distribution Provider and all Applicants included in the DGS Phase I Interconnection Study mutually agree to such waiver within thirty (30) Calendar Days of the issuance of the DGS Phase I Interconnection Study report. Within thirty (30) Calendar Days after Distribution Provider and Applicants agree to waive the DGS Phase II Interconnection Study, Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices, to Applicant. Applicant is responsible for all costs associated with Parallel Operation to support the safe and reliable operation of the Distribution and Transmission System as set forth in Section E.4. Refer to Section F.3.e for cost responsibility and time frames for completing the Generator Interconnection Agreement. (L)

(Continued)





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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 112

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- x) DGS Phase II Interconnection Study Procedures
- Distribution Provider shall utilize existing studies to the extent practicable in conducting the DGS Phase II Interconnection Study. The Distribution Provider shall commence the DGS Phase II Interconnection Study within sixty (60) Calendar Days of the issuance of the final DGS Phase I Interconnection Study report.
- Distribution Provider shall complete and distribute to Applicants the DGS Phase II Interconnection Study reports within sixty (60) Business Days after the commencement of each DGS Phase II Interconnection Study. The Distribution Provider will issue a final DGS Phase II Interconnection Study report to Applicant.
- At the request of Applicant or at any time Distribution Provider determines that it will not meet the required time frame for completing the DGS Phase II Interconnection Study, Distribution Provider shall notify Applicant as to the schedule status of the DGS Phase II Interconnection Study and provide an estimated completion date. If the Distribution Provider is unable to complete the DGS Phase II Interconnection Study in the time specified, such notice shall provide an explanation of the reasons why additional time is required.
- Upon request of the Applicant, Distribution Provider shall provide Applicant all supporting documentation, work papers, and relevant pre-Interconnection Request and post-Interconnection Request power, short circuit and stability databases for the DGS Phase II Interconnection Study, subject to confidentiality arrangements consistent with Section D.7. (L)

(Continued)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 113

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- x) DGS Phase II Interconnection Study Procedures (Cont'd.)
- The Distribution Provider will conduct a DGS Phase II Interconnection Study that will incorporate eligible Interconnection Requests from the previous DGS Phase I Interconnection Study. The DGS Phase II Interconnection Study shall (i) update, as necessary, analyses performed in the DGS Phase I Interconnection Study to account for the withdrawal of Interconnection Requests or other projects in the Interconnection Study Process, (ii) identify Distribution Upgrades needed to physically interconnect the Generating Facility, (iii) assign cost responsibility for the Distribution Upgrades, (iv) identify for each Interconnection Request a final Point of Interconnection and Distribution Provider's Interconnection Facilities, (v) provide an estimate for each Interconnection Request of the Distribution Provider's Interconnection Facilities, and (vi) optimize in-service timing requirements based on operational studies in order to maximize achievement of the Commercial Operation Dates of the Generating Facilities, as applicable.
- xi) DGS Phase II Interconnection Study Results Meeting
- If requested by an Applicant in a Distribution Study Group, a results meeting shall be held among Distribution Provider, the CAISO, if applicable, and the Applicant to discuss the results of the DGS Phase II Interconnection Study, including selection of the final Commercial Operation Date and assigned cost responsibility. Within five (5) Business Days of such request, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant, Distribution Provider and the CAISO, if applicable, for the results meeting. If Applicant wants to have a meeting, it must be completed within thirty (30) Calendar Days after issuance of the final DGS Phase II Interconnection Study report, unless mutually agreed upon by the Distribution Provider and Applicant. (L)

(Continued)





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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 114

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- xi) DGS Phase II Interconnection Study Results Meeting (Cont'd.)
- Distribution Provider shall tender a draft Generator Interconnection Agreement pursuant to F.3.e.i. Refer to Section F.3.e for cost responsibility and time frames for completing the Generator Interconnection Agreement.
- xii) Timing of the DGS Phase II Interconnection Study
- At any time Distribution Provider determines that it will not meet the required time frame for completing the DGS Phase II Interconnection Study, Distribution Provider shall notify each Applicant in the Distribution Study Group in writing as to the status of the DGS Phase II Interconnection Study and provide an estimated completion date with an explanation of the reasons why additional time is required.
- xiii) Second and Third Postings of Interconnection Financial Security
- Each Applicant in a Distribution Study Group will post its second and third posting of Interconnection Financial Security as set forth in Sections F.4.c and F.4.d based on the cost responsibility for Network Upgrades, Distribution Upgrades, and Distribution Provider's Interconnection Facilities set forth in the final DGS Phase II Interconnection Study, or the final DGS Phase I Interconnection Study if the DGS Phase II Interconnection Study is waived in accordance with Section F.3.c.ix. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 115

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- xiv) Withdrawal and Reallocation of Cost to Interconnection Requests in a Distribution Study Group
- If at any time, an Interconnection Request is withdrawn or a Generator Interconnection Agreement is terminated, the upgrades identified in the Interconnection Studies will be reevaluated to determine if they are still needed. If the Distribution Provider determines that a restudy is needed, it will be conducted pursuant to Section F.3.c.xv. Any costs, identified in the Distribution Group Study not already funded by Interconnection Financial Security that has been posted by the withdrawing Applicant, will be the responsibility of remaining Applicants in the Distribution Group and will be reallocated in accordance with E.4.e.
- xv) Restudy
- If a restudy is required following the issuance of the final DGS Phase II Interconnection Study, or the final DGS Phase I Interconnection Study if the DGS Phase II Interconnection Study is waived, due to a project withdrawal, Distribution Provider shall notify the remaining Applicant(s) in writing.
- The restudy report shall be completed and provided to each Applicant remaining in the Distribution Group within sixty (60) Business Days of the withdrawal of the Interconnection Request that caused the restudy. The Applicants remaining in the Distribution Group will be responsible for the cost of the restudy. (L)

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Sheet 116

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- c. Distribution Group Study Process (Cont'd.)
- xvi) Automatic Timing Extension
- If during any six month period, the number of Interconnection Requests exceeds by fifty (50) percent the number of active Interconnection Request in the preceding six month period, the study timelines for Distribution Group Studies begun during the next twelve (12) months will automatically increase as follows. The time to complete the DGS Phase I Interconnection Study pursuant to Section F.3.c.iv will increase from sixty (60) Business Days to one hundred twenty (120) Business Days. The time to complete the DGS Phase II Interconnection Study pursuant to Section F.3.c.x will increase from sixty (60) Business Days to one hundred twenty (120) Business Days. The time to tender a draft Generator Interconnection Agreement pursuant to F.3.e.i will increase from thirty (30) Calendar Days to forty-five (45) Calendar Days. Distribution Provider will notify Applicants in the Distribution Study Group in writing after commencement of DGS Phase I Interconnection Study of the extension.
- d. WDT Transmission Cluster Study Process (L)
- If Applicant's Interconnection Request fails Screen Q or elects to be studied under the WDT Transmission Cluster Study Process, Applicant shall have the option of applying for Interconnection under the WDT Transmission Cluster Study Process of the Wholesale Distribution Tariff in accordance with its provisions. If Applicant fails Screen Q, Applicant's Interconnection Request shall be deemed withdrawn under this Rule regardless of whether Applicant applies for Interconnection under the WDT. Distribution Provider shall inform Applicant of the Detailed Study start date. (L)  
(P)/(L)  
(P)/(L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 117

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- d. WDT Transmission Cluster Study Process (Cont'd.)
- An Applicant that chooses to apply under the WDT Transmission Cluster Study Process must file a valid Interconnection Request and post the applicable study deposit as set out in Distribution Provider's WDT. If Applicant chooses to apply under the WDT, then Applicant's Interconnection Request will be subject to the terms of Distribution Provider's WDT applicable to the WDT Transmission Cluster Study Process, including those provisions establishing cost responsibility. Upon completion of the WDT Transmission Cluster Study Process under the WDT, Applicants that are eligible for a State-jurisdictional Interconnection can, in accordance with the WDT, either execute the applicable Commission-approved Rule 21 Generator Interconnection Agreement for Exporting Generating Facilities or the WDT Generator Interconnection Agreement. Such Commission-approved Generator Interconnection Agreement for Exporting Generating Facilities will include the cost responsibility established in the WDT Transmission Cluster Study.
- If and when an Applicant submits a new interconnection request under the WDT, Applicant is under the jurisdiction of FERC. On the date the applicable Commission-approved Rule 21 Generator Interconnection Agreement for Exporting Generating Facilities is executed by Applicant, or Producer where those are different entities, and Distribution Provider, jurisdiction over the Interconnection reverts back to the Commission. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 118

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- e. Generator Interconnection Agreement
- i) Tender
- The Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices, within thirty (30) Calendar Days of the following:
- 1) Agreement by the Distribution Provider and Applicant to waive the Interconnection Facilities Study in accordance with Section F.3.b.vii,
  - 2) Issuance of the final Interconnection Facilities Study report (or results meeting, if held) to Applicant,
  - 3) Agreement by the Distribution Provider and all Applicants included in a DGS Phase I Interconnection Study to waive the DGS Phase II Interconnection Study in accordance with Section F.3.c.ix,
  - 4) Issuance of the final DGS Phase II Interconnection Study report to each Applicant in the Distribution Study Group (or results meeting, if held).
- Applicant(s) shall provide written comments, or notification of no comments, to the draft appendices within thirty (30) Calendar Days.
- ii) Negotiation
- Notwithstanding Section F.3.e.i, at the request of Applicant, Distribution Provider shall begin negotiations with Applicant concerning the appendices to the Generator Interconnection Agreement at any time after Distribution Provider provides Applicant with the final Interconnection Facilities Study report (or (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 119

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- e. Generator Interconnection Agreement (Cont'd.)
- ii) Negotiation (Cont'd.)
- final Interconnection System Impact Study report if the Interconnection Facilities Study is waived) or final DGS Phase II Interconnection Study report (or the final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process. Distribution Provider and Applicant shall negotiate concerning any disputed provisions of the appendices to the draft Generator Interconnection Agreement for not more than ninety (90) Calendar Days after Distribution Provider provides Applicant with the final DGS Phase II Interconnection Study report (or the final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process or the final Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived) in the case of the Independent Study Process. Producers whose Interconnection Requests were studied in a Distribution Group Study Process will be required to fund upgrades triggered by more than one Interconnection Request in accordance with a payment schedule that allows such upgrades to be completed in time for the earliest Commercial Operation Date of such Interconnection requests. Producer is responsible for all costs associated with Parallel Operation to support the safe and reliable operation of the Distribution System and Transmission System as set forth in Section E.4.
- If Applicant determines that negotiations are at an impasse, it may request termination of the negotiations at any time after tender of the draft Generator Interconnection Agreement pursuant to Section F.3.e.i and initiate Dispute Resolution procedures pursuant to Section K. Unless otherwise agreed by the Parties, if Applicant or Producer, where those are different entities, has not executed the Generator Interconnection Agreement, or initiated Dispute Resolution procedures pursuant to Section K, within ninety (90) Calendar Days after issuance of the final (L)

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

Sheet 120

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- e. Generator Interconnection Agreement (Cont'd.)
- ii) Negotiation (Cont'd.)
- DGS Phase II Interconnection Facilities Study report (or the final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process or Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived) in the case of the Independent Study Process, it shall be deemed to have withdrawn its Interconnection Request. (L)
- Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider will send an invoice to Applicant within five business days of execution of the Interconnection Agreement. (P)
- Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider shall schedule a mitigation work scoping meeting no later than 10 business days after receiving the payment for the engineering advance. (P)
- iii) Extensions of Commercial Operation Date (L)
- Extensions of the Commercial Operation Date will be agreed upon in the executed Generator Interconnection Agreement. Reasonable Commercial Operation Dates will be discussed at the DGS Phase II Interconnection Study results meeting, or the DGS Phase I Interconnection Study results meeting if the DGS Phase II Interconnection Study results meeting is waived, in the case of the Distribution Group Study Process, the Interconnection Facilities Study results meeting, or the Interconnection System Impact Study results meeting if the Interconnection Facilities Study is waived in the case of the Independent Study Process. A request for an extension of the Commercial Operation Date after the Generator Interconnection Agreement is executed will be agreed to provided that, the Producer is still responsible for funding any Distribution Upgrades and Network Upgrades as specified in the Generator Interconnection Agreement and under the same payment schedule agreed upon in the Generator Interconnection Agreement. This provision has no impact on any power purchase agreement terms. (L)

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

Sheet 121

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)
- f. Engineering & Procurement (E&P) Agreement
- Prior to executing a Generator Interconnection Agreement, in order to advance the implementation of its interconnection, an Applicant may request, and Distribution Provider shall offer, an E&P Agreement that authorizes Distribution Provider to begin engineering and procurement of long lead-time items necessary for the establishment of the interconnection. However, Distribution Provider shall not be obligated to offer an E&P Agreement if Applicant is in Dispute Resolution as a result of an allegation that Applicant has failed to meet any milestones or comply with any prerequisites specified in other parts of this Rule. The E&P Agreement is an optional procedure. The E&P Agreement shall provide for Applicant to pay the cost of all activities authorized by Applicant and to make advance payments or provide other satisfactory security for such costs.
- Applicant shall pay the cost of such authorized activities and any cancellation costs for equipment that is already ordered for its interconnection, which cannot be mitigated as hereafter described, whether or not such items or equipment later become unnecessary. If Applicant withdraws its Interconnection Request, or either Applicant or Distribution Provider terminates the E&P Agreement, to the extent the equipment ordered can be canceled under reasonable terms, Applicant shall be obligated to pay the associated cancellation costs. To the extent that the equipment cannot be reasonably canceled, Distribution Provider may elect: (i) to take title to the equipment, in which event Distribution Provider shall refund Applicant any amounts paid by Applicant for such equipment and shall pay the cost of delivery of such equipment, or (ii) to transfer title to and deliver such equipment to Applicant, in which event Applicant shall pay any unpaid balance and cost of delivery of such equipment.
4. INTERCONNECTION FINANCIAL SECURITY
- a. Types of Interconnection Financial Security
- The Interconnection Financial Security posted by an Applicant may be any combination of the following types of Interconnection Financial Security provided in favor of Distribution Provider: (L)

(Continued)





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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 122

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- a. Types of Interconnection Financial Security (Cont'd.)
- i) an irrevocable and unconditional letter of credit issued by a bank or financial institution that has a credit rating of A or better by Standard and Poor's or A2 or better by Moody's;
  - ii) an unconditional and irrevocable guaranty issued by a company has a credit rating of A or better by Standard and Poor's or A2 or better by Moody's;
  - iii) a cash deposit standing to the credit of Distribution Provider and in an interest-bearing escrow account maintained at a bank or financial institution that is reasonably acceptable to Distribution Provider;
- Interconnection Financial Security instruments as listed above shall be in such form as Distribution Provider may reasonably require from time to time by notice to Applicants, or in such other form as has been evaluated and approved as reasonably acceptable by Distribution Provider.
- Distribution Provider shall require the use of standardized forms of Interconnection Financial Security to the greatest extent possible. If at any time the guarantor of the Interconnection Financial Security fails to maintain the credit rating required by this Section F.4.a, Applicant shall provide to Distribution Provider replacement Interconnection Financial Security meeting the requirements of this Section F.4.a within five (5) Business Days of the change in credit rating.
- Interest on a cash deposit standing to the credit of Distribution Provider in an interest-bearing escrow account under subpart (iii) of this Section F.4.a will accrue to Applicant's benefit.
- b. Initial Posting of Interconnection Financial Security
- On or before sixty (60) Calendar Days after publication of either the final Interconnection System Impact Study report, or the final DGS Phase I Interconnection Study report, Applicant must post, with notice to Distribution Provider, two separate Interconnection Financial Security instruments. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 123

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)**

**b. Initial Posting of Interconnection Financial Security (Cont'd.)**

First, Applicant proposing to interconnect a Large Generating Facility shall post an Interconnection Financial Security instrument in an amount equal to the lesser of (i) fifteen percent (15%) of the total cost responsibility assigned to Applicant in the final Interconnection System Impact Study or final DGS Phase I Interconnection Study in the case of the Distribution Group Study Process for Network Upgrades, (ii) \$20,000 per MW of electrical output of the Large Generating Facility or the amount of megawatt increase in the generating capacity of each existing Generating Facility as listed by Applicant in its Interconnection Request, including any requested modifications thereto, or (iii) \$7,500,000.

Applicant proposing to interconnect a Small Generating Facility shall post an Interconnection Financial Security instrument in an amount equal to the lesser of (i) fifteen percent (15%) of the total cost responsibility assigned to Applicant in the final Interconnection System Impact Study or final DGS Phase I Interconnection Study in the case of the Distribution Group Study Process for Network Upgrades, or (ii) \$20,000 per MW of electrical output of the Small Generating Facility or the amount of megawatt increase in the generating capacity of each existing Generating Facility as listed by Applicant in its Interconnection Request.

Second, Applicant shall also post an Interconnection Financial Security instrument in the amount of twenty percent (20%) of the total estimated cost responsibility assigned to Applicant in the final Interconnection System Impact Study or final DGS Phase I Interconnection Study in the case of the Distribution Group Study Process for Distribution Provider's Interconnection Facilities and Distribution Upgrades.

The failure by an Applicant to timely post the Interconnection Financial Security required by this Section F.4.b shall result in the Interconnection Request being deemed withdrawn subject to Section F.6.

If required by Distribution Provider, Applicant shall provide Distribution Provider with written notice that it has posted the required Interconnection Financial Security no later than the applicable final day for posting.

(L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 124

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- c. Second Posting of Interconnection Financial Security
- On or before one hundred twenty (120) Calendar Days after issuance of the final DGS Phase II Interconnection Study report (or final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived) or final Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived in the case of the Independent Study Process), Applicant shall post two separate Interconnection Financial Security instruments.
- First, Applicant proposing to interconnect a Large Generating Facility shall post an Interconnection Financial Security instrument such that the total Interconnection Financial Security posted by Applicant for Network Upgrades equals the lesser of (i) \$15 million, or (ii) thirty percent (30%) of the total cost responsibility assigned to Applicant for Network Upgrades in either the final Interconnection System Impact Study (final DGS Phase I Interconnection Study in the case on the Distribution Group Study Process) or final Interconnection Facilities Study (final DGS Phase II Interconnection Study in the case of the Distribution Group Study Process), whichever is lower.
- Applicant proposing to interconnect a Small Generating Facility shall post an Interconnection Financial Security instrument such that the total Interconnection Financial Security posted by Applicant for Network Upgrades equals the lesser of (i) \$1 million, or (ii) thirty percent (30%) of the total cost responsibility assigned to Applicant for Network Upgrades in either the final Interconnection System Impact Study or final Interconnection Facilities Study (final DGS Phase I or final DGS Phase II Interconnection Studies, respectively, for the Distribution Group Study Process), whichever is lower.
- Second, Applicant shall also post an Interconnection Financial Security instrument such that the total Interconnection Financial Security posted by Applicant for Distribution Provider's Interconnection Facilities and Distribution Upgrades equals thirty percent (30%) of the total cost responsibility assigned to Applicant in the final DGS Phase II Interconnection Facilities Study (or final DGS Phase I Interconnection Study if the DGS Phase II Interconnection study is waived) in the case (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 125

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- c. Second Posting of Interconnection Financial Security (Cont'd.)
- of the Distribution Group Study Process, or final Interconnection Facilities Study (or final Interconnection System Impact Study if the Interconnection Facilities Study is waived) in the case of the Independent Study Process, for Distribution Provider's Interconnection Facilities and Distribution Upgrades.
- If the start date for Construction Activities of Network Upgrades, Distribution Provider's Interconnection Facilities and Distribution Upgrades on behalf of Applicant is prior to one hundred twenty (120) Calendar Days after issuance of the final DGS Phase II Interconnection Facilities Study report (or final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived), in the case of the Distribution Group Study Process or final Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived) in the case of the Independent Study Process, that start date must be set forth in Applicant's Generator Interconnection Agreement and Applicant shall make its second posting of Interconnection Financial Security pursuant to Section F.4.d rather than Section F.4.c.
- The failure by an Applicant to timely post the Interconnection Financial Security required by this Section F.4.c shall result in the Interconnection Request being deemed withdrawn and subject to Section F.6 or, if applicable, shall constitute grounds for termination of the Generator Interconnection Agreement.
- d. Third Posting of Interconnection Financial Security.
- On or before the start of Construction Activities for Network Upgrades or Distribution Provider's Interconnection Facilities or Distribution Upgrades on behalf of Applicant, whichever is earlier, Applicant shall modify the two separate Interconnection Financial Security instruments posted as follows.
- With respect to the Interconnection Financial Security instrument for Network Upgrades, Applicant shall modify this instrument so that it equals one hundred percent (100%) of the total cost responsibility (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 126

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- d. Third Posting of Interconnection Financial Security. (Cont'd.)
- assigned to Applicant for Network Upgrades in the final DGS Phase II Interconnection Study (or the final DGS Phase I Interconnection Study if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process or final Interconnection Facilities Study (or the final Interconnection System Impact Study if the Interconnection Facilities Study is waived) in the case of the Independent Study Process.
- With respect to the Interconnection Financial Security instrument for Distribution Provider's Interconnection Facilities or Distribution Upgrades, Applicant shall modify this instrument so that it equals one hundred percent (100%) of the total cost responsibility assigned to Applicant for Distribution Provider's Interconnection Facilities and Distribution Upgrades in the final DGS Phase II Interconnection Study (or the final DGS Phase I Interconnection Study if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process or final Interconnection Facilities Study (or the final Interconnection System Impact Study if the Interconnection Facilities Study is waived) in the case of the Independent Study Process.
- The failure by an Applicant to timely post the Interconnection Financial Security required by this Section F.4.d shall constitute grounds for termination of the Generator Interconnection Agreement.
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process.
- Except as set forth in Section F.4.e.i, withdrawal of an Interconnection Request or termination of a Generator Interconnection Agreement shall allow Distribution Provider to liquidate the Interconnection Financial Security, or balance thereof, posted by Applicant for Network Upgrades at the time of withdrawal. To the extent the amount of the liquidated Interconnection Financial Security plus capital, if any, separately provided by Applicant to satisfy its obligation to finance Network Upgrades in accordance with Section E.4 exceeds the total (L)

(Continued)



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

Sheet 127

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)**

- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)

cost responsibility for Network Upgrades assigned to Applicant by the final Interconnection Facilities Study, or the final Interconnection System Impact Study if the Interconnection Facilities Study is waived, Distribution Provider shall remit to Applicant the excess amount.

Withdrawal of an Interconnection Request or termination of a Generator Interconnection Agreement shall result in the release to Applicant of any Interconnection Financial Security posted by Applicant for Distribution Provider's Interconnection Facilities and Distribution Upgrades, except with respect to any amounts necessary to pay for costs incurred or irrevocably committed by Distribution Provider on behalf of Applicant for Distribution Provider's Interconnection Facilities and Distribution Upgrades and for which Distribution Provider has not been reimbursed.

- i) Conditions for Partial Recovery of Interconnection Financial Security Upon Withdrawal of Interconnection Request or Termination of Generator Interconnection Agreement.

A portion of the Interconnection Financial Security shall be released to Applicant, consistent with Section F.4.e.ii, if the withdrawal of the Interconnection Request or termination of the Generator Interconnection Agreement occurs for any of the following reasons:

- (1) Failure to Secure a Power Purchase Agreement.

At the time of withdrawal of the Interconnection Request or termination of the Generator Interconnection Agreement, Applicant demonstrates to Distribution Provider that it has failed to secure an acceptable power purchase agreement for the energy or capacity of the Generating Facility after a good faith effort to do so. A good faith effort can be established by demonstrating participation in a competitive solicitation

(L)

(Continued)





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

Sheet 128

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)
- i) Conditions for Partial Recovery of Interconnection Financial Security Upon Withdrawal of Interconnection Request or Termination of Generator Interconnection Agreement. (Cont'd.)
- (1) Failure to Secure a Power Purchase Agreement. (Cont'd.)
- process or bilateral negotiations with an entity other than an Affiliate that progressed, at minimum, to the mutual exchange by all counter-parties of proposed term sheets.
- (2) Failure to Secure a Necessary Permit.
- At the time of withdrawal of the Interconnection Request or termination of the Generator Interconnection Agreement, Applicant demonstrates to Distribution Provider that it has received a final denial from the primary issuing Governmental Authority of any permit or other authorization necessary for the construction or operation of the Generating Facility.
- (3) Increase in the Cost of Distribution Provider's Interconnection Facilities or Distribution Upgrades.
- Applicant withdraws the Interconnection Request or terminates the Generator Interconnection Agreement based on an increase of: (i) more than 30% or \$300,000, whichever is greater, in the estimated cost of Distribution Provider's Interconnection Facilities; or (ii) more than 30% or \$300,000, whichever is greater, in the estimated cost of Distribution Upgrades allocated to Applicant from the Interconnection System Impact Study to the Interconnection Facilities Study. This Section F.4.e.i.(3) shall not apply if the cause of the cost increase under (i) or (ii) above is the result of a change requested by Applicant pursuant to Section F.3.b.v. (L)

(Continued)



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

Sheet 129

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)
- i) Conditions for Partial Recovery of Interconnection Financial Security Upon Withdrawal of Interconnection Request or Termination of Generator Interconnection Agreement. (Cont'd.)
- (4) Material Change in Applicant's Interconnection Facilities Created by Distribution Provider's Change in the Point of Interconnection.
- Applicant withdraws the Interconnection Request or terminates the Generator Interconnection Agreement based on a material change from the Interconnection System Impact Study in the Point of Interconnection for the Generating Facility mandated by Distribution Provider and included in the final Interconnection Facilities Study. A material change in the Point of Interconnection shall be where the Point of Interconnection has moved to (i) a different substation, (ii) a different line on a different right of way, or (iii) a materially different location than previously identified on the same line.
- ii) Schedule for Determining Non-Refundable Portion of the Interconnection Financial Security for Network Upgrades.
- (1) Up to One Hundred Twenty (120) Calendar Days After the Final Interconnection Facilities Study Report (or Final Interconnection System Impact Study Report if the Interconnection Facilities Study is Waived).
- If, at any time after the initial posting of the Interconnection Financial Security for Network Upgrades under Section F.4.b and on or before one hundred twenty (120) Calendar Days (L)

(Continued)





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

Sheet 130

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)
- ii) Schedule for Determining Non-Refundable Portion of the Interconnection Financial Security for Network Upgrades (Cont'd.)
- (1) Up to One Hundred Twenty (120) Calendar Days After the Final Interconnection Facilities Study Report (or Final Interconnection System Impact Study Report if the Interconnection Facilities Study is Waived). (Cont'd.)
- after the date of issuance of the final Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived), Applicant withdraws the Interconnection Request or terminates the Generator Interconnection Agreement, as applicable, in accordance with Section F.4.e.i, Distribution Provider shall liquidate the Interconnection Financial Security for Network Upgrades under Section F.4.b and reimburse Applicant in an amount of (i) any posted amount less fifty percent (50%) of the value of the posted Interconnection Financial Security for Network Upgrades (with a maximum of \$10,000 per requested and approved MW value of the Generating Facility Capacity at the time of withdrawal being retained by Distribution Provider), or (ii) if the Interconnection Financial Security has been drawn down to finance Pre-Construction Activities for Network Upgrades on behalf of Applicant, the lesser of the remaining balance of the Interconnection Financial Security or the amount calculated under (i) above. If Applicant has separately provided capital apart from the Interconnection Financial Security to finance Pre-Construction Activities for Network Upgrades, Distribution Provider will credit the capital provided as if drawn from the Interconnection Financial Security and apply (ii) above. (L)

(Continued)



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

Sheet 131

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)
- ii) Schedule for Determining Non-Refundable Portion of the Interconnection Financial Security for Network Upgrades. (Cont'd.)
- (2) Between One Hundred Twenty-One (121) Calendar Days and After Final Interconnection Facilities Study Report and the Commencement of Construction Activities.
- If, at any time between one hundred twenty-one (121) Calendar Days and after the date of issuance of the final Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived), and the commencement of Construction Activities for either Network Upgrades or Distribution Provider's Interconnection Facilities or Distribution Upgrades, Applicant withdraws the Interconnection Request or terminates the Generator Interconnection Agreement, as applicable, in accordance with Section F.4.e.i, Distribution Provider shall liquidate the Interconnection Financial Security for Network Upgrades under Section F.4.c and reimburse Applicant in an amount of (i) any posted amounts less fifty percent (50%) of the value of the posted Interconnection Financial Security for Network Upgrades (with a maximum of \$20,000 per requested and approved MW value of the Generating Facility Capacity at the time of withdrawal being retained by Distribution Provider), or, (ii) if the Interconnection Financial Security has been drawn down to finance Pre-Construction Activities for Network Upgrades on behalf of Applicant, the lesser of the remaining balance of the Interconnection Financial Security or the amount calculated under (i) above. If Applicant has separately provided capital apart from the Interconnection Financial Security to finance Pre-Construction Activities for Network Upgrades, Distribution Provider will credit the capital provided as if drawn from the Interconnection Financial Security and apply (ii) above. (L)

(Continued)



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

Sheet 132

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)
- e. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Independent Study Process. (Cont'd.)
- ii) Schedule for Determining Non-Refundable Portion of the Interconnection Financial Security for Network Upgrades. (Cont'd.)
- (3) After Commencement of Construction Activities.
- Once Construction Activities on Network Upgrades on behalf of Applicant commence, any withdrawal of the Interconnection Request or termination of the Generator Interconnection Agreement by Applicant will be treated in accordance with this Section F.4.e.
- (4) Notification and Accounting by Distribution Provider.
- Distribution Provider will notify Applicant within three (3) Business Days of liquidating any Interconnection Financial Security. Within seventy-five (75) Calendar Days of any liquidating event, Distribution Provider will provide Applicant with an accounting of the disposition of the proceeds of the liquidated Interconnection Financial Security and all proceeds not otherwise reimbursed to Applicant or applied to costs incurred or irrevocably committed by Distribution Provider on behalf of Applicant in accordance with this Section F.4.e shall be applied as directed by the Commission. Where an Applicant with remaining proceeds from Interconnection Financial Security cannot be located, such remaining proceeds shall escheat to the State pursuant to the Unclaimed Property Law commencing with the California Code of Civil Procedure § 1500. (L)

(Continued)



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

Sheet 133

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**4. INTERCONNECTION FINANCIAL SECURITY (Cont'd.)**

- f. General Effect of Withdrawal of Interconnection Request or Termination of the Generator Interconnection Agreement on Interconnection Financial Security for Interconnection Requests Studied Under the Distribution Group Study Process.

Withdrawal of an Interconnection Request or termination of a Generator Interconnection Agreement shall allow Distribution Provider to liquidate the Interconnection Financial Security, or balance thereof, posted by Applicant for Network Upgrades or Distribution Upgrades at the time of withdrawal. To the extent the amount of the liquidated Interconnection Financial Security plus capital, if any, separately provided by Applicant to satisfy its obligation to finance Network Upgrades or Distribution Upgrades in accordance with Section E.4 exceeds the total cost responsibility for Network Upgrades or Distribution Upgrades assigned to Applicant by the final DGS Phase II Interconnection study (or final DGS Phase I Interconnection Study if the DGS Phase II Interconnection Study is waived), Distribution Provider shall remit to Applicant the excess amount.

Withdrawal of an Interconnection Request or termination of a Generator Interconnection Agreement shall result in the release to Applicant of any Interconnection Financial Security posted by Applicant for Distribution Provider's Interconnection Facilities, except with respect to any amounts necessary to pay for costs incurred or irrevocably committed by Distribution Provider on behalf of Applicant for Distribution Provider's Interconnection Facilities and for which Distribution Provider has not been reimbursed.

- i) Notification and Accounting by Distribution Provider.

Distribution Provider will notify Applicant within three (3) Business Days of liquidating any Interconnection Financial Security. Within seventy-five (75) Calendar Days of any liquidating event, Distribution Provider will provide Applicant with an accounting of the disposition of the proceeds of the liquidated Interconnection Financial Security and all proceeds not otherwise reimbursed to Applicant or applied to costs incurred or irrevocably committed by Distribution Provider on behalf of Applicant in accordance with this Section F.4.f. Where an Applicant with remaining proceeds from Interconnection Financial Security cannot be located, such remaining proceeds shall escheat to the State pursuant to the Unclaimed Property Law commencing with the California Code of Civil Procedure § 1500.

(L)

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

Sheet 134

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
5. COMMISSIONING TESTING AND PARALLEL OPERATION
- a. Commissioning Testing
- Producer Arranges for and Completes Commissioning Testing of Generating Facility and Producer's Interconnection Facilities:  
Producer is responsible for testing new Generating Facilities and associated Interconnection Facilities according to Section L.5 to ensure compliance with the safety and reliability provisions of this Rule prior to being operated in parallel with Distribution Provider's Distribution or Transmission System. For non-Certified Equipment, Producer shall develop a written testing plan to be submitted to Distribution Provider for its review and acceptance. Alternatively, Producer and Distribution Provider may agree to have Distribution Provider conduct the required testing at Producer's expense. Where applicable, the test plan shall include the installation test procedures published by the manufacturer of the Generating Facility or Interconnection Facilities. Facility testing shall be conducted at a mutually agreeable time, and depending on who conducts the test, Distribution Provider or Producer shall be given the opportunity to witness the tests.
- b. Parallel Operation or Momentary Parallel Operation
- Producer shall not commence Parallel Operation of its Generating Facility with Distribution Provider's system unless it has received Distribution Provider's express written permission to do so. Distribution Provider shall authorize Producer's Generating Facility for Parallel Operation or Momentary Parallel Operation with Distribution Provider's Distribution or Transmission System, in writing, within five (5) Business Days of satisfactory compliance with the terms of all applicable agreements. Compliance may include, but not be limited to, provision of any required documentation and satisfactorily completing any required inspections or tests as described herein or in the agreements formed between Producer and Distribution Provider. (L)

(Continued)



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

Sheet 135

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**6. WITHDRAWAL**

Applicant may withdraw its Interconnection Request at any time by written notice of such withdrawal to Distribution Provider. In addition, after receipt of the Interconnection Request, if Applicant fails to adhere to the requirements and timelines of this tariff, except as provided in Section K (Disputes), Distribution Provider shall deem the Interconnection Request to be withdrawn and shall provide written notice to Applicant of the deemed withdrawal within five (5) Business Days and an explanation of the reasons for such deemed withdrawal. Upon receipt of such written notice, Applicant shall have five (5) Business Days in which to either respond with information or action that either cures the deficiency or supports its position that the deemed withdrawal was erroneous and notifies Distribution Provider of its intent to pursue Dispute Resolution. If Applicant cures the deficiency or supports its position that the deemed withdrawal was erroneous, Applicant shall not lose its Queue Position established pursuant to Section E.5.

Withdrawal shall result in the removal of the Interconnection Request from the Interconnection Study process. If Applicant disputes the withdrawal and removal from the Interconnection Study process and has elected to pursue Dispute Resolution as set forth in Section K, Applicant's Interconnection Request is not required to be considered in any ongoing Interconnection Study during the Dispute Resolution process.

In the event of such withdrawal, Distribution Provider, subject to the provisions in Section D.7 and Sections E.3.a, as applicable, shall provide, at Applicant's request, all information that Distribution Provider developed for any completed study conducted up to the date of withdrawal of the Interconnection Request.

(L)

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

Sheet 136

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**7. COST ENVELOPE OPTION**

Interconnection Requests for Generating Facilities evaluated under the Fast Track Process or Independent Study Process may qualify for the Cost Envelope Option described in this Section F.7 provided the requirements set forth in subsection (a) below are met. As further described below, under the Cost Envelope Option, Distribution Provider will prepare a Cost Envelope Estimate. The Cost Envelope Estimate will be based on the Applicant's estimated costs to interconnect a Generating Facility and will identify which elements of the estimated costs are subject to the Cost Envelope, and which are excluded from the Cost Envelope. Should an Applicant decide to proceed to a Generator Interconnection Agreement following receipt of the Cost Envelope Estimate in accordance with Section F.2.e for the Fast Track Process, or Section F.3.e.i for the Independent Study Process, the Generator Interconnection Agreement shall include cost responsibility for required upgrades based upon the Cost Envelope Estimate.

**a. Eligibility for Cost Envelope Option**

**i) Eligibility of Interconnection Requests Under the Fast Track Process**

Interconnection Requests processed under the Fast Track Process are eligible for the Cost Envelope Option if all of the following criteria are met:

- (1) Applicant selects the Cost Envelope Option in its Interconnection Request, or during any applicable results meeting if mutually agreed upon by Distribution Provider and Applicant, and provides the additional required information specified therein for the Cost Envelope Option; and,
- (2) The Interconnection Request passes the Fast Track Process evaluation pursuant to Section F.2.; and,

(L)

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

Sheet 137

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- a. Eligibility for Cost Envelope Option (Cont'd.)
- i) Eligibility of Interconnection Requests Under the Fast Track Process (Cont'd.)
- (3) Applicant provides Distribution Provider the Cost Envelope Option deposit of \$2,500 within ten (10) Business Days following receipt of the Distribution Provider's non-binding cost estimate provided in accordance with Sections F.2.a, F.2.b, F.2.c.iii, or F.2.d, as applicable. The Cost Envelope Option deposit of \$2,500 is subject to adjustment upon mutual agreement of the Distribution Provider and Applicant.
- In the event it is determined under the Initial Review or Supplemental Review that i) there are no Distribution Provider Interconnection Facilities and/or Distribution Upgrades required for interconnection of the Generating Facility, or ii) there are no Distribution Provider's Interconnection Facilities and/or Distribution Upgrades required for interconnection of the Generating Facility for which Applicant bears cost responsibility, Applicant's election of the Cost Envelope Option shall be considered not applicable and shall be deemed withdrawn. In such event, the Interconnection Request shall continue to be processed in accordance with the Fast Track Process.
- ii) Eligibility of Interconnection Requests Under The Independent Study Process
- (1) Applicant selects the Cost Envelope Option in its Interconnection Request and provides the additional required information specified therein for the Cost Envelope Option; and,
- (2) The Interconnection Request qualifies for evaluation under the Independent Study Process pursuant to Section F.3.a; and, (L)

(Continued)





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

Sheet 138

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- a. Eligibility for Cost Envelope Option (Cont'd.)
- ii) Eligibility of Interconnection Requests Under The Independent Study Process (Cont'd.)
- (3) An Interconnection System Impact Study and Interconnection Facilities Study are completed for the Interconnection Request pursuant to Sections F.3.b.ii and F.3.b.viii, respectively; and,
- (4) In the case of a NEM Generating Facility or Solar  $\leq 1$  MW Generating Facility, Applicant provides Distribution Provider the Cost Envelope Option deposit of \$2,500 within the timeframe set forth in Section F.3.b.vi. The Cost Envelope Option deposit of \$2,500 is subject to adjustment upon mutual agreement of the Distribution Provider and Applicant.
- b. Cost Responsibility under the Cost Envelope Option
- i) Cost Responsibility for Facilities Subject to Cost Envelope
- Applicant shall be responsible for the actual cost of the portion of interconnection facilities and/or distribution upgrades subject to the cost envelope within the range of plus or minus twenty-five (25) percent of the estimated cost of such facilities identified in the cost envelope estimate. Applicant's cost responsibility for that portion of the interconnection facilities and/or distribution upgrades subject to the cost envelope shall be capped at twentyfive (25) percent above the estimated cost, and applicant shall not be responsible for the portion of the actual cost of such interconnection facilities and/or distribution upgrades that exceeds twenty-five (25) percent of the estimate. (L)

(Continued)



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

Sheet 139

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- b. Cost Responsibility under the Cost Envelope Option (Cont'd.)
- i) Cost Responsibility for Facilities Subject to Cost Envelope (Cont'd.)
- Correspondingly, applicant's cost responsibility for the portion of the interconnection facilities and/or distribution upgrades subject to the cost envelope shall not be less than the amount determined as twenty-five (25) percent below the estimated cost, and any portion of the actual cost of such interconnection facilities and/or distribution upgrades that is below twenty-five (25) percent of the estimate shall not be refundable to applicant.
- ii) Cost Responsibility for Facilities Not Subject to Cost Envelope
- Applicant shall be responsible for the actual cost of the portion of Interconnection Facilities and/or Distribution Upgrades that are not subject to the Cost Envelope and the actual cost of Network Upgrades in accordance with Section F.7.e.
- c. Timing of Applicant's Selection of Cost Envelope Option and Payment of Deposit
- i) For Interconnection Requests under the Fast Track Process, Applicant must select the Cost Envelope Option in its Interconnection Request to be eligible for the Cost Envelope Option, in accordance with Section F.7.a.i. In addition, for Interconnection Requests that pass the Fast Track Process, Applicant must provide the Distribution Provider a \$2,500 Cost Envelope Option deposit within ten (10) Business Days of receipt of the Distribution Provider's non-binding cost estimate for the (L)

(Continued)



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

Sheet 140

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- c. Timing of Applicant's Selection of Cost Envelope Option and Payment of Deposit (Cont'd.)
- i) Interconnection Facilities and/or Distribution Upgrades required for interconnection. If Applicant fails to provide the Cost Envelope Option deposit within ten (10) Business Days of receipt of the Distribution Provider's non-binding cost estimate for the Interconnection Facilities and/or Distribution Upgrades required for interconnection, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option. However, if the Applicant fails to provide the Cost Envelope Option deposit within the required timeframe, a Generator Interconnection Agreement may be requested by Applicant in accordance with Section F.2.e, and such Generator Interconnection Agreement will reflect the non-binding cost estimate for the Distribution Provider's required Interconnection Facilities and/or Distribution Upgrades provided during the Initial or Supplemental Review, and Applicant shall be responsible for the actual cost of such upgrades.
- ii) For Interconnection Requests under the Independent Study Process, Applicant must select the Cost Envelope Option in its Interconnection Request to be eligible for the Cost Envelope Option, in accordance with Section F.7.a.ii. In the case of a NEM Generating Facility or Solar ≤1 MW Generating Facility, Applicant must also provide Distribution Provider the Cost Envelope Option deposit of \$2,500 following completion of the Interconnection System Impact Study within the timeframe set forth in Section F.3.b.vi. The Cost Envelope Option deposit of \$2,500 is subject to adjustment upon mutual agreement of the Distribution Provider and Applicant. (L)

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

Sheet 141

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- c. Timing of Applicant's Selection of Cost Envelope Option and Payment of Deposit (Cont'd.)
- ii) An Applicant must withdraw its request for the Cost Envelope Option following the Distribution Provider's completion of the Interconnection System Impact Study in the event the Distribution Provider and Applicant agree to waive the Interconnection Facilities Study in accordance with Section F.3.b.vii, by so indicating on Attachment B of the Detailed Study Agreement, or for NEM Generating Facilities by providing Distribution Provider written notice of such withdrawal prior to commencement of the Interconnection Facilities Study in accordance with Section F.3.b.vi.
- d. Distribution Provider's Preparation of the Cost Envelope Estimate
- For Interconnection Requests evaluated under the Fast Track Process, Distribution Provider shall complete and issue to Applicant the Cost Envelope Estimate within twenty (20) Business Days following Distribution Provider's receipt of the Cost Envelope Option deposit required pursuant to Section F.7.a.i.3. For Interconnection Requests evaluated under the Independent Study Process, the Cost Envelope Estimate will be developed as part of the Interconnection Facilities Study and will be included in the Interconnection Facilities Study report in accordance with Section F.3.b.viii.
- Applicant shall be responsible for the actual cost of development of the Cost Envelope Estimate. (L)

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

Sheet 142

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
7. COST ENVELOPE OPTION (Cont'd.)
- d. Distribution Provider's Preparation of the Cost Envelope Estimate (Cont'd.)
- If full payment for the required Interconnection Facilities and/or Distribution Upgrades identified in the Cost Envelope Estimate has not been paid by Applicant to the Distribution Provider within two hundred ten (210) Calendar Days from the date Distribution Provider provides the Cost Envelope Estimate to Applicant, the Cost Envelope Estimate shall be subject to re-evaluation and adjustment by the Distribution Provider at Applicant's expense.
- e. Cost Elements Not Subject to Cost Envelope
- Any and all costs of required environmental studies, environmental mitigation, permits, and/or easements related to the construction and installation of Distribution Provider's Interconnection Facilities and/or Distribution Upgrades shall not be subject to the Cost Envelope. Such costs shall be the responsibility of Applicant based on the actual cost incurred by the Distribution Provider.
- Any and all costs of required Network Upgrades shall not be subject to the Cost Envelope. Such costs shall be the responsibility of Applicant based on the actual cost incurred by the Distribution Provider. (L)

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Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution



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

Sheet 143

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**7. COST ENVELOPE OPTION (Cont'd.)**

**e. Cost Elements Not Subject to Cost Envelope (Cont'd.)**

The cost of any Distribution Provider's Interconnection Facilities and/or Distribution Upgrades triggered by one or more earlier queued Interconnection Requests that are also required for interconnection of a later-queued Generating Facility under the Cost Envelope Option shall not be subject to the Cost Envelope. In the event one or more of the earlier-queued projects withdraws (or is delayed to the extent the upgrade will not be completed in time to meet the later-queued Generating Facility's requested In-Service Date), all, or a portion, of Distribution Provider's Interconnection Facilities and/or Distribution Upgrades may become the responsibility of the later-queued Generating Facility. Upon such an occurrence, the Generator Interconnection Agreement shall be amended to reflect the Applicant's responsibility for such Distribution Provider's Interconnection Facilities and/or Distribution Upgrades based on actual costs unless Applicant requests in writing, within ten (10) Business Days of Applicant's receipt of Distribution Provider's nonbinding estimated cost of such required facilities, that it elects to include such facilities in the Cost Envelope. Within ten (10) Business Days of Applicant's request, Distribution Provider shall provide to Applicant an estimate of the cost required to update the Cost Envelope Estimate. Applicant shall notify Distribution Provider in writing within ten (10) Business Days of Applicant's receipt of Distribution Provider's estimate whether (i) Applicant elects to proceed with the update to the Cost Envelope Estimate at Applicant's expense, or (ii) that Applicant withdraws its request to include the additional facilities in the Cost Envelope. If Applicant elects to proceed with the update to the Cost Envelope Estimate, Distribution Provider shall complete the update within the sum of the time allowed for each step utilized by the Distribution Provider in preparation of the initial Cost Envelope Estimate pursuant to Section F.2 for Interconnection Requests evaluated under the Fast Track Process, or Section F.3.b for Interconnection Requests evaluated under the Independent Study Process, from receipt of payment of the estimated cost of the update. Should Applicant fail to so notify Distribution Provider within the ten (10) Business Day period, Applicant's request to include such additional facilities in the Cost Envelope shall be deemed withdrawn and such additional facilities shall be the responsibility of Applicant based on actual cost.

(L)

(Continued)



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

Sheet 144

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**7. COST ENVELOPE OPTION (Cont'd.)**

**f. Modifications**

Under the Fast Track Process, modifications are not permitted to the Generating Facility, related equipment, Point of Interconnection or other interconnection parameters that would require a re-evaluation of the Initial Review or Supplemental Review. However, notwithstanding these restrictions, an Applicant may identify and suggest minor changes to the Interconnection Facilities (e.g., minor adjustments to physical location of switchgear or other equipment, adjustments to routing of conductor from the Point of Common Coupling to the Point of Interconnection, etc.) upon or near completion of Applicant's final design of its Interconnection Facilities. If an Applicant identifies such changes, Applicant shall notify Distribution Provider of the requested changes and if, in the reasonable judgement of Distribution Provider, a re-evaluation of the costs under the Cost Envelope Option is required, Distribution Provider will provide Applicant within ten (10) Business Days of receipt of Applicant's notice an estimate of the time required to re-evaluate the costs under the Cost Envelope Option and the estimated cost of such re-evaluation. Applicant may either (i) accept the additional time and cost to complete the re-evaluation, (ii) withdraw the proposed changes, or (iii) proceed with a new Interconnection Request for such changes. Applicant shall provide Distribution Provider written notice of its election within ten (10) Business Days following Applicant's receipt of Distribution Provider's estimated additional time and cost required for the re-evaluation. If Applicant elects to proceed with the re-evaluation of the costs under the Cost Envelope Option, Distribution Provider shall complete the reevaluation within twenty (20) Business Days from receipt of all required technical data related to the proposed changes and payment of the estimated cost of the reevaluation. Should Applicant fail to so notify Distribution Provider within such ten (10) Business Day period, Applicant's request to make the proposed changes shall be deemed withdrawn.

(L)

(Continued)





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

Sheet 145

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)** (L)

**7. COST ENVELOPE OPTION (Cont'd.)**

**f. Modifications**

Under the Independent Study Process, any requested modifications, including required updates to costs under the Cost Envelope Option, shall be made in accordance with Section F.3.b.v. If Applicant elects to proceed with re-evaluation of the costs under the Cost Envelope Option pursuant to Section F.3.b.v, Distribution Provider shall complete the re-evaluation within the sum of the time allowed for each step utilized by the Distribution Provider for preparation of the initial Cost Envelope Estimate pursuant Section F.3.b from receipt of all required technical data related to the proposed changes and payment of the estimated cost of the re-evaluation.

**g. Tender of the Generator Interconnection Agreement Under the Cost Envelope Option**

Negotiation and execution of the Generator Interconnection Agreement shall be in accordance with Section F.2.e for Interconnection Requests evaluated under the Fast Track Process, and in accordance with Section F.3.e.ii for Interconnection Requests evaluated under the Independent Study Process.

**8. DESIGN AND CONSTRUCTION TIMELINE** (N)

Subject to emergencies, delays from other agencies, and other reasons, the standard timeline for design and construction of interconnection-related Distribution Upgrades is as follows:

- i) 60 business days for design and 60 business days for construction, or
- ii) Design and construct timelines as agreed to between Applicant and Distribution Provider.

The 60-day clock commences upon payment and after Applicant has done everything necessary on its end to prepare for construction.

(Continued)



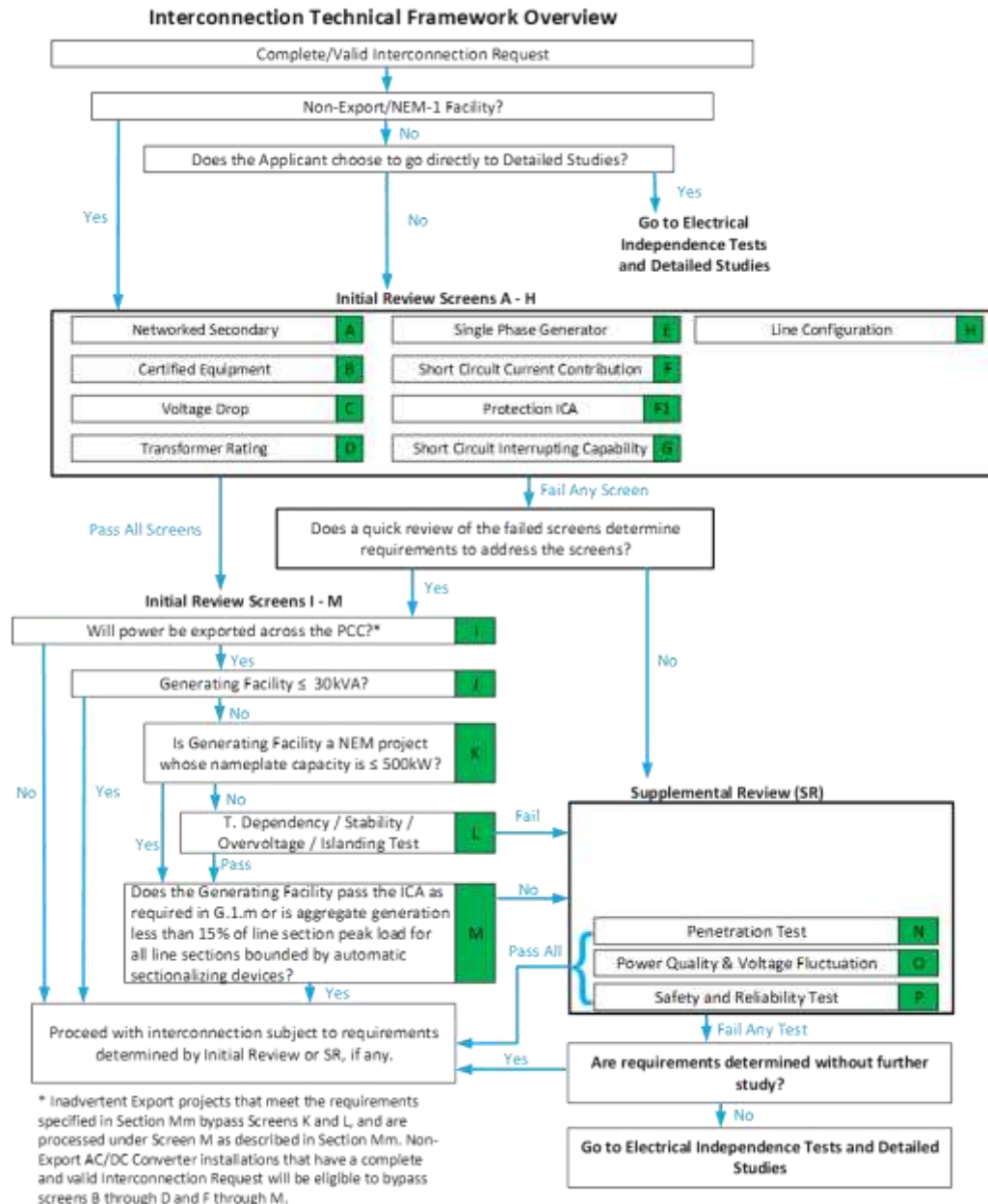


**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 146

**G. ENGINEERING REVIEW DETAILS**

(T)



(T)

(Continued)

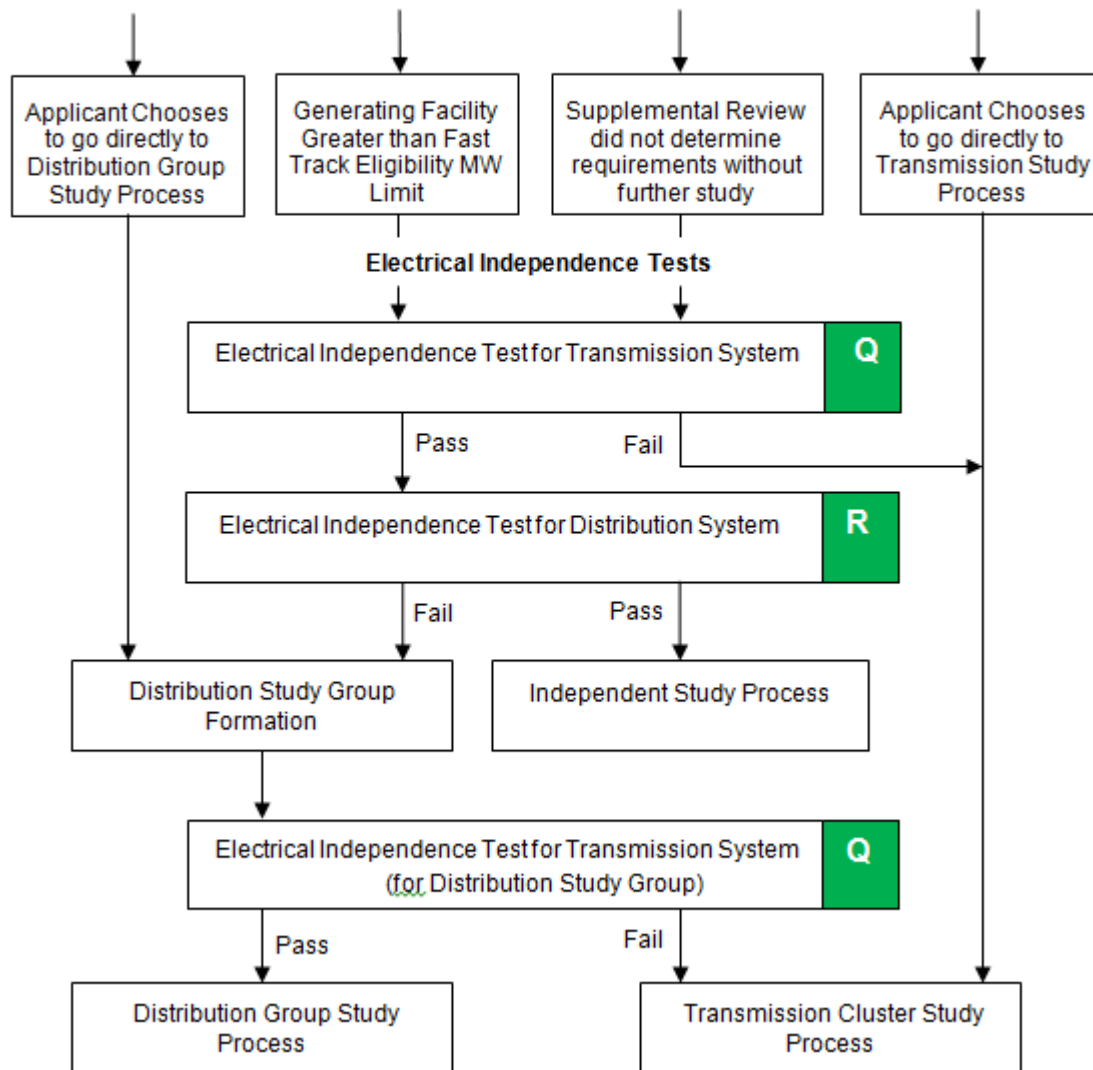


**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 147

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

**Interconnection Technical Framework- Overview**



(L)  
-----  
(L)

(Continued)



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

Sheet 148

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

(L)

**1. INITIAL REVIEW SCREENS**

The Initial Review consists of Screens A through M. If any of the Screens A through H are not passed, a quick review of the failed Screen(s) may determine the requirements to address the failure(s). Otherwise, Supplemental Review is required.

Some examples of solutions that may be available to mitigate the impact of a failed Screen A through H are:

1. Replace an overloaded distribution transformer with a larger transformer.
2. Replace overloaded secondary conductors with larger conductor.
3. Determine if phase balancing on the transformer is possible with minimal review.
4. If possible without further study check if the Generating Facility will actually overstress equipment.
- a. Screen A: Is the PCC on a Networked Secondary System?
  - If Yes (fail), must go to Supplemental Review except if the Generating Facility is on a Spot Network and meets the following criteria. If the Generating Facility meets the following criteria, continue to Screen B pursuant to Section G.1.

The proposed Generating Facility must utilize an inverter-based equipment package and, together with the aggregated other inverter-based generation, shall not exceed the smaller of 5 % of a Spot Network's maximum load or 50 kW. Under no condition shall the interconnection of a Generating Facility result in a backfeed of a Spot Network or cause unnecessary operation of any Spot Network protectors.

(L)

(Continued)



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

Sheet 149

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

(L)

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

**a. Screen A: Is the PCC on a Networked Secondary System? (Cont'd.)**

- If No (pass), continue to Screen B.

Significance: Special considerations must be given to Generating Facilities proposed to be installed on Networked Secondary Systems because of the design and operational aspects of network protectors. There are no such considerations for radial distribution systems.

**b. Screen B: Is Certified Equipment used?**

Does the Interconnection Request propose to use Certified Equipment as set out in Section L or does the equipment have interim Distribution Provider approval?

- If Yes (pass), continue to Screen C.
- If No (fail) continue to Screen C pursuant to Section G.1.

Interim approval allows Distribution Provider to treat equipment that has not completed this Rule's Certification requirements as having met the intent of this screen. Interim approval is granted at Distribution Provider's discretion on case by case bases, and approval for one Generating Facility does not guarantee approval for any other Generating Facility.

Significance: If the Generating and/or Interconnection Facility has been Certified or previously approved by Distribution Provider, Distribution Provider does not need to repeat its full review and/or test of the Generating and/or Interconnection Facility's Protective Functions. Site Commissioning Testing may still be required to ensure that the Protective Functions are working properly.

Certification indicates that the criteria in Section L, as appropriate, have been tested and verified.

(L)

(Continued)



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

Sheet 150

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

(L)

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

**c. Screen C: Is the Starting Voltage Drop within acceptable limits?**

- If Yes (pass), continue to Screen D.
- If No (fail), continue to Screen D pursuant to Section G.1.

Note: This Screen only applies to Generating Facilities that start by motoring the Generator(s).

Distribution Provider has two options in determining whether Starting Voltage Drop is acceptable. The option to be used is at Distribution Provider's discretion.

Option 1: Distribution Provider may determine that the Generating Facility's starting In-rush Current is equal to or less than the continuous ampere rating of the Customer's service equipment.

Option 2: Distribution Provider may determine the impedances of the service distribution transformer (if present) and the secondary conductors to Customer's service equipment and perform a voltage drop calculation. Alternatively, Distribution Provider may use tables or nomographs to determine the voltage drop. Voltage drops caused by starting a Generator must be less than 2.5% for primary Interconnections and 5% for secondary Interconnections.

Significance:

1. This Screen addresses potential voltage fluctuation problems that may be caused by Generators that start by motoring.
2. When starting, Generating Facilities should have minimal impact on the service voltage to other Distribution Provider Customers.
3. Passing this Screen does not relieve Producer from ensuring that its Generating Facility complies with the flicker requirements of this Rule, Section H.2.d.

(L)

(Continued)



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

Sheet 151

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

(L)

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

- d. Screen D: Is the transformer or secondary conductor rating exceeded?

Do the maximum aggregated Gross Ratings for all the Generating Facilities connected to a secondary distribution transformer exceed the transformer or secondary conductor rating, modified per established Distribution Provider practice, absent any Generating Facilities?

- If Yes (fail), continue to Screen E pursuant to Section G.1.
- If No (pass), continue to screen E.

Significance: This screen addresses potential secondary transformer or secondary conductor overloads. When Distribution Provider's analysis determines a transformer or conductor change is required, Distribution Provider will furnish Applicant with an explanation of why the change is needed.

- e. Screen E: Does the Single-Phase Generator cause unacceptable imbalance?

If the proposed Generating Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, does it cause unacceptable imbalance between the two phases of the 240 volt service?

- If Yes (fail), continue to Screen F pursuant to Section G.1.
- If No (pass), continue to screen F.

(L)

(Continued)



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

Sheet 152

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
1. INITIAL REVIEW SCREENS (Cont'd.)
- e. Screen E: Does the Single-Phase Generator cause unacceptable imbalance? (Cont'd.) (L)
- Significance: Generating Facilities connected to a single-phase transformer with 120/240 V secondary voltage must be installed such that the aggregated gross output is as balanced as practicable between the two phases of the 240 volt service. When Distribution Provider's analysis determines a transformer change is required. Distribution Provider will furnish the customer with an explanation of why the change is needed. (L)
- f. Screens F and F1: (P)/(L)
- Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits? (P)/(L)
- If Yes (pass), continue to Screen F1. (P)/(L)
  - If No (fail), continue to Screen F1 pursuant to Section G.1. (P)/(L)
- Note: This Screen does not apply to Generating Facilities with a Gross Rating of 30 kVA or less. (L)  
(T)/(L)
- When measured at primary side (high side) of the Dedicated Distribution Transformer serving a Generating Facility, the sum of the Short Circuit Contribution Ratios of all Generating Facilities connected to Distribution Provider's Distribution System circuit that serves the Generating Facility must be less than or equal to 0.1. (L)  
(L)
- Significance: If the Generating Facility passes this screen, it can be expected that it will have no significant impact on Distribution Provider's Distribution System's short circuit duty, fault detection sensitivity, relay coordination or fuse-saving schemes. (P)/(L)  
(L)  
(L)

(Continued)





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

Sheet 153

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

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

**f. Screens F and F1:**

(P)/(L)

Screen F1: Is the per unit short circuit current contribution under allowable levels?

Is the short circuit current contribution less than or equal to 1.2 per unit or is the Generating Facility Gross Nameplate Rating multiplied by its per unit contribution less than the Protection Integrated Capacity Analysis (ICA) Value multiplied by 1.2 per unit?

- If Yes to either (pass), continue to Screen G.
- If No to both (fail), continue to Screen G pursuant to Section G.1.

Significance: Generating systems with a per unit short circuit contribution of 1.2 or less can bypass this screen and directly use the ICA because ICA calculations assume that Generating Facilities have a per unit short circuit contribution of 1.2. For Generating Facilities with a per unit short circuit contribution greater than 1.2, the Distribution Provider will use the Protection ICA Value<sup>1</sup> at the point of interconnection in conjunction with the Generating Facility's per unit short circuit contribution to determine whether the facility passes Screen F1.

(P)/(L)

**g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?**

(L)

Does the proposed Generating Facility, in aggregate with other Generating Facilities on the distribution circuit, cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Request equipment on the system to exceed 87.5 % of the short circuit interrupting capability; or is the Interconnection proposed for a circuit that already exceeds 87.5 % of the short circuit interrupting capability?

- If Yes (fail) continue to Screen H pursuant to Section G.1.
- If No (pass), continue to Screen H

(L)

(L)

(L)

<sup>1</sup> The protection limit is one of the components of the ICA Value that pertains to sensing faults on the grid.

(P)/(L)

(P)/(L)

(Continued)





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

Sheet 154

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

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

- g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?  
(Cont'd)

Note: This Screen does not apply to Generating Facilities with a  
Gross Rating of 30 kVA or less.

Significance: If the Generating Facility passes this screen, it can be  
expected that it will not cause any of Distribution Provider's equipment  
to be overstressed.

- h. Screen H: Is the line configuration compatible with the  
Interconnection type?

- If Yes (pass), continue to Screen I.
- If No (fail), continue to Screen I pursuant to Section G.1.

Note: This Screen does not apply to Generating Facilities with a  
Gross Rating of 30 kVA or less

Line Configuration Screen: Identify primary distribution line  
configuration that will serve the Generating Facility. Based on the  
type of Interconnection to be used for the Generating Facility,  
determine from Table G.1 if the proposed Generating Facility passes  
the Screen.

**Table G-1**  
**Type of Interconnection**

| Primary Distribution<br>Line Type Configuration                                                     | Type of Interconnection<br>to be made to<br>Primary Distribution Line | Result/Criteria                                                                                                                 |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Three-phase, three-wire                                                                             | Any type                                                              | Pass Screen                                                                                                                     |
| Three-phase, four-wire                                                                              | Single-phase,<br>line-to-neutral                                      | Pass Screen                                                                                                                     |
| Three-phase, four-wire<br>(For any line that has such a<br>section OR mixed three-wire & four-wire) | All others                                                            | To pass, aggregate<br>Generating Facility nameplate<br>rating must be less than<br>or equal to 10% of Line<br>Section peak load |

(Continued)



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

Sheet 155

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

(L)

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

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

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

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

(L)

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

(P)/(L)  
(P)/(L)

- If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate Options 1, 2, 3, 4, 7, or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If Option 8 is used, see section Mm2 to determine screen application.

(P)/(L)  
|  
(P)/(L)

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

(L)

(L)

(Continued)



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

Sheet 156

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
1. INITIAL REVIEW SCREENS (Cont'd.)
- i. Screen I: Will power be exported across the PCC? (Cont'd.)
- Option 2 ("Minimum Power Protection"): To ensure at least a minimum amount of power is imported across the PCC at all times (and, therefore, that power is not exported), an under-power Protective Function may be provided. The default setting for this Protective Function shall be 5% (import) of Generating Facility's total Gross Rating, with a maximum 2.0 second time delay.
- Option 3 (Certified Non-Islanding Protection): To ensure the incidental export of power is limited to acceptable levels, this option requires that all of the following conditions be met: a) the total Gross Capacity of the Generating Facility must be no more than 25% of the nominal ampere rating of Producer's service equipment; b) the total Gross Capacity of the Generating Facility must be no more than 50% of Producer's service transformer capacity rating (this capacity requirement does not apply to Customers taking primary service without an intervening transformer); and c) the Generating Facility must be Certified as Non-Islanding.
- The ampere rating of the Customer's service equipment to be used in this evaluation will be that rating for which the customer's utility service was originally sized or for which an upgrade has been approved. It is not the intent of this provision to allow increased export simply by increasing the size of the customer's service panel, without separate approval for the resize. (L)

(Continued)



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

Sheet 157

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

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

- i. Screen I: Will power be exported across the PCC? (Cont'd.) (L)
  - Option 4 (Relative Generating Facility Rating): This option, when used, requires the Net Rating of the Generating Facility to be so small in comparison to its host facility's minimum load, that the use of additional Protective Functions is not required to ensure that power will not be exported to Distribution Provider's Distribution or Transmission System. This option requires the Generating Facility capacity to be no greater than 50% of Producer's verifiable minimum Host Load over the past 12 months. (L)
  - Option 5: Inadvertent Export as described in Section M. (L)
  - Option 6: Inadvertent Export utilizing UL-1741 or UL-1741 SA/SB listed grid support (Non-Islanding) inverters as described in Section Mm. (P)/(L)
  - Option 7: Non-Export utilizing Non-Export AC/DC Converter as described in Section O. (P)/(L)
  - Option 8: Non-Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm1. (P)/(L)
  - Option 9: Limited Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm2. (P)/(L)
  - Option 10: Non-Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm3. (P)/(L)
  - Option 11: Limited Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm4. (P)/(L)

(Continued)



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

Sheet 158

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

(L)

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

**i. Screen I: Will power be exported across the PCC? (Cont'd.)**

Significance:

1. If it can be assured that the Generating Facility will not export power, Distribution Provider's Distribution or Transmission System does not need to be studied for load-carrying capability or Generating Facility power flow effects on Distribution Provider voltage regulators.
2. This Screen permits the use of reverse-power or minimum-power relaying as a Non-Islanding Protective Function (Option 1, 2, and 3).
3. This Screen allows, under certain defined conditions, for Generating Facilities that incorporate Certified Non-Islanding protection to qualify for interconnection through the Fast Track process without implementing reverse power or minimum power Protective Functions (Option 3).

(L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution



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

Sheet 159

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
1. INITIAL REVIEW SCREENS (Cont'd.) (L)
- j. Screen J: Is the Gross Rating of the Generating Facility 30 kVA or less? (T)/(L)
- If Yes (pass), skip Screens K, L and M; Initial Review is complete. (L)
  - If No (fail), continue to Screen K.<sup>i</sup>
- Significance: The Generating Facility will have a minimal impact on fault current levels and any potential line overvoltages from loss of Distribution Provider's Distribution System neutral grounding.
- k. Screen K: Is the Generating Facility a Net Energy Metering (NEM) Generating Facility with nameplate capacity less than or equal to 500 kW?
- If Yes (pass), skip screen L and continue to screen M.
  - If No (fail), continue to screen L.
- Significance: The purpose of this Screen is solely to facilitate interconnection of NEM facilities below this size threshold by allowing such facilities to bypass Screen M. The use of nameplate capacity expedites the Initial Review analysis. In Supplemental Review, the net export will be analyzed.
- <sup>i</sup> Inadvertent Export systems that meet the requirements specified in Section Mm bypass Screens K and L, and are processed under Screen M as described in Section Mm. (L)

(Continued)



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

Sheet 160

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

(L)

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

(L)

**I. Screen L: Transmission Dependency, and Stability, Overvoltage, and  
Islanding Tests**

(P)/(L)  
(P)/(L)

Is the Interconnection Request for an area where: (i) there are known, or posted, transient/dynamic stability limitations, or (ii) the proposed Generating Facility has interdependencies, known to Distribution Provider, with earlier-queued Transmission System interconnection requests, , or (iii) islanding conditions are possible based on PG&E's currently adopted and published screening policies with respect to antiislanding, or (iv) transmission ground fault overvoltage is possible based on PG&E's currently adopted and published screening policies with respect to overvoltage screening. Where (i) or (ii) or (ii) or (iv) above are met, the impacts of this Interconnection Request to the Transmission System may require further Study.

(L)  
(P)/(L)  
(L)  
(L)  
(P)/(L)  
|  
|  
|  
|  
|  
(P)/(L)

• If Yes (fail), Supplemental Review is required.

(L)

• If No (pass), continue to Screen M.

|

Significance: Special consideration must be given to those areas identified as having current or future (due to currently-queued interconnection requests) grid stability concerns.

|  
|  
|  
(L)

PG&E will temporarily apply anti-islanding tests until the resolution of **Issue 18\*** in R. 17-07-007, Working Group Four Report made effective in PG&E's tariffs.

(P)/(L)  
|  
(P)/(L)

(L)

|

(L)

\* Issue 18 is "Should the Commission adopt changes to anti-islanding screen parameters to reflect research on islanding risks when using UL 1741-certified inverters in order to avoid unnecessary mitigations? If yes, what should those changes entail?"

(P)(L)  
|  
(P)/(L)

(Continued)



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

Sheet 161

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

(N)

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

- m. Screen M: When ICA Values are available at the requested Point of Interconnection, the Distribution Provider shall compare the ICA Values to the Gross Nameplate Rating or typical PV Generation Profile.

For Interconnection Requests based on Gross Nameplate Rating:

- a. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-SG 576 Profile? or
- b. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-OF 576 Profile?

If the response is "yes" to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

For Interconnection Requests based on typical PV Generation Profile:

- a. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-SG 576 value in any hour? or
- b. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-OF 576 value in any hour?

If the response is "yes" to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

(N)

(Continued)





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

Sheet 162

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

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

**m. Screen M (Cont'd):**

(T)/(L)

Is the aggregate Generating Facility capacity on the Line Section less than 15% of Line Section peak load for all line sections bounded by automatic sectionalizing devices?

(L)  
(L)  
(T)/(L)

- If Yes (pass), Initial Review is complete.
- If No (fail), Supplemental Review is required.

(L)  
(L)

When ICA information is not available at the requested Point of Interconnection, Screen M should be evaluated as follows:

(N)  
(N)

Significance:

(L)

1. Low penetration of Generating Facility capacity will have a minimal impact on the operation and load restoration efforts of Distribution Provider's Distribution System.
2. The operating requirements for a high penetration of Generating Facility capacity may be different since the impact on Distribution Provider's Distribution System will no longer be minimal, therefore requiring additional study or controls.

The purpose of this Screen is solely to identify if the Generating Facility needs additional study and is not intended as justification for limiting the penetration of generation on a line section.

**2. SUPPLEMENTAL REVIEW SCREENS**

The Supplemental Review consists of Screens N through P. If any of the Screens are not passed, a quick review of the failed Screen(s) will determine the requirements to address the failure(s) or that Detailed Studies are required. In certain instances, Distribution Provider may be able to identify the necessary solution and determine that Detailed Studies are unnecessary. Some examples of solutions that may be available to mitigate the impact of a failed Screen are:

1. Replacing a fixed capacitor bank with a switched capacitor bank.
2. Adjustment of line regulation settings.
3. Simple reconfiguration of the distribution circuit.

(L)  
(D)

(Continued)



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

Sheet 163

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

(L)

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**a. Screen N: Penetration Test**

(L)

If Integration Capacity Analysis Values are available at the requested Point of Interconnection, evaluate Screen N as follows:

(N)

**i) Penetration Level Using Generating ICA Profile:**

For Interconnection Requests based on Gross Nameplate Rating: Is the Generating Facility aggregate Gross Nameplate Rating equal to or below 90% of the lowest value in the ICA-SG 576 Profile?

For Interconnection Requests based on typical PV Generation Profile: Is the Generating Facility Generation Profile, based on PV Watts or equivalent, equal to or below 90% the ICA-SG value at each hour in the ICA-SG 576 Profile?

**ii) Screen F1: Did the Interconnection Request pass Screen F1?**

If yes to both of the above (pass), continue to Screen O.

If "no" to either or both of the above(fail), a quick review of the failure within Supplemental Review may determine the requirements to address the failure; otherwise Electrical Independence Tests or Detailed Studies are required.

- If the failure(s) that cannot be addressed in Supplemental Review, the Distribution Provider will conduct a review to identify the reasons why further studies are required.

(N)

(Continued)



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

Sheet 164

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

(N)

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**a. Screen N: Penetration Test (Cont'd)**

**ii) Screen F1: Did the Interconnection Request pass Screen F1 (Cont'd)?**

- If the failure(s) cannot be addressed in Supplemental Review, and generation is 100% or less of the applicable ICA value (lowest value of the ICA-SG profile or lowest value at each hour) the Distribution Provider must identify a reason why a specific technical constraint is not captured by the ICA and the why the project must proceed to Electrical Independence Tests and Detailed Studies.
- If voltage is a prevailing constraint, then the smart inverter default volt/var function will be used in power flow analysis for the evaluation of the proposed project. This will reveal if the proposed project causes any voltage impacts of concern. If concerns related to steady state voltage, thermal, or protection exist and the Distribution Provider can identify simple upgrades through power flow analysis (e.g., installation of voltage regulator devices or protection devices to mitigate reduction of reach), then the Distribution Provider will determine the mitigation requirements within Screen N. When larger upgrades or complex protection evaluation is required, Screen N will fail, and the technical evaluation will be conducted under the Detailed Study process.
- If no reason for further study is identified, or if requirements to address the failure can be identified in screen N, proceed to Screen O.
- Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens if Applicant elects to proceed.
- If Integration Capacity Analysis Values are not available, evaluate Screen N as follows:

(N)

(Continued)



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

Sheet 165

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

(L)

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**a. Screen N: Penetration Test**

Where 12 months of line section minimum load data is available, can be calculated, can be estimated from existing data, or determined from a power flow model, is the aggregate Generating Facility capacity on the Line Section less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility?

- If yes (pass), continue to Screen O.
- If no (fail), a quick review of the failure may determine the requirements to address the failure; otherwise Electrical Independence Tests and Detailed Studies are required. Continue to Screen O. (Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens, if Applicant elects to proceed.)

Note 1: If none of the above options are available, this screen defaults to Screen M.

Note 2: The type of Generating Facility technology will be taken into account when calculating, estimating, or determining circuit or Line Section minimum load relevant for the application of this screen. For solar Generating Facilities with no battery storage, daytime minimum load will be used (i.e., 10 am to 4 pm for fixed panel solar Generating Facilities and 8 am to 6 pm for solar Generating Facilities utilizing tracking systems), while absolute minimum load will be used for all other Generating Facility technologies.

Note 3: When this screen is being applied to a NEM Generating Facility, the net export in kW, if known, that may flow across the Point of Common Coupling into Distribution Provider's Distribution System will be considered as part of the aggregate generation.

(L)

(Continued)



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

Sheet 166

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)
- a. Screen N: Penetration Test (Cont'd.)
- Note 4: Distribution Provider will not consider as part of the aggregate Generating Facility capacity for purposes of this screen Generating Facility capacity known to be already reflected in the minimum load data.
- Note 5: NEM Generating Facilities with net export less than or equal to 500 kW that may flow across the Point of Common Coupling into Distribution Provider's Distribution or Transmission System will not be studied in the WDT Transmission Cluster Study Process, but may be studied under the Independent Study Process.
- Significance: Penetration of Generating Facility capacity that does not result in power flow from the circuit back toward the substation will have a minimal impact on equipment loading, operation, and protection of the Distribution System.
- b. Screen O: Power Quality and Voltage Tests
- In aggregate with existing Generating Facility capacity on the Line Section, distribution circuit, and/or substation.
- i) Can it be determined within the Supplemental Review that the voltage regulation on the line section can be maintained in compliance with Commission Rule 2 and/or Conservation Voltage Regulation voltage requirements under all system conditions?
- ii) Can it be determined within the Supplemental Review that the voltage fluctuation is within acceptable limits as defined by IEEE 1453 or utility practice similar to IEEE1453? (L)

(Continued)



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

Sheet 167

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

(L)

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**b. Screen O: Power Quality and Voltage Tests (Cont'd.)**

In aggregate with existing Generating Facility capacity on the Line Section, distribution circuit, and/or substation. (Cont'd.)

- iii) Can it be determined within the Supplemental Review that the harmonic levels meet IEEE 519 limits at the Point of Common Coupling (PCC)?
- iv) Can it be determined within the Supplemental Review that the Generating Facility will not cause any voltage impacts considering the settings of the Volt-Var function and the characteristics of the circuit segment?
- If yes to all of the above (pass), continue to Screen P.
- If no to any of the above (fail), a quick review of the failure may determine the requirements to address the failure; otherwise Electrical Independence Tests and Detailed Studies are required. Continue to Screen P. (Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens.)

Significance: Adverse voltages and undesirable interference may be experienced by other Customers on Distribution Provider's Distribution System caused by operation of the Generating Facility(ies).

**c. Screen P: Safety and Reliability Tests**

Does the location of the proposed Generating Facility or the aggregate generation capacity on the Line Section create impacts to safety or reliability that cannot be adequately addressed without Detailed Study?

- If yes (fail), review of the failure may determine the requirements to address the failure; otherwise Electrical Independence Tests and Detailed Studies are required. Continue to Section G.3.
- If no (pass), Supplemental Review is complete.

(L)

(Continued)



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

Sheet 168

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)
- c. Screen P: Safety and Reliability Tests (Cont'd.)
- Significance: In the safety and reliability test, there are several factors that may affect the nature and performance of an Interconnection. These include, but are not limited to:
1. Generating Facility energy source
  2. Modes of synchronization
  3. Unique system topology
  4. Possible impacts to critical load customers
  5. Possible safety impacts
- The specific combination of these factors will determine if any system study requirements are needed. The following are some examples of the items that may be considered under this screen:
1. Does the Line Section have significant minimum loading levels dominated by a small number of customers (i.e. several large commercial customers)?
  2. Is there an even or uneven distribution of loading along the feeder?
  3. Is the proposed Generating Facility located in close proximity to the substation (i.e. <2.5 electrical line miles), and is the distribution line from the substation to the customer composed of large conductor/cable (i.e. 600A class cable)? (L)

(Continued)





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

Sheet 169

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

(L)

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**c. Screen P: Safety and Reliability Tests (Cont'd.)**

4. Does the Generating Facility incorporate a time delay function to prevent reconnection of the generator to the system until system voltage and frequency are within normal limits for a prescribed time?
5. Is operational flexibility reduced by the proposed Generating Facility, such that transfer of the line section(s) of the Generating Facility to a neighboring distribution circuit/substation may trigger overloads or voltage issues?
6. Does the Generating Facility utilize Certified anti-islanding functions and equipment?

**3. DETAILED STUDY SCREENS**

**a. Screen Q: Is the Interconnection Request electrically Independent of the Transmission System?**

Distribution Provider, in consultation with the CAISO, will determine, based on knowledge of the interdependencies with earlier-queued interconnection requests under any tariff, whether the Interconnection Request to the Distribution System is of sufficient MW size and located at a point of interconnection such that it is reasonably anticipated to require or contribute to the need for Reliability Network Upgrades. In making this determination, the Distribution Provider will make a Determination of Electrical Independence for the CAISO Controlled Grid as set forth in the applicable CAISO Tariff in effect at the time the Electrical Independence Test begins.

If Distribution Provider determines that no interdependencies exist, or that interdependencies do exist but the proposed Generating Facility is not reasonably anticipated to require or contribute to the need for Reliability Network Upgrades, then the Interconnection Request will be deemed to have passed Distribution Provider's Determination of Electrical Independence for the CAISO Controlled Grid.

If Distribution Provider determines that interdependencies exist and that they are reasonably anticipated to require or contribute to the need for Reliability Network Upgrades, then Interconnection Request may be studied under the WDT Transmission Cluster Study Process as set forth in Section F.3.d.

(L)

(Continued)





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

Sheet 170

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

(L)

**3. DETAILED STUDY SCREENS (Cont'd.)**

- a. Screen Q: Is the Interconnection Request electrically Independent of the Transmission System? (Cont'd.)

Distribution Provider will coordinate with the CAISO if necessary to conduct the Determination of Electrical Independence for the CAISO Controlled Grid as set forth in the applicable CAISO Tariff\*\* in effect at the time the Electrical Independence Test (EIT) begins. The results of the incremental power flow, aggregate power flow, and short-circuit current contribution tests set out in the applicable CAISO Tariff in effect at the time the EIT begins will determine whether the Interconnection Request is electrically independent from the CAISO Controlled Grid.

- If Yes (pass), continue to Screen R.
- If No (fail), proceed to Section F.3.d.

Exemptions: All NEM Generating Facilities and all inverter-based Generating Facilities with a nameplate capacity less than or equal to 1 MVA will not be studied in the WDT Transmission Cluster Study Process, but may be studied under the Independent Study Process. For an Applicant that agrees to the installation, at Applicant's cost, of Distribution Provider-approved software/firmware controlled devices or equipment Nationally Recognized Testing Laboratory certified to limit the Generating Facility's net export so that it will never exceed the 1 MVA exemption limit, the Generating Facility's net export will be considered exempt from the WDT Transmission Cluster Study Process for purposes of this section.

Significance: Generating Facilities that are electrically interdependent with the Transmission System must be studied with other interconnection requests that have Transmission System interdependencies. It is possible to pass this Screen Q (i.e., be found to have no electrical interdependencies with earlier-queued Distribution System and/or Transmission System interconnection requests as set out above), be studied under the Independent Study Process, and still trigger a Reliability Network Upgrade.

\*\* The currently effective CAISO Tariff can be accessed at the following CAISO website  
<http://www.caiso.com/rules/Pages/Regulatory/Default.aspx>

(L)

(Continued)



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

Sheet 171

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

(L)

**3. DETAILED STUDY SCREENS (Cont'd.)**

- b. Screen R: Is the Interconnection Request independent of other earlier-queued and yet to be studied interconnection requests interconnecting to the Distribution System?

For Interconnection Requests that are electrically independent from the CAISO Controlled Grid, Distribution Provider will evaluate each Interconnection Request for known or reasonably anticipated relationships between the Interconnection Request and any earlier-queued interconnection requests in the Distribution Group Study Process, the Independent Study Process, or interconnection requests studied under predecessor interconnection procedures that have yet to complete their respective interconnection studies. Distribution Provider may conduct incremental power flow, aggregate power flow, and/or short-circuit duty tests using existing interconnection studies, Base Case data, overall system knowledge, and engineering judgment to determine whether an Interconnection Request can be studied independently of earlier-queued interconnection requests. If the Interconnection Request being evaluated for electrical independence on the Distribution System may be electrically related to earlier-queued interconnection requests that have yet to complete interconnection studies, then it fails the evaluation of electrical independence for the Distribution System.

- If Yes (pass), continue to Independent Study Process
- If No (fail), continue to the Distribution Group Study Process

Significance: Interconnection Requests that are electrically related to earlier-queued interconnection requests that have not yet been studied do not qualify for independent study.

(L)

(Continued)



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

Sheet 172

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

(L)

**3. DETAILED STUDY SCREENS (Cont'd.)**

**c. Independent Study Process and Distribution Group Study Process  
Interconnection Studies**

The Interconnection Studies shall consist of an Interconnection System Impact Study and an Interconnection Facilities Study for the Independent Study Process or the DGS Phase I Interconnection Study and the DGS Phase II Interconnection Study for the Distribution Group Study Process. The Interconnection Studies will identify Interconnection Facilities, Distribution Upgrades and Reliability Network Upgrades necessary to mitigate thermal overloads and voltage violations, and address short circuit, dynamic/stability, and reliability issues associated with the requested Interconnection Service. If Distribution Provider anticipates that Reliability Network Upgrades will be required, or the Interconnection Studies identify the need for Reliability Network Upgrades, then Distribution Provider will coordinate with the CAISO during the study process as set forth in Sections F.3.b or F.3.c above.

The estimated costs of short circuit related upgrades and shared interconnection facilities, if any, identified through a Distribution Group Study shall be assigned as provided in E.4.e.

**i) Interconnection System Impact and DGS Phase I Interconnection Study.**

**(1) Scope of the Interconnection System Impact and DGS Phase I Interconnection Study.**

The Interconnection System Impact or DGS Phase I Interconnection Study in the case of the Distribution Group Study Process may consist of a localized short circuit analysis, a stability/dynamic analysis, a power flow analysis, and any other studies that are deemed necessary. The localized short circuit analysis will evaluate impacts to the Distribution and Transmission System only with any local short circuit-duty related Reliability Network Upgrades allocated to the Generating Facility or Generating Facilities that require(s) the upgrades. Short circuit duty impacts to the

(L)

(Continued)



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

Sheet 173

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

(L)

**3. DETAILED STUDY SCREENS (Cont'd.)**

**c. Independent Study Process and Distribution Group Study Process  
Interconnection Studies (Cont'd.)**

**i) Interconnection System Impact and DGS Phase I Interconnection  
Study. (Cont'd.)**

**(1) Scope of the Interconnection System Impact and DGS Phase  
I Interconnection Study. (Cont'd.)**

CAISO Controlled Grid are appropriately evaluated only in the WDT Transmission Cluster Study Process as set forth in Section F.3.d. The short circuit duty contribution of any Interconnection Requests studied in the Independent Study Process or Distribution Group Study Process that are subsequently identified in the Cluster Study Process will be allocated its pro rata share of the short circuit duty-related Reliability Network Upgrades on the basis of the short circuit duty contribution of each Generating Facility.

The Interconnection System Impact Study or DGS Phase I Interconnection Study in the case of the Distribution Group Study Process, shall state the assumptions upon which it is based, state the results of the analyses, and provide the requirement or potential impediments to providing the requested Interconnection Service, including a preliminary indication of the cost and length of time that would be necessary to correct any problems identified in those analyses and implement the Interconnection.

The Interconnection System Impact or DGS Phase I Interconnection Study shall provide a list of Distribution Provider's Interconnection Facilities, Distribution Upgrades, and Reliability Network Upgrades that are required as a result of the Interconnection Request along with a non-binding good faith estimate of cost responsibility and the amount of construction time required.

If at any time the Distribution Provider determines that it will not meet the required time frame for completing the DGS Phase I Interconnection Study due to the large number of

(L)

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

Sheet 174

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
3. DETAILED STUDY SCREENS (Cont'd.)
- c. Independent Study Process and Distribution Group Study Process Interconnection Studies (Cont'd.)
- i) Interconnection System Impact and DGS Phase I Interconnection Study. (Cont'd.)
- (1) Scope of the Interconnection System Impact and DGS Phase I Interconnection Study. (Cont'd.)
- Interconnection Requests in the Distribution Group Study Application window, study complexity, or unavailability of resources on a reasonable basis to perform the study in the required time frame, the Distribution Provider shall notify the Interconnection Customer(s) within the Distribution Group Study as to the schedule status of the DGS Phase I Interconnection Study and provide an estimated completion date with an explanation of the reasons why additional time is required.
- Upon request, the Distribution Provider shall provide the Applicant(s) all supporting documentation, work papers and relevant pre-Interconnection Request and post-Interconnection Request power flow, short circuit and stability databases for the DGS Phase I Interconnection Study, subject to confidentiality arrangements as outlined in Section D.7.
- ii) Interconnection Facilities Study and DGS Phase II Interconnection Study.
- (1) Scope and Purpose of the Interconnection Facilities and DGS Phase II Interconnection Study.
- The Interconnection Facilities Study or DGS Phase II Interconnection Study in the case of the Distribution Group Study Process shall specify and estimate the cost of the equipment, engineering, procurement, and construction work (including overheads) needed to implement the conclusions of the Interconnection System Impact Study or DGS Phase I Interconnection Study technical analyses in accordance with (L)

(Continued)



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

Sheet 175

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

(L)

**3. DETAILED STUDY SCREENS (Cont'd.)**

**c. Independent Study Process and Distribution Group Study Process  
Interconnection Studies (Cont'd.)**

**ii) Interconnection Facilities Study and DGS Phase II Interconnection  
Study. (Cont'd.)**

**(1) Scope and Purpose of the Interconnection Facilities and DGS  
Phase II Interconnection Study. (Cont'd.)**

Good Utility Practice to physically and electrically connect the Generating Facility to the Distribution or Transmission System. The Interconnection Facilities Study or DGS Phase II Interconnection Study shall also identify (i) the electrical switching configuration of the connection equipment, including, without limitation: the transformer, switchgear, meters, and other station equipment; the nature and estimated cost of any Distribution Provider's Interconnection Facilities, Distribution Upgrades, and Network Upgrades necessary to accomplish the interconnection; and an estimate of the time required to complete the construction and installation of such facilities. The analyses in the Interconnection System Impact Study (or DGS Phase I Interconnection Study in the case of the Distribution Group Study Process) will be updated as necessary in the Interconnection Facilities Study (or DGS Phase II Interconnection Study), to account for withdrawal of interconnection requests in the interconnection queue.

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**

Section H shall be used for interconnection of non-inverter based technologies.

Section H shall also continue to be used for interconnection of inverter based technologies until September 8, 2017. Following such date, Section Hh shall apply for interconnection of inverter based technologies. Until such date, Section Hh may be used in all or in part, for inverter based technologies by mutual agreement of the Distribution Provider and the Applicant.

(L)

(Continued)





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

Sheet 176

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)**  
(Cont'd.)

**1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS**

This section is consistent with the requirements of ANSI/IEEE 1547-2003 Standard for Interconnecting Distributed Resources with Electric Power Systems (IEEE 1547). Exceptions are taken to IEEE 1547 Clauses 4.1.4.2 Distribution Secondary Spot Networks and Clauses 4.1.8.1 or 5.1.3.1, which address Protection from Electromagnetic Interference. These are being studied for inclusion in a subsequent version of this Rule. Also, Rule 21 does not adopt the Generating Facility power limitation of 10 MW incorporated in IEEE 1547.

The Protective Functions and requirements of this Rule are designed to protect Distribution Provider's Distribution and Transmission System and not the Generating Facility. A Producer shall be solely responsible for providing adequate protection for its Generating Facility and Interconnection Facilities. Producer's Protective Functions shall not impact the operation of other Protective Functions on Distribution Provider's Distribution and Transmission System in a manner that would affect Distribution Provider's capability of providing reliable service to its customers.

**a. Protective Functions Required**

Generating Facilities operating in parallel with Distribution Provider's Distribution or Transmission System shall be equipped with the following Protective Functions to sense abnormal conditions on Distribution Provider's Distribution or Transmission System and cause the Generating Facility to be automatically disconnected from Distribution Provider's Distribution or Transmission System or to prevent the Generating Facility from being connected to Distribution Provider's Distribution or Transmission System inappropriately:

- i) Over and under voltage trip functions and over and under frequency trip functions;
- ii) A voltage and frequency sensing and time-delay function to prevent the Generating Facility from energizing a de-energized Distribution or Transmission System circuit and to prevent the Generating Facility from reconnecting with Distribution Provider's

(L)

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

Sheet 177

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- a. Protective Functions Required (Cont'd.)
- ii) Distribution or Transmission System unless Distribution Provider's Distribution System service voltage and frequency is within the ANSI C84.1-1995 Table 1 Range B voltage Range of 106 volts to 127 volts (on a 120 volt basis), inclusive, and a frequency range of 59.3 Hz to 60.5 Hz, inclusive, and are stable for at least 60 seconds; and
- iii) A function to prevent the Generating Facility from contributing to the formation of an Unintended Island, and cease to energize Distribution Provider's Distribution System within two seconds of the formation of an Unintended Island.
- The Generating Facility shall cease to energize Distribution Provider's Distribution System for faults on Distribution Provider's Distribution System circuit to which it is connected (IEEE 1547-4.2.1). The Generating Facility shall cease to energize Distribution Provider's Distribution circuit prior to re-closure by Distribution Provider's Distribution System equipment (IEEE 1547-4.2.2).
- b. Momentary Paralleling Generating Facilities
- With Distribution Provider's approval, the transfer switch or scheme used to transfer Producer's loads from Distribution Provider's Distribution or Transmission System to Producer's Generating Facility may be used in lieu of the Protective Functions required for Parallel Operation.
- c. Suitable Equipment Required
- Circuit breakers or other interrupting equipment located at the Point of Common Coupling (PCC) must be Certified or "Listed" (as defined in Article 100, the Definitions Section of the National Electrical Code) as suitable for their intended application. This includes being capable of (L)

(Continued)





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

Sheet 178

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- c. Suitable Equipment Required (Cont'd.)
- interrupting the maximum available fault current expected at their location. Producer's Generating Facility and Interconnection Facilities shall be designed so that the failure of any single device or component shall not potentially compromise the safety and reliability of Distribution Provider's Distribution and Transmission System. The Generating Facility paralleling-device shall be capable of withstanding 220% of the Interconnection Facility rated voltage (IEEE 1547-4.1.8.3). The Interconnection Facility shall have the capability to withstand voltage and current surges in accordance with the environments defined in IEEE Std C62.41.2-2002 or IEEE Std C37.90.1-2002 as applicable and as described in L.3.e (IEEE 1547-4.1.8.2).
- d. Visible Disconnect Required
- When required by Distribution Provider's operating practices, Producer shall furnish and install a ganged, manually-operated isolating switch (or a comparable device mutually agreed upon by Distribution Provider and Producer) near the Point of Interconnection to isolate the Generating Facility from Distribution Provider's Distribution or Transmission System. The device does not have to be rated for load break nor provide over-current protection.
- The device must:
- i) allow visible verification that separation has been accomplished. (This requirement may be met by opening the enclosure to observe contact separation.)
  - ii) include markings or signage that clearly indicates open and closed positions.
  - iii) be capable of being reached:
    - a) for Emergency purposes quickly and conveniently 24 hours a day by Distribution Provider personnel for construction, (L)

(Continued)



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

Sheet 179

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- d. Visible Disconnect Required (Cont'd.)
- iii) be capable of being reached: (Cont'd.)
- a) operation, maintenance, inspection, testing or to isolate the Generating Facility from Distribution Provider's Distribution or Transmission System without obstacles or requiring those seeking access to obtain keys, special permission, or security clearances.
- b) for Non-Emergency purposes during normal business hours. Distribution Provider, where possible, will provide notice to Customer for gaining access to Customer's premises.
- iv) be capable of being locked in the open position,
- v) be clearly marked on the submitted single line diagram and its type and location approved by Distribution Provider prior to installation. If the device is not adjacent to the PCC, permanent signage must be installed at a Distribution Provider approved location providing a clear description of the location of the device. If the switch is not accessible outside the locked premises, signage with contact information and a Distribution Provider approved locking device for the premises shall be installed.
- Generating Facilities with Non-Islanding inverters totaling one (1) kilovolt-ampere (kVA) or less are exempt from this requirement.
- e. Drawings Required
- Prior to Parallel Operation or Momentary Parallel Operation of the Generating Facility, Distribution Provider shall approve Producer's Protective Function and control diagrams. Generating Facilities equipped with Protective Functions and a control scheme previously approved by Distribution Provider for system-wide application or only Certified Equipment may satisfy this requirement by reference to previously approved drawings and diagrams. (L)

(Continued)



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

Sheet 180

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- f. Generating Facility Conditions Not Identified
- In the event this Rule does not address the Interconnection conditions for a particular Generating Facility, Distribution Provider and Producer may agree upon other arrangements
2. PREVENTION OF INTERFERENCE
- Producer shall not operate Generating or Interconnection Facilities that superimpose a voltage or current upon Distribution Provider's Distribution or Transmission System that interferes with Distribution Provider operations, service to Distribution Provider Customers, or communication facilities. If such interference occurs, Producer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by Distribution Provider. If Producer does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, Distribution Provider may, without liability, disconnect Producer's facilities from Distribution Provider's Distribution or Transmission System, in accordance with Section D.9 of this Rule. To eliminate undesirable interference caused by its operation, each Generating Facility shall meet the following criteria:
- a. Voltage Regulation
- The Generating Facility shall not actively regulate the voltage at the PCC while in parallel with Distribution Provider's Distribution System. The Generating Facility shall not cause the service voltage at other customers to go outside the requirements of ANSI C84.1-1995, Range A (IEEE 1547-4.1.1). (L)

(Continued)



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

Sheet 181

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- b. Voltage Trip Setting
- The voltage ranges in Table H.1 define protective trip limits for the Protective Function and are not intended to define or imply a voltage regulation Function. Generating Facilities shall cease to energize Distribution Provider's Distribution System within the prescribed trip time whenever the voltage at the PCC deviates from the allowable voltage operating range. The Protection Function shall detect and respond to voltage on all phases to which the Generating Facility is connected.
- i) Generating Facilities (30 kVA or less)
- Generating Facilities with a Gross Rating of 30 kVA or less shall be capable of operating within the voltage range normally experienced on Distribution Provider's Distribution System from plus to minus 5% of the nominal voltage (e.g. 114 volts to 126 volts, on a 120 volt base), at the service panel or PCC. The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping between 106 volts and 132 volts on a 120-volt base (88%-110% of nominal voltage) to compensate for voltage drop between the generator terminals and the PCC. Voltage may be detected at either the PCC or the Point of Interconnection. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal. (L)

(Continued)



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

Sheet 182

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- b. Voltage Trip Setting (Cont'd.)
- ii) Generating Facilities (greater than 30 kVA)
- Distribution Provider may have specific operating voltage ranges for Generating Facilities with Gross Ratings greater than 30 kVA, and may require adjustable operating voltage settings. In the absence of such requirements, the Generating Facility shall be capable of operating at a range between 88% and 110% of the applicable interconnection voltage. Voltage shall be detected at either the PCC or the Point of Interconnection, with settings compensated to account for the voltage at the PCC. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal.
- iii) Voltage Disturbances
- Whenever Distribution Provider's Distribution System voltage at the PCC varies from and remains outside normal (Nominally 120 volts) for the predetermined parameters set forth in Table H-1, the Generating Facility's Protective Functions shall cause the Generator(s) to become isolated from Distribution Provider's Distribution System: (L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution



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

Sheet 183

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**  
(Cont'd.)

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**b. Voltage Trip Setting (Cont'd.)**

**iii) Voltage Disturbances (Cont'd.)**

| Table H.1: Voltage Trip Settings for Generating Facilities*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |                                         |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|--------------|
| Voltage at Point of Common Coupling (the ranges below are used to trip the generator during abnormal distribution system conditions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  | Maximum Trip Time**                     |              |
| Assuming 120 Volt Base                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | % of Nominal Voltage                             | # of Cycles<br>(Assuming 60 Hz Nominal) | Seconds      |
| Less than 60 volts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Less than 50%                                    | 10 Cycles                               | 0.16 Seconds |
| Greater than or equal to 60 volts but less than 106 volts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Greater than or equal to 50% but less than 88%   | 120 Cycles                              | 2 Seconds    |
| Greater than 132 volts but less than or equal to 144 volts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Greater than 110% but less than or equal to 120% | 60 Cycles                               | 1 Second     |
| Greater than 144 volts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Greater than 120%                                | 10 Cycles                               | 0.16 Seconds |
| *For Generating Facilities with a Rating greater than 30 kVA, set points shall be field adjustable and different voltage set points and trip times from those in Table H.1 may be negotiated with Distribution Provider                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |                                         |              |
| ** "Maximum Trip Time" refers to the time between the onset of the abnormal condition and the Generating Facility ceasing to energize Distribution Provider's Distribution System. Protective Function equipment and circuits may remain connected to Distribution Provider's Distribution System to allow sensing of electrical conditions for use by the "reconnect" feature. The purpose of the allowed time delay is to allow for a Generating Facility to minimize tripping during short term system disturbances. Set points shall not be user adjustable for generating facilities less than 30 kW. |                                                  |                                         |              |

(Continued)



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

Sheet 184

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- c. Paralleling
- The Generating Facility shall parallel with Distribution Provider's Distribution or Transmission System without causing a voltage fluctuation at the PCC greater than plus/minus 5% of the prevailing voltage level of Distribution Provider's Distribution or Transmission System at the PCC, and meet the flicker requirements of Section H.2.d. Section L, Certification and Testing Criteria, provides technology-specific tests for evaluating the paralleling Function. (IEEE 1547-4.1.3)
- d. Flicker
- The Generating Facility shall not create objectionable flicker for other customers on Distribution Provider's Distribution or Transmission System. To minimize the adverse voltage effects experienced by other customers (IEEE 1547-4.3.2), flicker at the PCC caused by the Generating Facility should not exceed the limits defined by the "Maximum Borderline of Irritation Curve" identified in IEEE 519-1992 (IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, IEEE STD 519-1992). This requirement is necessary to minimize the adverse voltage affects experienced by other Customers on Distribution Provider's Distribution or Transmission System. Generators may be connected and brought up to synchronous speed (as an induction motor) provided these flicker limits are not exceeded. (L)

(Continued)

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

Sheet 185

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- e. Integration with Distribution Provider's Distribution System Grounding
- The grounding scheme of the Generating Facility shall not cause over-voltages that exceed the rating of the equipment connected to Distribution Provider's Distribution System and shall not disrupt the coordination of the ground fault protection on Distribution Provider's Distribution System (IEEE 1547-4.1.2) (See Section G.1.i, line configuration).
- f. Frequency
- Distribution Provider controls system frequency, and the Generating Facility shall operate in synchronism with Distribution Provider's Distribution or Transmission System. Whenever Distribution Provider's Distribution or Transmission System frequency at the PCC varies from and remains outside normal (nominally 60 Hz) by the predetermined amounts set forth in Table H.2, the Generating Facility's Protective Functions shall cease to energize Distribution Provider's Distribution or Transmission System within the stated maximum trip time. (L)

(Continued)

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

Sheet 186

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**  
**(Cont'd.)**

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**f. Frequency (Cont'd.)**

***Table H.2***  
***Frequency Trip Settings***

| <u>Generating Facility Rating</u> | <u>Frequency Range</u><br><u>(Assuming 60Hz Nominal)</u>                                  | <u>Maximum Trip Time [1]</u><br><u>(Assuming 60 Cycles per Second)</u> |
|-----------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Less or equal to 30kW             | Less than 59.3 Hz                                                                         | 10 Cycles                                                              |
|                                   | Greater than 60.5 Hz                                                                      | 10 Cycles                                                              |
| Greater than 30 kW                | Less than 57.0 Hz                                                                         | 10 Cycles                                                              |
|                                   | Less than an adjustable value<br>between 59.8 Hz and 57 Hz but<br>greater than 57 Hz. [2] | Adjustable between 10 and 18,000<br>Cycles. [2, 3]                     |
|                                   | Greater than 60.5 Hz.                                                                     | 10 Cycles                                                              |

[1] – “Maximum Trip time” refers to the time between the onset of the abnormal condition and the Generating Facility ceasing to energize Distribution Provider’s Distribution or Transmission System. Protective Function sensing equipment and circuits may remain connected to Distribution Provider’s Distribution or Transmission System to allow sensing of electrical conditions for use by the “reconnect” feature. The purpose of the allowed time delay is to allow a Generating Facility to “ride through” short-term disturbances to avoid nuisance tripping. Set points shall not be user adjustable (though they may be field adjustable by qualified personnel). For Generating Facilities with a Gross Rating greater than 30 kVA, set points shall be field adjustable and different voltage set points and trip times from those in Table H.2 may be negotiated with Distribution Provider.

[2] – Unless otherwise required by Distribution Provider, a trip frequency of 59.3 Hz and a maximum trip time of 10 cycles shall be used.

[3] – When a 10 cycle Maximum trip time is used, a second under frequency trip setting is not required.

(Continued)



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

Sheet 187

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**  
**(Cont'd.)**

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**g. Harmonics**

When the Generating Facility is serving balanced linear loads, harmonic current injection into Distribution Provider's Distribution or Transmission System at the PCC shall not exceed the limits stated in Table H.3. The harmonic current injections shall be exclusive of any harmonic currents due to harmonic voltage distortion present in Distribution Provider's Distribution or Transmission System without the Generating Facility connected (IEEE 1547-4.3.3.). The harmonic distortion of a Generating Facility shall be evaluated using the same criteria as for the Host Loads.

***Table H.3***

***Maximum harmonic current distortion in percent of current (I) [1,2]***

| Individual<br>harmonic order, h<br>(odd harmonics) [3] | h<11 | 11≤h<17 | 17≤h<23 | 23≤h<35 | 35≤h | Total demand<br>distortion |
|--------------------------------------------------------|------|---------|---------|---------|------|----------------------------|
| Max Distortion<br>(%)                                  | 4.0  | 2.0     | 1.5     | 0.6     | 0.3  | 5.0                        |

[1] – IEEE1547-4.3.3

[2] – I = the greater of the maximum Host Load current average demand over 15 or 30 minutes without the GF, or the GF rated current capacity (transformed to the PCC when a transformer exists between the GF and the PCC).

[3] – Even harmonics are limited to 25% of the odd harmonic limits above.

(Continued)



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

Sheet 188

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- h. Direct Current Injection
- Generating Facilities should not inject direct current greater than 0.5% of rated output current into Distribution Provider's Distribution or Transmission System.
- i. Power Factor
- Producer shall provide adequate reactive power compensation on site to maintain the Generating Facility power factor near unity at rated output or a Distribution Provider specified power factor within a power factor range from 0.9 leading to 0.9 lagging, based on local system conditions. While not required, for generators that do not have inherent reactive power control capability Distribution Provider at its option may offer reactive power support in the form of power factor correction capacitors on its Distribution or Transmission System, under a Generator Interconnection Agreement or an Added Facilities or Special Facilities agreement, as described in Rule 2.H, as applicable. (L)

(Continued)

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

Sheet 189

- H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(Cont'd.)
3. TECHNOLOGY SPECIFIC REQUIREMENTS
- a. Technology Specific Requirements
- Three-Phase Synchronous Generators: For three phase Generators, the Generating Facility circuit breakers shall be three-phase devices with electronic or electromechanical control. Producer shall be responsible for properly synchronizing its Generating Facility with Distribution Provider's Distribution or Transmission System by means of either manual or automatic synchronous equipment. Automatic synchronizing is required for all synchronous Generators that have a Short Circuit Contribution Ratio (SCCR) exceeding 0.05. Loss of synchronism protection is not required except as may be necessary to meet Section H.2.d (Flicker) (IEEE1547-4.2.5). Unless otherwise agreed upon by Producer and Distribution Provider, synchronous Generators shall automatically regulate power factor, not voltage, while operating in parallel with Distribution Provider's Distribution System. A power system stabilization Function is specifically not required for Generating Facilities under 10 MW Net Rating.
- b. Induction Generators
- Induction Generators (except self-excited Induction Generators) do not require a synchronizing Function. Starting or rapid load fluctuations on induction Generators can adversely impact Distribution Provider's Distribution or Transmission System voltage. Corrective step-switched capacitors or other techniques may be necessary and may cause undesirable ferro-resonance. When these counter measures (e.g. additional capacitors) are installed on Producer's side of the PCC, Distribution Provider must review these measures. Additional equipment may be required as determined in a Supplemental Review or an Interconnection Study. (L)

(Continued)



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

Sheet 190

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**  
(Cont'd.)

(L)

**3. TECHNOLOGY SPECIFIC REQUIREMENTS (Cont'd.)**

**c. Inverters**

Grid-interactive inverters do not require separate synchronizing equipment. Non-grid-interactive or "stand-alone" inverters shall not be used for Parallel Operation with Distribution Provider's Distribution or Transmission System.

**d. Limitations on Inverters Not Classified as Smart Inverters**

i) Inverter based systems may continue to be installed per Section H until September 8, 2017. Section Hh may be used in all or in part, for inverter based technologies by mutual agreement of the Distribution Provider and the Applicant.

ii) The replacement of an existing inverter to an inverter that is of equal or greater ability than the original is allowed per Section H. Section Hh may be used in all or in part, for replacement inverter-based technologies by mutual agreement of the Distribution Provider and the Applicant. If a developer replaces an existing inverter with an inverter of greater ability, the replacement inverter shall have all the required functionalities and be set according to current Commission practices as of the date the new smart inverter is installed, unless the interconnection applicant can demonstrate that safety or operational needs necessitate otherwise, per D.19-03-013 OP 12.

**e. Non-Export AC/DC Converters**

A Non-Export AC/DC Converter must satisfy the definition in Section C.

(L)

(Continued)



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

Sheet 191

**H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**  
(Cont'd.)

(L)

**4. SUPPLEMENTAL GENERATING FACILITY REQUIREMENTS**

**a. Fault Detection**

A Generating Facility with an SCCR exceeding 0.1 or one that does not cease to energize Distribution Provider's Distribution or Transmission System within two seconds of the formation of an Unintended Island shall be equipped with Protective Functions designed to detect Distribution or Transmission System faults, both line-to-line and line-to-ground, and cease to energize Distribution Provider's Distribution or Transmission System within two seconds of the initiation of a fault.

**b. Transfer Trip**

For a Generating Facility that cannot detect Distribution or Transmission System faults (both line-to-line and line-to-ground) or the formation of an Unintended Island, and cease to energize Distribution Provider's Distribution or Transmission System within two seconds, Distribution Provider may require a Transfer Trip system or an equivalent Protective Function.

**c. Reclose Blocking**

Where the aggregate Generating Facility capacity exceeds 15% of the peak load on any automatic reclosing device, Distribution Provider may require additional Protective Functions, including, but not limited to reclose-blocking on some of the automatic reclosing devices.

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS**

Section H shall continue to be used for interconnection of inverter based technologies until September 8, 2017. Following such date, Section Hh shall apply for interconnection of inverter based technologies. Until such date, Section Hh may be used in all or in part, for inverter based technologies by mutual agreement of the Distribution Provider and the Applicant.

<sup>1</sup> "The Standard for Inverters, Converters, and Controllers for Use in Independent Power Systems".

(L)

(Continued)



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

Sheet 192

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)**

(L)

The inverter requirements are intended to be consistent with UL 1741 - Supplement SA using Section Hh of Rule 21 as the source requirement document and ANSI/IEEE 1547-2003 and 1547a Standard for Interconnecting Distributed Resources with Electric Power Systems (IEEE 1547 including amendment 1547a), where possible. In the event of conflict between this Rule, and UL 1741 - Supplement SA, and/or IEEE 1547-2003 or IEEE 1547a, this Rule shall take precedence. Exceptions are taken to IEEE 1547 Clauses 4.1.4.2 Distribution Secondary Spot Networks and Clauses 4.1.8.1 or 5.1.3.1, which address Protection from Electromagnetic Interference. Rule 21 does not adopt the Generating Facility power limitation of 10 MW incorporated in IEEE 1547.

(L)

The Smart Inverter default settings and default activation states may be modified upon mutual agreement between Applicant or Producer and Distribution Provider.

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

Process for changing default settings for new Interconnection Requests:

(P)/(L)

Distribution Provider, in the study process for new Generating Facilities, may determine and provide the optimum Smart Inverter Settings for the reactive power settings, including changes to the reactive power default settings (Example: Deactivate Volt/Var and activate Fixed Power Factor at given power factor).

Distribution Provider, in the study process for new Generating Facilities, may determine and provide the optimum Smart Inverter Settings for the Ramp Rate settings depending on the Generating Facility technology (such as solar, storage).

Distribution Provider, in the study process for new Generating Facilities, may determine the optimum Smart Inverter Settings for the volt/watt settings including changes to the default settings (Example: Change the volt/watt set points). The Applicant may select to agree on the new settings or select to perform upgrades to operate using the existing default volt/watt settings.

Default settings for voltage ride-through, frequency ride-through requirements, and Frequency/Watt should not be modified on an individual project basis unless the Interconnection Studies have determined that the default settings may not meet grid reliability requirements.

(P)/(L)

(Continued)





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

Sheet 193

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)**

(P)/(L)

Process for changing default settings for Generating Facilities with an executed Interconnection Agreement:

When grid changes or Generating Facility changes require that the Smart Inverter operating parameters be reevaluated, the Distribution Provider or Producer may request changes to the Smart Inverter operating parameters. The request must include the reason for and timing of the proposed changes. The requested changes must be within the Smart Inverter function adjustability limits, must be within the limits specified in this tariff, and must be mutually agreed upon.

(P)/(L)

**1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION  
REQUIREMENTS**

(L)

The Protective Functions and requirements of this Rule are designed to protect Distribution Provider's Distribution and Transmission System and not the Generating Facility. A Producer shall be solely responsible for providing adequate protection for its Generating Facility and Interconnection Facilities. Producer's Protective Functions shall not impact the operation of other Protective Functions on Distribution Provider's Distribution and Transmission System in a manner that would affect Distribution Provider's capability of providing reliable service to its customers.

**a. Protective Functions Required**

Smart Inverters operating in parallel with Distribution Provider's Distribution or Transmission System shall be equipped with the following Protective Functions to sense abnormal conditions on Distribution Provider's Distribution or Transmission System and cause the Smart Inverter to be automatically disconnected from Distribution Provider's Distribution or Transmission System or to prevent the Smart Inverter from being connected to Distribution Provider's Distribution or Transmission System inappropriately:

- (i) Over and under voltage trip functions and over and under frequency trip functions;

(L)

(Continued)





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

Sheet 194

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- a. Protective Functions Required (Cont'd.)
- (ii) A voltage and frequency sensing and time-delay function to prevent the Smart Inverter from energizing a de-energized Distribution or Transmission System circuit and to prevent the Smart Inverter from reconnecting with Distribution Provider's Distribution or Transmission System unless Distribution Provider's Distribution System service voltage and frequency is within the ANSI C84.1-1995 Table 1 Range B voltage Range of 106 volts to 127 volts (on a 120 volt basis), inclusive, and a frequency range of 58.5 Hz to 60.5 Hz, inclusive, and are stable for at least 15 seconds; and
- (iii) A function to prevent the Smart Inverter from contributing to the formation of an Unintended Island, and cease to energize Distribution Provider's Distribution System within two seconds of the formation of an Unintended Island.
- The Smart Inverter shall cease to energize Distribution Provider's Distribution System for faults on Distribution Provider's Distribution System circuit to which it is connected (IEEE 1547-4.2.1). The Smart Inverter shall cease to energize Distribution Provider's Distribution circuit prior to re-closure by Distribution Provider's Distribution System equipment (IEEE 1547-4.2.2).
- b. Momentary Paralleling Generating Facilities
- With Distribution Provider's approval, the transfer switch or scheme used to transfer Producer's loads from Distribution Provider's Distribution or Transmission System to Producer's Generating Facility may be used in lieu of the Protective Functions required for Parallel Operation. (L)

(Continued)



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

Sheet 195

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- c. Suitable Equipment Required
- Circuit breakers or other interrupting equipment located at the Point of Common Coupling (PCC) must be Certified or "Listed" (as defined in Article 100, the Definitions Section of the National Electrical Code) as suitable for their intended application. This includes being capable of interrupting the maximum available fault current expected at their location. Producer's Smart Inverter and Interconnection Facilities shall be designed so that the failure of any single device or component shall not potentially compromise the safety and reliability of Distribution Provider's Distribution and Transmission System. The Smart Inverter paralleling-device shall be capable of withstanding 220% of the Interconnection Facility rated voltage (IEEE 1547-4.1.8.3). The Interconnection Facility shall have the capability to withstand voltage and current surges in accordance with the environments defined in IEEE Std C62.41.2-2002 or IEEE Std C37.90.1-2002 as applicable and as described in L.3.e (IEEE 1547-4.1.8.2).
- d. Visible Disconnect Required
- When required by Distribution Provider's operating practices, Producer shall furnish and install a ganged, manually-operated isolating switch (or a comparable device mutually agreed upon by Distribution Provider and Producer) near the Point of Interconnection to isolate the Smart Inverter from Distribution Provider's Distribution or Transmission System. The device does not have to be rated for load break nor provide over-current protection.
- The device must:
- (i) allow visible verification that separation has been accomplished. (This requirement may be met by opening the enclosure to observe contact separation.) (L)

(Continued)



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

Sheet 196

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- d. Visible Disconnect Required (Cont'd.)
- (ii) include markings or signage that clearly indicates open and closed positions.
  - (iii) be capable of being reached:
    - a) for Emergency purposes quickly and conveniently 24 hours a day by Distribution Provider personnel for construction, operation, maintenance, inspection, testing or to isolate the Smart Inverter from Distribution Provider's Distribution or Transmission System without obstacles or requiring those seeking access to obtain keys, special permission, or security clearances.
    - b) for Non-Emergency purposes during normal business hours. Distribution Provider, where possible, will provide notice to Customer for gaining access to Customer's premises.
  - (iv) be capable of being locked in the open position.
  - (v) be clearly marked on the submitted single line diagram and its type and location approved by Distribution Provider prior to installation. If the device is not adjacent to the PCC, permanent signage must be installed at a Distribution Provider approved location providing a clear description of the location of the device. If the switch is not accessible outside the locked premises, signage with contact information and a Distribution Provider approved locking device for the premises shall be installed.
- Generating Facilities with Non-Islanding inverters totaling one (1) kilovolt-ampere (kVA) or less are exempt from this requirement. (L)

(Continued)



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

Sheet 197

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (Cont'd.)
- e. Drawings Required
- Prior to Parallel Operation or Momentary Parallel Operation of the Smart Inverter, Distribution Provider shall approve Producer's Protective Function and control diagrams. Generating Facilities equipped with Protective Functions and a control scheme previously approved by Distribution Provider for system-wide application or only Certified Equipment may satisfy this requirement by reference to previously approved drawings and diagrams.
- f. Generating Facility Conditions Not Identified
- In the event this Rule does not address the Interconnection conditions for a particular Smart Inverter, Distribution Provider and Producer may agree upon other arrangements.
2. PREVENTION OF INTERFERENCE
- Producer shall not operate Smart Inverters that superimpose a voltage or current upon Distribution Provider's Distribution or Transmission System that interferes with Distribution Provider operations, service to Distribution Provider Customers, or communication facilities. If such interference occurs, Producer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by Distribution Provider. If Producer does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, Distribution Provider may, without liability, disconnect Producer's facilities from Distribution Provider's Distribution or Transmission System, in accordance with Section D.9 of this Rule. To eliminate undesirable interference caused by its operation, each Smart Inverter shall meet the following criteria: (L)

(Continued)



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

Sheet 198

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (L) |
| 2. PREVENTION OF INTERFERENCE (Cont'd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
| a. Voltage Regulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |
| If approved by the Distribution Provider, the Smart Inverter may actively regulate the voltage at the PCC while in parallel with Distribution Provider's Distribution System. The Smart Inverter shall not cause the service voltage at other customers to go outside the requirements of ANSI C84.1-1995, Range A (IEEE 1547-4.1.1).                                                                                                                                                                                                                                                                                                                                          |     |
| b. Voltage Trip and Ride-Through Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |
| The voltage ranges in Table Hh-.1 define protective trip limits for the Protective Function and are not intended to define or imply a voltage regulation Function. Generating Facilities shall cease to energize Distribution Provider's Distribution System within the prescribed trip time whenever the voltage at the PCC deviates from the allowable voltage operating range. The Protection Function shall detect and respond to voltage on all phases to which the Generating Facility is connected.                                                                                                                                                                     |     |
| (i) Smart Inverters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |
| Smart Inverters shall be capable of operating within the voltage range normally experienced on Distribution Provider's Distribution System from plus to minus 5% of the nominal voltage (e.g. 114 volts to 126 volts, on a 120 volt base), at the service panel or PCC. The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping in accordance with Table Hh-.1 to compensate for voltage drop between the generator terminals and the PCC. Voltage may be detected at either the PCC or the Point of Interconnection. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal. | (L) |

(Continued)



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

Sheet 199

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

b. Voltage Trip and Ride-Through Settings (Cont'd.)

(ii) Voltage Disturbances

Whenever Distribution Provider's Distribution System voltage at the PCC varies from and remains outside near Nominal voltage for the predetermined parameters set forth in Table Hh-.1, the Smart Inverter's Protective Functions shall cause the Smart Inverter(s) to become isolated from Distribution Provider's Distribution System:

1. The Smart Inverter shall stay connected to the Distribution Provider's Transmission or Distribution System while the grid remains within the "Ride-Through Until" voltage-time range and must stay connected in the corresponding "Operating Mode.
2. For voltage excursions beyond the near Nominal (NN) magnitude range and within the range of the HV1 or LV3 regions, the Smart Inverter shall momentarily cease to energize within 0.16 seconds.
3. In the HV1 region, the Smart Inverter is permitted to reduce power output as a function of voltage under mutual agreement between the Producer and the Distribution Provider.
4. If the distribution system voltage does not exit the ride-through region and recovers to normal system voltage, the Smart Inverter shall restore continuous operation within 2 seconds.
5. If the Distribution Provider's Transmission or Distribution System voltage does not exit the ride-through region and returns from the LV3 region to the LV2 or LV1 region, the Smart Inverter shall restore available current within 2 seconds.
6. Different voltage-time settings could be permitted by the Distribution Provider.

(L)

(Continued)



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

Sheet 200

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

2. PREVENTION OF INTERFERENCE (Cont'd.)

b. Voltage Trip and Ride-Through Settings (Cont'd.)

(ii) Voltage Disturbances (Cont'd.)

Table Hh.1: Voltage Ride-Through Table

| Region                  | Voltage at Point of<br>Common Coupling<br>(% Nominal Voltage) | Ride-Through<br>Until | Operating<br>Mode       | Maximum<br>Trip Time |
|-------------------------|---------------------------------------------------------------|-----------------------|-------------------------|----------------------|
| High Voltage 2<br>(HV2) | $V \geq 120$                                                  |                       |                         | 0.16<br>seconds      |
| High Voltage 1<br>(HV1) | $110 < V < 120$                                               | 12 seconds            | Momentary<br>Cessation  | 13 seconds           |
| Near Nominal<br>(NN)    | $88 \leq V \leq 110$                                          | Indefinite            | Continuous<br>Operation | Not<br>Applicable    |
| Low Voltage 1<br>(LV1)  | $70 \leq V < 88$                                              | 20 seconds            | Mandatory<br>Operation  | 21 seconds           |
| Low Voltage 2<br>(LV2)  | $50 \leq V < 70$                                              | 10 seconds            | Mandatory<br>Operation  | 11 seconds           |
| Low Voltage 3<br>(LV3)  | $V < 50$                                                      | 1 seconds             | Momentary<br>Cessation  | 1.5 seconds          |

(Continued)





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

Sheet 201

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
2. PREVENTION OF INTERFERENCE (Cont'd.)
- c. Paralleling
- The Generating Facility shall parallel with Distribution Provider's Distribution or Transmission System without causing a voltage fluctuation at the PCC greater than plus/minus 5% of the prevailing voltage level of Distribution Provider's Distribution or Transmission System at the PCC, and meet the flicker requirements of Section H.2.d. Section L, Certification and Testing Criteria, provides technology-specific tests for evaluating the paralleling Function. (IEEE 1547-4.1.3)
- d. Flicker
- The Generating Facility shall not create objectionable flicker for other customers on Distribution Provider's Distribution or Transmission System. To minimize the adverse voltage effects experienced by other customers (IEEE 1547-4.3.2), flicker at the PCC caused by the Generating Facility should not exceed the limits defined by the "Maximum Borderline of Irritation Curve" identified in IEEE 519-1992 (IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, IEEE STD 519-1992). This requirement is necessary to minimize the adverse voltage affects experienced by other Customers on Distribution Provider's Distribution or Transmission System. Generators may be connected and brought up to synchronous speed (as an induction motor) provided these flicker limits are not exceeded.
- e. Integration with Distribution Provider's Distribution System Grounding
- The grounding scheme of the Generating Facility shall not cause over-voltages that exceed the rating of the equipment connected to Distribution Provider's Distribution System and shall not disrupt the coordination of the ground fault protection on Distribution Provider's Distribution System (IEEE 1547-4.1.2) (See Section G.1.i, line configuration). (L)

(Continued)





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

Sheet 202

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

f. Frequency

Distribution Provider controls system frequency, and the Generating Facility shall operate in synchronism with Distribution Provider's Distribution or Transmission System. Whenever Distribution Provider's Distribution or Transmission System frequency at the PCC varies from and remains outside normal (nominally 60 Hz) by the predetermined amounts set forth in Table H.2, the Generating Facility's Protective Functions shall cease to energize Distribution Provider's Distribution or Transmission System within the stated maximum trip time.

(i) Frequency Ride-Through Requirements

Smart Inverter based systems shall remain connected to the Distribution Provider's Distribution or Transmission System while the grid is within the frequency-time range indicated in Table Hh-.2, and shall disconnect from the electric grid during a high or low frequency event that is outside that frequency-time range.

The frequency values are shown in Table Hh.2. These values provide default interconnection system response to abnormal frequencies. The inverter shall disconnect by the default clearing times. In the high frequency range between 60.2 Hz and 61.5 Hz, or some other mutually agreed range, the Smart Inverter is permitted to reduce real power output until it ceases to export power by 61.5 Hz, or other frequency value mutually agreed between the generating facility operator and the Distribution Provider. Islands and microgrids may need different default frequency settings.

(L)

(Continued)



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

Sheet 203

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

2. PREVENTION OF INTERFERENCE (Cont'd.)

f. Frequency (Cont'd.)

(i) Frequency Ride-Through Requirements(Cont'd.)

Table Hh.2: Frequency Ride-Through and Trip Settings Table

| System Frequency Default Settings (Hz) | Minimum Range of Adjustability (Hz) | Ride-Through Until | Ride-Through Operational Mode | Maximum Trip Time |
|----------------------------------------|-------------------------------------|--------------------|-------------------------------|-------------------|
| $f > 62$                               | 62 - 64                             | No Ride Through    | Not Applicable                | 0.16 seconds      |
| $60.5 < f \leq 62$                     | 60.1 - 62                           | 299 seconds        | Mandatory Operation           | 300 seconds       |
| $58.5 \leq f \leq 60.5$                | Not Applicable                      | Indefinite         | Continuous Operation          | Not Applicable    |
| $57.0 \leq f < 58.5$                   | 57 - 59.9                           | 299 seconds        | Mandatory Operation           | 300 seconds       |
| $f < 57.0$                             | 53 - 57                             | No Ride Through    | Not Applicable                | 0.16 seconds      |

g. Harmonics

When the Smart Inverter is serving balanced linear loads, harmonic current injection into Distribution Provider's Distribution or Transmission System at the PCC shall not exceed the limits stated in Table Hh-.43. The harmonic current injections shall be exclusive of any harmonic currents due to harmonic voltage distortion present in Distribution Provider's Distribution or Transmission System without the Smart Inverter connected (IEEE 1547-4.3.3.). The harmonic distortion of a Smart Inverter shall be evaluated using the same criteria as for the Host Loads.

(Continued)



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

Sheet 204

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

g. Harmonics (Cont'd.)

**Table Hh.3**

**Maximum harmonic current distortion in percent of current (I) [1,2]**

| Individual<br>harmonic order, h<br>(odd harmonics) [3] | h<11 | 11≤ h<17 | 17≤ h<23 | 23≤ h<35 | 35≤ h | Total demand<br>distortion |
|--------------------------------------------------------|------|----------|----------|----------|-------|----------------------------|
| Max Distortion (%)                                     | 4.0  | 2.0      | 1.5      | 0.6      | 0.3   | 5.0                        |

[1] – IEEE1547-4.3.3

[2] – I = the greater of the maximum Host Load current average demand over 15 or 30 minutes without the GF, or the GF rated current capacity (transformed to the PCC when a transformer exists between the GF and the PCC).

[3] – Even harmonics are limited to 25% of the odd harmonic limits above.

h. Direct Current Injection

Smart Inverter should not inject direct current greater than 0.5% of rated output current into Distribution Provider's Distribution or Transmission System.

i. Fixed Power Factor

Producer shall provide adequate reactive power compensation on site to maintain the Smart Inverter power factor near unity at rated output or a Distribution Provider specified power factor in accordance with the following requirements:

- (i) Default Power Factor setting: Absorbing reactive power at 0.95 lagging power factor.
- (ii) Aggregate generating facility is greater than 15 kW: 1.0 +/- 0.15 (0.85 Lagging to 0.85 Leading) down to 20% rated power irrespective of Real Power Production.

(L)

(Continued)



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

Sheet 205

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

i. Fixed Power Factor (Cont'd.)

(iii) Aggregate generating facility is less than or equal to 15 kW: 1.0  
+/- 0.10 (0.90 Lagging to 0.90 Leading) down to 20% rated power  
irrespective of Real Power Production.

j. Dynamic Volt/VAR Operations

The Smart Inverter shall be capable of operating dynamically within a  
power factor range of +/- 0.85 PF for larger (>15 kW) systems, down  
to 20% of rated active power, and +/- 0.9 PF for smaller systems (≤15  
kW), down to 20% of rated active power, irrespective of Real Power  
Production. This dynamic Volt/VAR capability shall be able to be  
activated or deactivated in accordance with Distribution Provider  
requirements.

The Distribution Provider may permit or require the Smart Inverter  
systems to operate in larger power factor ranges, including in 4-  
quadrant operations for storage systems with the implementation of  
additional anti-islanding protection as determined by the Distribution  
Provider.

The Smart Inverter shall be capable of providing dynamic reactive  
power compensation (dynamic Volt/VAR operation) within the  
following constraints:

- The Smart Inverter shall be able to consume reactive power in  
response to an increase in line voltage, and produce reactive  
power in response to a decrease in line voltage.
- The reactive power provided shall be per the range irrespective of  
real power production, but the maximum reactive power provided  
to the system shall be as directed by the Distribution Provide
- Reduction of real power production is allowed to meet the  
required reactive power ranges.

(L)

(Continued)



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

Sheet 206

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)**

(L)

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**j. Dynamic Volt/VAR Operations (Cont'd.)**

**Dynamic Volt/Var Operations Default Settings**

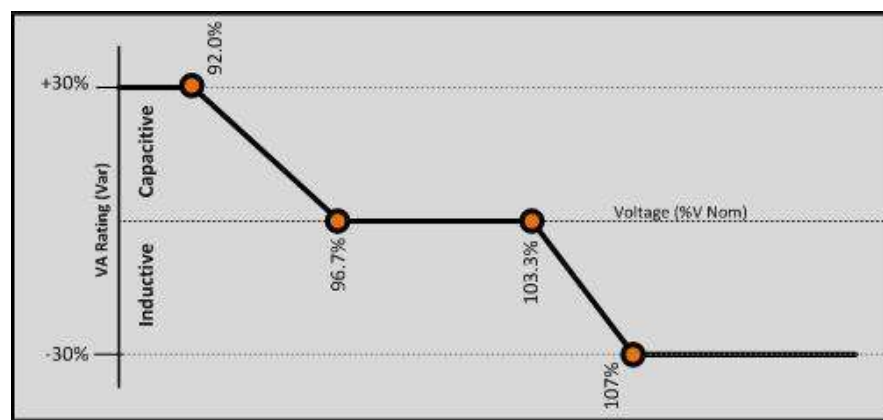
Table Hh-4 and Figure Hh-1 depict the default settings, which should be applied for all inverter sizes. Specific volt/var settings may be required for larger Generating Facilities (such as 100 kw or greater), or for specific areas with the Distribution Systems as determined by the Distribution Provider.

Default Open Loop Response Time for volt/var operation should be five (5) seconds.

**Table Hh-4: Voltage and Reactive Default Settings**

| Voltage Setpoint | Voltage Value | Reactive Setpoint | Reactive Value | Operation                 |
|------------------|---------------|-------------------|----------------|---------------------------|
| V1               | 92.0%         | Q1                | 30%            | Reactive Power Injection  |
| V2               | 96.7%         | Q2                | 0              | Unity Power Factor        |
| V3               | 103.3%        | Q3                | 0              | Unity Power Factor        |
| V4               | 107.0%        | Q4                | 30%            | Reactive Power Absorption |

**Figure Hh-1: Voltage and Reactive Default Settings**



(L)

(Continued)



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

Sheet 207

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

k. Ramp Rate Requirements

The Smart Inverter is required to have the following ramp controls for at least the following four conditions. These functions can be established by multiple control functions or by one general ramp rate control function. Ramp rates are contingent upon sufficient energy available from the Smart Inverter.

- Normal ramp-up rate: For transitions between energy output levels over the normal course of operation. The default value is 100% of maximum current output per second with a range of adjustment between 1% to 100%, with specific settings as mutually agreed by the Distributor Provider and the Producer.
- Connect/Reconnect Ramp-up rate: Upon starting to inject power into the grid, following a period of inactivity or a disconnection, the inverter shall be able to control its rate of increase of power from 1 to 100% maximum current per second. The default value is 2% of maximum current output per second, with specific settings as mutually agreed upon by the Distribution Provider and the Producer.

l. Frequency-Watt Requirements

This requirement will become mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted on or after February 22, 2019, nine (9) months following the approval of the SunSpec Alliance Communication Protocol Certification Test Standard.

The utilization of this function is permissible under mutual agreement between the utility and the generating facility before the effective date.

Smart Inverters shall reduce their real power production as a function of system frequency, in accordance with the following:

- When system frequency exceeds 60.036 Hz, the active power output produced by the Smart Inverter shall be reduced by 50% of real power nameplate rating per hertz (5% of real power nameplate rating reduction per 0.1 hertz)

(L)

(Continued)



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

Sheet 208

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)**

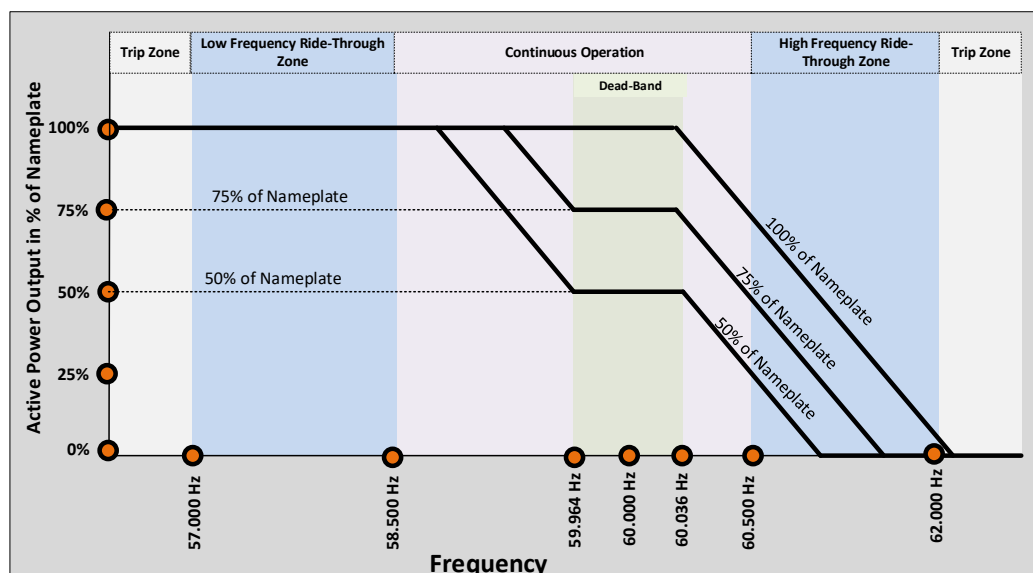
(L)

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**I. Frequency-Watt Requirements (Cont'd.)**

- When system frequency moves under 59.964 Hz, the active power output produced by the Smart Inverter shall be increased by 50% of real power nameplate rating per hertz (5% of real power nameplate rating increase per 0.1 hertz) when inverter is capable of increasing real power production.
- The default dead-band should be +/- 0.036 Hz from 60 Hertz (59.964 Hz to 60.036 Hz). When the system frequency is in range of 59.964 Hz and 60.036 Hz, the Smart Inverter is not required to decrease power as a function of system frequency.
- Open loop response time for Frequency –Watt shall be 5 seconds.
- Figure Hh-2 illustrated this requirement for three levels of output power. Figure Hh-2 is for illustration purposes only.

Figure Hh-2: Active Power as a Function of System Frequency



Note: the frequency markers on the horizontal axis are not drawn to scale.

(L)

(Continued)





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

Sheet 209

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

m. Voltage-Watt Default Settings Requirements

This requirement will become mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted on or after February 22, 2019, nine (9) months following the approval of the SunSpec Alliance Communication Protocol Certification Test Standard.

The utilization of this function is permissible under mutual agreement between the utility and the generating facility before the effective date.

Smart Inverters shall reduce their real power production as a function of measured voltage at the inverter terminals or at the Generating Facility Point of Common Coupling (PCC) in accordance with the following:

- When the measured voltage is greater than 106% of nominal voltage (for example: 127.2 volts on a 120 volts nominal), the export of active power at the PCC or the production of active power by the Smart Inverter shall be reduced at a rate of 25% of active power nameplate rating per one percent of nominal voltage. Figure Hh-3 – Volt-Watt Requirements – illustrates the required rate of reduction. When export of active power is controlled, a certified inverter and control system shall be used.

(L)

(Continued)





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

Sheet 210

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

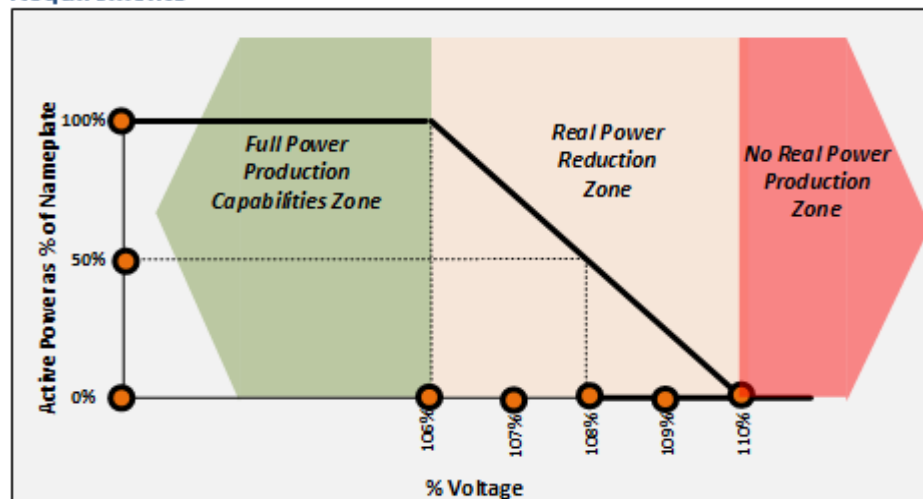
(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

m. (Cont'd.)

- When the measured voltage is greater than 110% of nominal voltage (Example: 132 volts on a 120 volts nominal), the export of active power output to the grid at the PCC or the production of active power by the Smart Inverter shall be reduced to 0 watts

**Figure HH-3 – Volt-Watt  
Requirements**



Percent (%) of nominal voltage

(L)

(Continued)



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

Sheet 211

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

n. Dynamic Reactive Power Support Function

The capability for this requirement will become mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted twelve (12) months after approval of a nationally recognized standard that includes the function.

The utilization of this function is allowed and optional upon the mutual agreement of the Distribution Provider and the Applicant or Producer, before the effective date.

o. Default Activation States

Unless otherwise provided by Distribution Provider, pursuant to Distribution Provider's Distribution Generation Interconnection Handbook, the default settings will be as follows:

|    | <b><u>Function</u></b>                         | <b><u>State</u></b>              |
|----|------------------------------------------------|----------------------------------|
| 1  | Anti-islanding                                 | activated                        |
| 2  | Low/High Voltage Ride-Through                  | activated                        |
| 3  | Low/High Frequency Ride-Through                | activated                        |
| 4  | Dynamic Volt/VAR operations                    | activated                        |
| 5  | Ramp rates                                     | activated                        |
| 6  | Fixed power factor                             | deactivated                      |
| 7  | Reconnect by "soft-start" methods              | activated                        |
| 8  | Frequency-Watt*                                | activated                        |
| 9  | Volt/Watt*                                     | activated                        |
| 10 | Set Active Power Function Mode (Optional)      | activated under mutual agreement |
| 11 | Dynamic Reactive Power Support Mode (Optional) | activated under mutual agreement |

These default activation states may be modified by mutual agreement between Distribution Provider and Producer.

\* These functions must be activated for Interconnection Requests submitted on or after February 22, 2019.

(L)

(Continued)



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

Sheet 212

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

p. Phase 3 Functions

Table of Phase 3 Effective Dates Pursuant to Resolution E-4898 and  
Resolution E-5000 and CPUC Letter of March 20, 2020 responding to a  
request to extend the date for Functions 1, 2, 3 and 8:

| <b>Phase 3 Function #</b> |                                                                                         |                                                                                                                                      |
|---------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                           | <b>Description</b>                                                                      | <b>Effective Date (note)</b>                                                                                                         |
| 1                         | Monitor Key DER Data                                                                    | <b>June 22, 2020</b>                                                                                                                 |
| 2                         | DER Disconnect and<br>Reconnect Command<br>(Cease to Energize and<br>Return to Service) | <b>June 22, 2020</b>                                                                                                                 |
| 3                         | Limit Maximum Active<br>Power Mode                                                      | <b>June 22, 2020</b>                                                                                                                 |
| 4                         | Set Active Power Mode                                                                   | 12 months after approval of a<br>nationally recognized standard that<br>includes the function.                                       |
| 5                         | Frequency Watt Mode                                                                     | <b>February 22, 2019</b> , which is 9<br>months following SunSpec Alliance<br>Communication Protocol<br>Certification Test Standard. |
| 6                         | Volt Watt Mode                                                                          | <b>February 22, 2019</b> , which is 9<br>months following SunSpec Alliance<br>Communication Protocol<br>Certification Test Standard. |
| 7                         | Dynamic Reactive Support                                                                | 12 months after approval of a<br>nationally recognized standard that<br>includes the function.                                       |
| 8                         | Scheduling Power Values<br>and Modes                                                    | <b>June 22, 2020</b>                                                                                                                 |

Note: The utilization of any of these functions is permissible under mutual  
agreement between the utility and the generating facility before the  
effective date.

(L)

(Continued)



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

Sheet 213

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

2. PREVENTION OF INTERFERENCE (Cont'd.)

q. Load Shedding or Transfer

The voltage and frequency ride-through requirements of Hh.2.b.(ii) and Hh.2.f.(i) shall not apply if either: a) The real power across the Point of Common Coupling is continuously maintained at a value less than 10% of the aggregate rating of the Smart Inverters connected to the Generation Facility prior to any voltage disturbance, and the Generation Facility disconnects from the Distribution Provider's T&D system, along with Generation Facility load, such that the net change in real power flow from or to the Distribution Provider is less than 10% of the aggregate Smart Inverter capacity; or b) Generation Facility load real power demand equal to 90% to 120% of the pre-disturbance aggregate Smart Inverter real power output is shed within 0.1 seconds of Smart Inverter disconnection.

3. TECHNOLOGY SPECIFIC REQUIREMENTS

Grid-interactive inverters do not require separate synchronizing equipment. Non grid-interactive or "stand-alone" inverters shall not be used for Parallel Operation with Distribution Provider's Distribution or Transmission System.

(L)

(Continued)



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

Sheet 214

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
4. SUPPLEMENTAL SMART INVERTER REQUIREMENTS
- a. Fault Detection
- A Smart Inverter with an SCCR exceeding 0.1 or one that does not cease to energize Distribution Provider's Distribution or Transmission System within two seconds of the formation of an Unintended Island shall be equipped with Protective Functions designed to detect Distribution or Transmission System faults, both line-to-line and line-to-ground, and cease to energize Distribution Provider's Distribution or Transmission System within two seconds of the initiation of a fault.
- b. Transfer Trip
- For a Generating Facility that cannot detect Distribution or Transmission System faults (both line-to-line and line-to-ground) or the formation of an Unintended Island, and cease to energize Distribution Provider's Distribution or Transmission System within two seconds, Distribution Provider may require a Transfer Trip system or an equivalent Protective Function.
- c. Reclose Blocking
- Where the aggregate Generating Facility capacity exceeds 15% of the peak load on any automatic reclosing device, Distribution Provider may require additional Protective Functions, including, but not limited to reclose-blocking on some of the automatic reclosing devices. (L)

(Continued)



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

Sheet 215

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

5. COMMUNICATION REQUIREMENTS

a. The communication protocol requirements included in this section Hh.5 shall become mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted June 22, 2020. Until such date, this subsection may be used in all or in part by inverter-based technologies by mutual agreement of the Distribution Provider and the Applicant. The communications requirements herein shall be between:

- (i) the Distribution Provider and the individual Generating Facility's inverter control or energy management system;
- (ii) the Distribution Provider and communication to the Generating Facility through an aggregator not co-located or part of the Generating Facility; or
- (iii) other communication options as are mutually agreed to are by Applicant and the Distribution Provider.

(L)

(Continued)



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

Sheet 216

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
5. COMMUNICATION REQUIREMENTS (Cont'd.)
- b. Generating Facilities utilizing inverter-based technologies must adhere to all of the following communication protocol requirements for communications between Distribution Provider and communication option selected in section Hh. 5. This Rule does not specify the communication between the selected communication option and Smart Inverter but performance will be enforced by in compliance with this Rule:
- (i) Shall be capable of communications;
  - (ii) Software shall be updateable via communications remotely;
  - (iii) The transport level protocol shall be TCP/IP; and,
  - (iv) The default application-level protocol shall be IEEE 2030.5 (i.e., Smart Energy Profile 2.0 (SEP 2)) as defined in the California IEEE 2030.5 Implementation Guide, but other application-level protocols may be used by mutual agreement of the parties including IEEE 1815/DNP3 for SCADA real-time monitoring and control and IEC 61850. (L)

(Continued)



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

Sheet 217

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
5. COMMUNICATION REQUIREMENTS (Cont'd.)
- c. Additional communication protocol requirements shall also apply to Generating Facilities utilizing inverter-based technologies as provided in the following documents:
- (i) Distribution Provider Generation Interconnection Handbook, which shall include:
- a) Details and guidelines for the implementation of communications with Generating Facilities utilizing inverter-based technologies;
- b) Cybersecurity and privacy requirements (these may additionally or alternatively be included in the application-level protocol implementation guide); and,
- c) Generic device communications registration management requirements, including how to register individual Generating Facilities, Generating Facilities with energy management systems, and aggregators (these requirements additionally or alternatively may be included in the application-level protocol implementation guide).
- (ii) Application-Level Protocol Implementation Guide, which shall provide:
- a) Communication requirements and implementation guidelines to ensure consistent interoperability of the Generating Facilities with all California investor-owned utilities under the Commission's jurisdiction. (L)

(Continued)





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

Sheet 218

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

6. SCHEDULING CAPABILITY REQUIREMENTS

- a. Generating Facilities which incorporate Smart Inverters shall incorporate scheduling capabilities with a minimum scheduling memory capability of at least 24 events. The capability for this requirement will be mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted on or after June 22, 2020.

The utilization of this function is permissible under mutual agreement between the utility and the generating facility before the effective date.

Each event is composed of modifications to each, selected group of, or all of the following Smart Inverter function.

- (i) Modifications to the voltage and reactive set-points of the Dynamic volt/var function.
- (ii) Modifications to the reactive power set-points for the fixed power factor function.
- (iii) Modifications to the voltage and watt-reduction level set-points for the volt/watt function.

(L)

(Continued)



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

Sheet 219

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

6. SCHEDULING CAPABILITY REQUIREMENTS (Cont'd.)

- b. The Generating Facility's scheduling capability requirement herein shall be met by one or more of the following options.
  - (i) Scheduling capability requirements may be stored at the Generating Facility Energy Management System (GFEMS). The GFEMS shall communicate the necessary commands to the Smart Inverters within 10 minutes from when GFEMS received the scheduling information:
  - (ii) Scheduling capability requirements may be stored at the Smart Inverter Control Unit (SMCU) within the Generating Facility. The SMCU shall communicate necessary commands to the Smart Inverters within 10 minutes from when SCMU received the scheduling information.
  - (iii) Scheduling capability requirements may be stored at an aggregator not co-located within the Generating Facility. The aggregator shall communicate the necessary commands to the Smart Inverters within 15 minutes of the aggregator receiving the scheduling information.
  - (iv) Other options may be utilized by mutual agreement between the Applicant and Distribution Provider.
- c. The selected scheduling control system shall store the schedules and shall send operational commands to the Smart Inverters as required by the schedule received from the Distribution Provider. The Smart Inverter shall respond by changing its mode of operation as commanded at the schedule start time with no unreasonable delay.

Each scheduled mode of operation shall include and start-time and duration. The Smart Inverter should return to its default settings at the end of the duration time or shall enter a new operational mode as directed by the scheduling control system.

(L)

(Continued)



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

Sheet 220

- Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.) (L)
7. MONITORING AND TELEMETRY REQUIREMENTS
- a. The capability for this requirement will be mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted on or after June 22, 2020.
- The utilization of this function is permissible under mutual agreement between the utility and the generating facility before the effective date.
- Smart Inverter shall have the capability to communicate its performance information including:
- (i) Smart Inverter production or consumption of active power (Watts).
  - (ii) Smart Inverter consumption or production of reactive power (VARs)
  - (iii) Phase measured at the AC terminals of the Smart Inverter (Volts)
  - (iv) Frequency measured at the AC terminals of the Smart Inverter (Hz) (L)

(Continued)



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

Sheet 221

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

7. MONITORING AND TELEMETRY REQUIREMENTS (Cont'd.)

- b. When the Generating Facility includes energy-storage with Smart Inverters, the following monitoring and telemetry capability are required:
  - (i) The Smart Inverter shall be capable of communicating the operational state of charge as a percentage of energy storage capacity.
- c. Operational State as In-Service or not In-service communication capability requirements. The Smart Inverter shall be capable of communicating when the Smart Inverter is capable of providing electric services as follows:
  - (i) In-Service state: An operational state which indicates that the Smart Inverter is connected to the electric system and operating as determined locally by the Generating Facility operator or by a scheduling control system as outlined in section Hh.6
  - (ii) Not In-Service state: An operating state which indicates that the Smart Inverter is not capable of connecting to the electric system and not capable of providing any type of electrical support as required locally or as commanded by a scheduling control system as outlined in section Hh.

(L)

(Continued)



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

Sheet 222

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

7. MONITORING AND TELEMETRY REQUIREMENTS (Cont'd.)

d. Monitoring and performance information should be communicated in  
aggregate at the Generating Facility as follows:

(i) When the Generating Facility includes only Smart Inverters: The  
production or consumption of active and reactive power shall be  
communicated as an aggregate of all Smart Inverters within the  
Generating Facility.

(ii) When a Generating Facility includes Smart Inverters and other  
technologies such as synchronous or induction generation  
systems, the Generating Facility should communicate the  
following:

a) The production or consumption of active and reactive power  
shall be communicated in aggregate of all Smart Inverters  
within the Generating Facility

b) The production or consumption of active and reactive power  
shall be communicated in aggregate of all the other  
technologies within the Generating Facility

(iii) When the Generating Facility with Smart Inverters includes one or  
multiple energy storage systems: The available operational  
energy should be communicated as an aggregate of all the energy  
storage systems.

(L)

(Continued)



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

Sheet 223

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)

(L)

8. CONTROL THROUGH COMMUNICATION CAPABILITIES

- a. The capability for these requirements will be mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted on or after the earlier of the dates shown in the "Table of Phase 3 Effective Dates Pursuant to Resolution E-4898" in Section Hh.2.p.

The utilization of these functions is permissible under mutual agreement between the utility and the generating facility before the effective date.

Smart Inverters shall have the capabilities of accepting an operational controls through communications in accordance to the following:

- (i) Cease to energize control command. When the Smart Inverter receives a cease-to-energize command through communication it must enter into a cease-to-energize state of operation or shall initiate the opening of the DER switch referenced in the ECP in order to galvanically isolate the DER system from the Distribution System
- (ii) Return to service control command. When the Smart Inverter receives a return-to-service control command, the Smart Inverter may return to service operation as required by Generating Facility operator or as required by the scheduling control system as required by section H.6
- (iii) Limit Active Power command. When the Smart Inverter receives a command to limit its production of real power, the Smart Inverter shall reduce its real power production to the specified percent of real power capacity of the Smart Inverter or to a specified real power value.
- (iv) Set Active Power Level Mode Function. The capability for this requirement will become mandatory for Generating Facilities utilizing inverter-based technologies for which an Interconnection Request is submitted twelve (12) months after approval of a nationally recognized standard that includes the function.
- (v) Suspension of Active Power restriction. When the Smart Inverter receives a command to suspend the command for active power reduction, the Smart Inverter may return to normal operation as required by Generating Facility operator or as required by the scheduling control system as required by section H.6.

(L)

(Continued)



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

Sheet 224

**I. THIRD-PARTY INSTALLATIONS, RESERVATION OF UNUSED FACILITIES,  
AND REFUND OF SALVAGE VALUE**

(L)

**1. INTERCONNECTION FACILITIES AND DISTRIBUTION UPGRADES**

Except as provided for in the Generator Interconnection Agreement of this Rule, Interconnection Facilities connected to Distribution Provider's side of the PCC and Distribution Upgrades shall be provided, installed, owned, and maintained by Distribution Provider at Producer's expense.

**2. THIRD-PARTY INSTALLATIONS**

(L)

Producer may, at its option, employ a qualified contractor that meets the Contractor Qualifications set forth under Electric Rule 15, Section G, to provide and install Interconnection Facilities or Distribution Upgrades, to be owned and operated by Distribution Provider, on Distribution Provider's side of the PCC.\* Such Interconnection Facilities and Distribution Upgrades shall be installed in accordance with Distribution Provider's design and specifications. Upon final inspection and acceptance by Distribution Provider, Producer shall transfer ownership of such Producer installed Interconnection Facilities or Distribution Upgrades to Distribution Provider and such facilities shall thereafter be owned and maintained by Distribution Provider at Producer's expense. Producer shall pay Distribution Provider's reasonable cost of design, administration, and monitoring of the installation for such facilities to ensure compliance with Distribution Provider's requirements. Producer shall also be responsible for all costs, including any income tax liability, associated with the transfer of Producer installed Interconnection Facilities and Distribution Upgrades to Distribution Provider.

(P)/(L)  
(P)/(L)  
(L)  
(L)  
(P)/(L)  
(L)

(L)

\* Only duly authorized employees of utility are allowed to connect to, disconnect from, or perform any work upon Utility's facilities.

(P)/(L)  
(P)/(L)

(Continued)



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

Sheet 225

- I. THIRD-PARTY INSTALLATIONS, RESERVATION OF UNUSED FACILITIES, AND REFUND OF SALVAGE VALUE (Cont'd.) (L)
3. RESERVATION OF UNUSED FACILITIES
- When a Producer wishes to reserve Distribution Provider-owned Interconnection Facilities or Distribution Upgrades installed and operated as Added Facilities for Producer at Producer's expense, but idled by a change in the operation of Producer's Generating Facility or otherwise, Producer may elect to abandon or reserve such facilities consistent with the terms of its agreement with Distribution Provider. If Producer elects to reserve idle Interconnection Facilities or Distribution Upgrades, Distribution Provider shall be entitled to continue to charge Producer for the costs related to the ongoing operation and maintenance of the Added Facilities.
4. REFUND OF SALVAGE VALUE
- When a Producer elects to abandon the Special Facilities or Added Facilities for which it has either advanced the installed costs or constructed and transferred to Distribution Provider, Producer shall, at a minimum, receive from Distribution Provider a credit for the net salvage value of the Added Facilities.
- J. METERING, MONITORING AND TELEMETERING
1. GENERAL REQUIREMENTS
- All Generating Facilities shall be metered in accordance with this Section J and shall meet all applicable standards of Distribution Provider contained in Distribution Provider's applicable tariffs and published Distribution Provider manuals dealing with Metering specifications.
2. METERING BY NON-DISTRIBUTION PROVIDER PARTIES
- The ownership, installation, operation, reading, and testing of revenue Metering Equipment for Generating Facilities shall be by Distribution Provider except to the extent that the Commission authorizes any or all these services be performed by others. (L)

(Continued)





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

Sheet 226

- J. METERING, MONITORING AND TELEMETERING (Cont'd.) (L)
3. NET GENERATION OUTPUT METERING
- Generating Facility customers may be required to install Net Generation Output Metering for evaluation, monitoring, and verification purposes and to determine applicable standby and non-bypassable charges as defined in Distribution Provider's tariffs, to satisfy applicable California Independent System Operator (CAISO) reliability requirements, and for Distribution System planning and operations.
- However, Generating Facility customers do not need to install Net Generation Output Metering where less intrusive and/or more cost effective options, for Producer/Customer, are available for providing generator data to Distribution Provider. These Generating Facilities may opt to have Distribution Provider estimate load data in accordance with Distribution Provider's applicable tariffs to determine or meet applicable standby and non-bypassable and other applicable charges and tariff requirements. However, if a Generating Facility customer objects to Distribution Provider's estimate of the Generator(s) output, the customer may elect to install the Net Generation Output Metering, or have Distribution Provider install Net Generation Output Metering at the customer's expense.
- (a) All metering options available to the customer must conform to the requirements set forth in Distribution Provider's Rule 22. If Distribution Provider does not receive meter data in accordance with Rule 22, Distribution Provider shall have the right to install Distribution Provider-owned Net Generation Output Metering at the customer's expense. The relevant factors in determining the need for Net Generation Output Metering are as listed below:
- i) Data requirements in proportion to need for information;
  - ii) Producer's election to install equipment that adequately addresses Distribution Provider's operational requirements;
- (L)

(Continued)



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

Sheet 227

J. METERING, MONITORING AND TELEMETERING (Cont'd.) (L)

3. NET GENERATION OUTPUT METERING (Cont'd.)

- iii) Accuracy and type of required Metering consistent with purposes of collecting data;
- iv) Cost of Metering relative to the need for and accuracy of the data;
- v) The Generating Facility's size relative to the cost of the Metering/monitoring;
- vi) Other means of obtaining the data (e.g. Generating Facility logs, proxy data, etc.);
- vii) Requirements under any Generator Interconnection Agreement with Producer.

The requirements in this Section may not apply to Metering of Generating Facilities operating under Distribution Provider's Net Energy Metering tariffs. Nothing in this Section J.3 supersedes Section D.4, Compliance with Laws, Rules and Tariff Schedules.

Distribution Provider will report to the Commission or designated authority, on a quarterly basis, the rationale for requiring Net Generation Output Metering equipment in each instance along with the size and location of the facility.

The standard timeline for installation of Net Generation Output Meters is as follows: (P)/(L)

- i) 20 business for design and 20 business days for construction, or
- ii) design and construction timelines as agree with the customer.

The 20-day clock commences upon payment and after the customer had done everything necessary on their end to prepare for construction. By mutual agreement, Applicant and Distribution Provider may agree to a timeline that is different from the timeline described above.

(P)/(L)

(Continued)



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

Sheet 228

**J. METERING, MONITORING AND TELEMETERING (Cont'd.)**

(L)

**4. POINT OF COMMON COUPLING (PCC) METERING**

For purposes of assessing Distribution Provider's charges for retail service, Producer's PCC Metering shall be reviewed by Distribution Provider, and if required, replaced to ensure that it will appropriately measure electric power according to the provisions of the Customer's electric service Tariff. Where required, the Customer's existing meter may be replaced with a bi-directional meter so that power deliveries to and from Producer's site can be separately recorded. Alternately, Producer may, at its sole option and cost, require Distribution Provider to install multi-metering equipment to separately record power deliveries to Distribution Provider's Distribution System and retail purchases from Distribution Provider. Where necessary, such PCC Metering shall be designed to prevent reverse registration.

Generating Facilities participating in Net Energy Metering shall have metering provided pursuant to the terms of the applicable Net Energy Metering tariff schedule.

**5. TELEMETERING**

If the nameplate rating of the Generating Facility is 1 MW or greater, Telemetering equipment at the Net Generation Output Metering location may be required at Producer's expense. If the Generating Facility is Interconnected to a portion of Distribution Provider's Distribution System operating at a voltage below 10 kV, then Telemetering equipment may be required on Generating Facilities 250 kW or greater. Distribution Provider shall only require Telemetering to the extent that less intrusive and/or more cost effective options for providing the necessary data in real time are not available. Distribution Provider will report to the Commission or designated authority, on a quarterly basis, the rationale for requiring Telemetering equipment in each instance along with the size and location of the facility.

Customer-owned, behind-the-meter, telemetry equipment is allowed where practicable to mitigate the costs associated with Distribution Provider's ownership of the equipment (i.e., the Income Tax Component of Contribution and Cost of Ownership charges), per D.19-03-013 Ordering Paragraph 5. Distribution Provider will allow for a cap of thirty calendar days to repair or replace malfunctioning equipment as notified by the Distribution Provider and if the malfunctioning equipment is not repaired by the thirtieth day, the Distribution Provider can make the necessary repairs and charge the customer for related costs or can disconnect the distributed energy resource.

(L)

(Continued)



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

Sheet 229

- J. METERING, MONITORING AND TELEMETERING (Cont'd.) (L)
6. LOCATION
- Where Distribution Provider-owned Metering is located on Producer's premises, Producer shall provide, at no expense to Distribution Provider, a suitable location for all such Metering Equipment.
7. COSTS OF METERING
- Producer will bear all costs of the Metering required by this Rule, including the incremental costs of operating and maintaining the Metering Equipment.
8. MULTIPLE TARIFF METERING
- The requirements of Section J.3 may not apply where a Generating Facility includes multiple generators eligible for service under more than one Net Energy Metering (NEM) tariff schedule (e.g. NEM-1, NEM-2, NEMBIO, NEMFC), or where a Generating Facility consists of one or more NEM-eligible generators in combination with one or more non-NEM eligible generators without Non-Export relays ("Reverse Power Protection"). To ensure proper tariff administration, metering will be required at the PCC and at each of the NEM eligible generator groups eligible for service under the same NEM tariff schedule. For combinations of multiple NEM eligible generators under different tariffs, billing administration and metering requirements will be as specified in the appropriate NEM tariff schedule.
- Where a Generating Facility consists of one or more NEM eligible generator groups in combination with one or more non-NEM generators, metering of the non-NEM generators is not required, except as specified in Section J.3. (L)

(Continued)



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

Sheet 230

**K. DISPUTE RESOLUTION PROCESS**

(L)

In addition to the informal procedures for timeline-related disputes set out in Section F.1.d, the following procedures will apply for disputes arising from this Rule:

**1. SCOPE**

The Commission shall have initial jurisdiction to interpret, add, delete or modify any provision of this Rule or of any agreements entered into between Distribution Provider and Applicant or Producer to implement this tariff ("Implementing Agreements") and to resolve disputes regarding Distribution Provider's performance of its obligations under Commission-jurisdictional tariffs, the applicable agreements, and requirements related to the interconnection of Applicant's or Producer's Generating Facility or Interconnection Facilities pursuant to this Rule.

**2. PROCEDURES**

Any dispute arising between Distribution Provider and Producer (individually referred to in Section K as "Party" and collectively "the Parties") regarding Distribution Provider's or Producer's performance of its obligations under its tariffs, the Implementing Agreements, and requirements related to the interconnection of Producer's Facilities pursuant to this Rule shall be resolved according to the following procedures:

- a. The dispute shall be documented in a written notice ("notice") by the aggrieved Party to the other Party containing the relevant known facts pertaining to the dispute, the specific dispute and the relief sought, and express notice by the aggrieved Party that it is invoking the procedures under this Section. The notice shall be sent to the Party's email address and physical address set forth in the Generator Interconnection Agreement or Interconnection Request, if there is no Generator Interconnection Agreement. A copy of the notice shall also be sent to the Energy Division, Office of the Director, at the Commission. The receiving Party shall acknowledge the notice within five (5) Calendar Days of its receipt.

(L)

(Continued)



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

Sheet 231

**K. DISPUTE RESOLUTION PROCESS (Cont'd.)**

(L)

**2. PROCEDURES (Cont'd.)**

- a. Upon the aggrieved Party notifying the other Party of the dispute, each Party must designate a representative with the authority to make decisions for its respective Party to review the dispute within seven (7) Calendar Days. In addition, upon receipt of the notice, Distribution Provider shall provide the aggrieved Party with all relevant regulatory and/or technical details and analysis regarding any Distribution Provider interconnection requirements under dispute within twenty-one (21) Calendar Days.

Within forty-five (45) Calendar Days of the date of the notice, the Parties' authorized representatives will be required to meet and confer to try to resolve the dispute. Parties are expected to operate in good faith and use best efforts to resolve the dispute.

- b. If a resolution is not reached in forty-five (45) Calendar Days from the date of the notice, either 1) a Party may request to continue negotiations for an additional forty-five (45) Calendar Days or 2) the Parties may by mutual agreement make a written request for mediation to the ADR Coordinator in the Commission's ALJ Division. The request may be submitted by electronic mail to [adr\\_program@cpuc.ca.gov](mailto:adr_program@cpuc.ca.gov). Alternatively, both Parties by mutual agreement may request mediation from an outside third-party mediator with costs to be shared equally between the Parties.
- c. At any time, either Party may file a formal complaint before the Commission pursuant to California PUC section 1702 and Article 4 of the Commission's Rules of Practice and Procedure.

Nothing in this section shall be construed to limit the rights of any Party to exercise rights and remedies under Commission law.

(L)

(Continued)



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

Sheet 232

**K. DISPUTE RESOLUTION PROCESS (Cont'd.)**

(L)

**3. PERFORMANCE DURING DISPUTE**

Pending resolution of any dispute under this Section, the Parties shall proceed diligently with the performance of their respective obligations under this Rule and the Implementing Agreements, unless the Implementing Agreements have been terminated. Disputes as to the Interconnection Request and implementation of this Section shall be subject to resolution pursuant to the procedures set forth in this Section.

**L. CERTIFICATION AND TESTING CRITERIA**

**1. INTRODUCTION**

This Section describes the test procedures and requirements for equipment used for the Interconnection of Generating Facilities to Distribution Provider's Distribution or Transmission System. Included are Type Testing, Production Testing, Commissioning Testing, and Periodic Testing. The procedures listed rely heavily on those described in appropriate Underwriters Laboratory (UL), Institute of Electrical and Electronic Engineers (IEEE), and International Electrotechnical Commission (IEC) documents—most notably UL 1741 and IEEE 929 as well as the testing described in *May 1999 New York State Public Service Commission's Interconnection Requirements*. As noted in Section B, this Rule has been revised to be consistent with ANSI/IEEE 1547-2003 Standard for Interconnecting Distribution Resources with Electric Power Systems.

(L)

(Continued)





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

Sheet 233

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**1. INTRODUCTION (Cont'd.)**

The tests described here, together with the technical requirements in Section H of this Rule, are intended to provide assurance that the Generating Facility's equipment will not adversely affect Distribution Provider's Distribution or Transmission System and that a Generating Facility will cease providing power to Distribution Provider's Distribution or Transmission System under abnormal conditions. The tests were developed assuming a low level of Generating Facility penetration or number of connections to Distribution Provider's Distribution or Transmission System. At high levels of Generating Facility penetration, additional requirements and corresponding test procedures may need to be defined.

Section L also provides criteria for "Certifying" Generators, inverters or converters. Once a Generator, inverter or converter has been Certified per this Rule, it may be considered suitable for Interconnection with Distribution Provider's Distribution or Transmission System. Subject to the exceptions described in Section L, Distribution Provider will not repeat the design review or require retesting of such Certified Equipment. It should be noted that the Certification process is intended to facilitate Generating Facilities Interconnections. Certification is not a prerequisite to interconnect a Generating Facility for Section H, except for Non-Export AC/DC Converters seeking an expedited process, but it is a prerequisite for inverters installed after September 8, 2017, pursuant to Section Hh of this Rule.

(L)

(Continued)

Advice 5915-E-B  
Decision D.20-09-035

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

Submitted November 4, 2021  
Effective  
Resolution





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

Sheet 234

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
2. CERTIFIED AND NON-CERTIFIED INTERCONNECTION EQUIPMENT
- a. Certified Equipment
- Equipment tested and approved (i.e. "Listed") by an accredited NRTL as having met both the Type Testing and Production Testing requirements described in this document is considered to be Certified Equipment for purposes of Interconnection with Distribution Provider's Distribution or Transmission System. Certification may apply to either a pre-packaged system or an assembly of components that address the necessary functions. Type Testing may be done in the manufacturer's factory or test laboratory, or in the field. At the discretion of the testing laboratory, field-certification may apply only to the particular installation tested. In such cases, some or all of the tests may need to be repeated at other installations.
- When equipment is Certified by a NRTL, the NRTL shall provide to the manufacturer, at a minimum, a Certificate with the following information for each device:
- Administrative:
- (1) The effective date of Certification or applicable serial number (range or first in series), and/or other proof that certification is current;
  - (2) Equipment model number(s) of the Certified equipment;
  - (3) The software version utilized in the equipment, if applicable;
  - (4) Test procedures specified (including date or revision number); and
  - (5) Laboratory accreditation (by whom and to what standard). (L)

(Continued)



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

Sheet 235

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
2. CERTIFIED AND NON-CERTIFIED INTERCONNECTION EQUIPMENT (Cont'd.)
- a. Certified Equipment (Cont'd.)
- Technical (as appropriate):
- (1) Device ratings (kW, kV, Volts, amps, etc.);
  - (2) Maximum available fault current in amps;
  - (3) In-rush Current in amps;
  - (4) Trip points, if factory set (trip value and timing);
  - (5) Trip point and timing ranges for adjustable settings;
  - (6) Nominal power factor or range if adjustable;
  - (7) If the equipment is Certified as Non-Exporting and the method used (reverse power or underpower);
  - (8) If the equipment is Certified as Non-Islanding; and
  - (9) If the equipment is Certified as a Non-Export AC/DC Converter.
- It is the responsibility of the equipment manufacturer to ensure that Certification information is made publicly available by the manufacturer, the testing laboratory, or by a third party.
- b. Non-Certified Equipment
- For non-Certified equipment, some or all of the tests described in this Rule may be required by Distribution Provider for each Generating and/or Interconnection Facility. The manufacturer or a laboratory acceptable to Distribution Provider may perform these tests. Test results for non-Certified equipment must be submitted to Distribution Provider for the Supplemental Review. Approval by Distribution Provider for equipment used in a particular Generating and/or Interconnection Facility does not guarantee Distribution Provider's approval for use in other Generating and/or Interconnection Facilities.
- (L)

(Continued)



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

Sheet 236

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**3. TYPE TESTING**

**a. Type Tests and Criteria for Interconnection Equipment Certification**

Type testing provides a basis for determining that equipment meets the specifications for being designated as Certified equipment under this Rule. The requirements described in this Section cover only issues related to Interconnection and are not intended to address device safety or other issues.

Table L.1 defines the test criteria by Generator or inverter technology. While UL 1741(1) and UL 1741 – Supplement SA were written specifically for inverters, the requirements are readily adaptable to synchronous Generators, induction Generators, as well as single/multi-function controllers and protection relays. Until a universal test standard is developed, Distribution Provider or NRTL shall adopt the procedures referenced in Table L.1 as appropriate and necessary for a Generating Facility and/or Interconnection Facilities or associated equipment performance and its control and Protection Functions. These tests shall be performed in the sequence shown in Table L.2.

Non-Export AC/DC Converters must satisfy the requirements in its definition in Section C.

(L)

(Continued)



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

Sheet 237

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**3. TYPE TESTING (Cont'd.)**

**a. Type Tests and Criteria for Interconnection Equipment Certification  
(Cont'd.)**

**Table L.1, Type Test and Requirements for Interconnection Equipment Certification**

| Type Test                                                 |                                                                                                                                                                                                                                                                                                                                                                                     | Reference 1           | Inverter (6) | Smart Inverter (7) | Synchronous Generators | Induction Generators |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|--------------------|------------------------|----------------------|
| Utility Interaction                                       |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 – 39, 40      | X            | X                  | X                      | X                    |
| Utility Compatibility (Required testing to 1547 & 1547.1) |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 - 46          | X            | X                  | X                      | X                    |
| DC Isolation                                              |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.6   | X            | X                  | -                      | -                    |
| Dielectric Voltage Withstand                              |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.5.3 | X            | X                  | X                      | X                    |
| Harmonic Distortion                                       |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.11  | X            | X                  | X                      | X                    |
| DC Injection                                              |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.6   | X            | X                  | -                      | -                    |
| Distribution Provider Voltage Variation                   |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.2   | X            | -                  | X                      | X                    |
| Distribution Provider Frequency Variation                 |                                                                                                                                                                                                                                                                                                                                                                                     | IEEE 1547.1(8) -5.3   | X            | -                  | X                      | X                    |
| Abnormal Tests                                            |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 – 47          |              |                    |                        |                      |
| Loss of Control Circuit                                   |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 – 47.8        | X            | X                  | X                      | X                    |
| Short Circuit                                             |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 - 47.3        | X            | X                  | X                      | X                    |
| Load Transfer                                             |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 - 47.7        | X            | X                  | X                      | X                    |
| Surge Withstand Capability                                |                                                                                                                                                                                                                                                                                                                                                                                     | L.3.e                 | X            | X                  | X                      | X                    |
| Anti-Islanding (non-Smart Inverters)                      |                                                                                                                                                                                                                                                                                                                                                                                     | L.3.b                 | (2)          | -                  | (2)                    | (2)                  |
| Non-Export                                                |                                                                                                                                                                                                                                                                                                                                                                                     | L.3.c                 | (3)          | (3)                | (3)                    | (3)                  |
| In-rush Current                                           |                                                                                                                                                                                                                                                                                                                                                                                     | L.3.d                 | -            | -                  | -                      | (4)                  |
| Synchronization                                           |                                                                                                                                                                                                                                                                                                                                                                                     | L.3.f                 | (5)          | (5)                | X                      | (5)                  |
| Anti-islanding (Smart Inverters)                          |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA8      | -            | X                  | -                      | -                    |
| Low and High Voltage Ride-through (L/H VRT)               |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA – SA9      | -            | X                  | -                      | -                    |
| Low and High Frequency Ride-through (L/H FRT)             |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA10     | -            | X                  | -                      | -                    |
| Normal and Soft-Start Ramp Rate (RR)                      |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA11     | -            | X                  | -                      | -                    |
| Specified Power Factor                                    |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA12     | -            | X                  | -                      | -                    |
| Volt/Var Mode (Q(V))                                      |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA13     | -            | X                  | -                      | -                    |
| Frequency-Watt(FW) - optional                             |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA14     | -            | X                  | -                      | -                    |
| Volt-Watt (VW) - optional                                 |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA - SA15     | -            | X                  | -                      | -                    |
| Markings and Instructions                                 |                                                                                                                                                                                                                                                                                                                                                                                     | UL 1741 SA6, SA16     | -            | X                  | -                      | -                    |
| Table Notes:                                              | (1) References are to section numbers in either UL 1741 and/or UL 1741-Supplement SA (Inverters, Converters and Charge Controllers for Use in Independent Power Systems) or this Rule. References in UL 1741 to “photovoltaics” or “inverter” may have to be adapted to the other technologies by the testing laboratory to appropriately apply in the tests to other technologies. |                       |              |                    |                        |                      |
|                                                           | (2) Required only if Non-Islanding designation.                                                                                                                                                                                                                                                                                                                                     |                       |              |                    |                        |                      |
|                                                           | (3) Required only if Non-Export designation is desired.                                                                                                                                                                                                                                                                                                                             |                       |              |                    |                        |                      |
|                                                           | (4) Required for Generators that use Distribution Provider power to motor to speed.                                                                                                                                                                                                                                                                                                 |                       |              |                    |                        |                      |
|                                                           | (5) Required for all self-excited induction Generators as well as Inverters that operate as voltage sources when connected to Distribution Provider’s Distribution or Transmission System.                                                                                                                                                                                          |                       |              |                    |                        |                      |
|                                                           | (6) Inverters compliant with Section H.                                                                                                                                                                                                                                                                                                                                             |                       |              |                    |                        |                      |
|                                                           | (7) Inverters compliant with Section Hh.                                                                                                                                                                                                                                                                                                                                            |                       |              |                    |                        |                      |
|                                                           | (8) IEEE 1547.1 refers to 2005 revision.                                                                                                                                                                                                                                                                                                                                            |                       |              |                    |                        |                      |
| “X” = Required      “-” = Not Required                    |                                                                                                                                                                                                                                                                                                                                                                                     |                       |              |                    |                        |                      |

(L)

(Continued)



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

Sheet 238

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**3. TYPE TESTING (Cont'd.)**

**a. Type Tests and Criteria for Interconnection Equipment Certification  
(Cont'd.)**

Table L.2 Type Tests Sequence for Interconnection Equipment Certification

| <u>Test No.</u>                                                                                                                                                                                                                                                                           | <u>Type Test</u>                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1                                                                                                                                                                                                                                                                                         | Distribution Provider Voltage and Frequency Variation                            |
| 2                                                                                                                                                                                                                                                                                         | Synchronization                                                                  |
| 3                                                                                                                                                                                                                                                                                         | Surge Withstand Capability                                                       |
| 4                                                                                                                                                                                                                                                                                         | Distribution Provider Voltage and Frequency Variation,<br>including ride through |
| 5                                                                                                                                                                                                                                                                                         | Synchronization                                                                  |
| 6                                                                                                                                                                                                                                                                                         | Other Required and Optional Tests                                                |
| Tests 1, 2, and 3 must be done first and in the order shown. Tests 4<br>and on follow in order convenient to the test agency.                                                                                                                                                             |                                                                                  |
| <b>b. Anti-Islanding Test</b>                                                                                                                                                                                                                                                             |                                                                                  |
| Devices that pass the Anti-Islanding test procedure described in UL<br>1741 Section 46.3 will be considered Non-Islanding for the purposes<br>of these Interconnection requirements. The test is required only for<br>devices for which a Certified Non-Islanding designation is desired. |                                                                                  |
| <b>c. Non-Export Test</b>                                                                                                                                                                                                                                                                 |                                                                                  |
| Equipment that passes the Non-Export test procedure described in<br>Section L.7.a will be considered Non-Exporting for the purposes of<br>these Interconnection requirements. This test is required only for<br>devices for which a Certified Non-Export designation is desired.          |                                                                                  |

(L)

(Continued)



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Sheet 239

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
3. TYPE TESTING (Cont'd.)
- d. In-rush Current Test
- Generation equipment that utilizes Distribution Provider power to motor up to speed will be tested using the procedure defined in Section L.7.b to determine the maximum current drawn during this startup process. The resulting In-rush Current is used to estimate the Starting Voltage Drop.
- e. Surge Withstand Capability Test
- The interconnection equipment shall be tested for the surge withstand requirement in Section H.1.c in all normal operating modes in accordance with IEEE Std C62.45-2002 for equipment rates less than 1000 V to confirm that the surge withstand capability is met by using the selected test level(s) from IEEE Std C62.41.2-2002. Interconnection equipment rated greater than 1000 V shall be tested in accordance with manufacturer or system integrator designated applicable standards. For interconnection equipment signal and control circuits, use IEEE Std C37.90.1-2002. These tests shall confirm the equipment did not fail, did not misoperate, and did not provide misinformation (IEEE 1547-5.1.3.2).
- The location/exposure category for which the equipment has been tested shall be clearly marked on the equipment label or in the equipment documentation. External surge protection may be used to protect the equipment in harsher location/exposure categories. (L)

(Continued)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 240

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
3. TYPE TESTING (Cont'd.)
- f. Synchronization Test
- This test is applied to synchronous Generators, self-excited induction generators, and inverters capable of operating as voltage-source while connected to Distribution Provider's Distribution or Transmission System. The test is also applied to the resynchronization Function (transition from stand-alone to parallel operation) on equipment that provides such functionality. This test may not need to be performed on both the synchronization and re-synchronization functions if the manufacturers can verify to the satisfaction of the testing organization that monitoring and controls hardware and software are common to both functions. This test is not necessary for induction generators or current-source inverters. Instead, the In-rush Current test Section L.3.d shall be applied to those generators.
- This test shall demonstrate that at the moment of the paralleling-device closure, all three synchronization parameters in Table L.3 are within the stated limits. This test shall also demonstrate that if any of the parameters are outside of the limits stated in the table, the paralleling-device shall not close (IEEE 1547-5.1.2A). The test will start with only one of the three parameters: (1) voltage difference between Generating Facility and Distribution Provider's Distribution or Transmission System; (2) frequency difference; or (3) phase angle outside of the synchronization specification. Verify that the Generating Facility is brought within specification prior to synchronization. Repeat the test five times for each of the three parameters. For manual synchronization with synch check or manual control with auto synchronization, the test must verify that paralleling does not occur until the parameters are brought within specifications. (L)

(Continued)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 241

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**3. TYPE TESTING (Cont'd.)**

**f. Synchronization Test (Cont'd.)**

***Table L.3***  
***Synchronization Parameter Limits [1]***

| Aggregate Rating<br>of Generator Units<br>(kVA) | Frequency<br>Difference<br>( $\Delta f$ , Hz) | Voltage Difference<br>( $\Delta V$ , %) | Phase Angle<br>Difference<br>( $\Delta \Phi$ , °) |
|-------------------------------------------------|-----------------------------------------------|-----------------------------------------|---------------------------------------------------|
| 0-500                                           | 0.3                                           | 10                                      | 20                                                |
| > 500-1,500                                     | 0.2                                           | 5                                       | 15                                                |
| > 1,500-10,000                                  | 0.1                                           | 3                                       | 10                                                |

[1] – IEEE 1547-5.1.1B

**g. Paralleling Device Withstand Test**

The di-electric voltage withstand test specified in Section L.1 shall be performed on the paralleling device to ensure compliance with those requirements specified in Section H.1.c (IEEE 1547-5.1.3.3).

**h. Backfeed Test**

Non-Export AC/DC Converters must satisfy the requirements in its definition in Section C.

**4. PRODUCTION TESTING**

At a minimum, each interconnection system shall be subjected to Distribution Provider Voltage and Frequency Variation Test procedure described in UL1741 under Manufacturing and Production Tests, Section 68 and the Synchronization test specified in Section L.3.f. Interconnection systems with adjustable set points shall be tested at a single set of set points as specified by the manufacturer. This test may be performed in the factory or as part of a Commissioning Test (Section L.5).

(L)

(Continued)





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

Sheet 242

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**5. COMMISSIONING TESTING**

**a. Commissioning Testing**

Commissioning Testing, where required, will be performed on-site to verify protective settings and functionality. Upon initial Parallel Operation of a Generating Facility, or any time interface hardware or software is changed that may affect the functions listed below, a Commissioning Test must be performed. An individual qualified in testing protective equipment (professional engineer, factory-certified technician, or licensed electrician with experience in testing protective equipment) must perform Commissioning Testing in accordance with the manufacturer's recommended test procedure to verify the settings and requirements per this Rule.

Distribution Provider may require written Commissioning test procedure be submitted to Distribution Provider at least 10 working days prior to the performance of the Commissioning Test. Distribution Provider has the right to witness Commissioning Test. Distribution Provider may also require written certification by the installer describing which tests were performed and their results. Protective Functions to be tested during commissioning, particularly with respect to non-Certified equipment, may consist of the following:

- (1) Over and under voltage
- (2) Over and under frequency
- (3) Anti-Islanding function (if applicable)
- (4) Non-Exporting function (if applicable)
- (5) Inability to energize dead line

(L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 243

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
5. COMMISSIONING TESTING (Cont'd.)
- a. Commissioning Testing (Cont'd.)
- (6) Time delay on restart after Distribution Provider source is stable
- (7) Distribution Provider system fault detection (if used)
- (8) Synchronizing controls (if applicable)
- (9) Other Interconnection Protective Functions that may be required as part of the Generator Interconnection Agreement
- Commissioning Test shall include visual inspections of the interconnection equipment and protective settings to confirm compliance with the interconnection requirements.
- b. Review, Study, and Additional Commissioning Test Verification Costs
- A Producer shall be responsible for the reasonably incurred costs of the reviews, studies and additional Commissioning Test verifications conducted pursuant to Section E of this Rule. If the initial Commissioning Test verification is not successful through no fault of Distribution Provider, Distribution Provider may impose upon Producer a cost based charge for subsequent Commissioning Test verifications. All Costs for additional Commissioning Test verifications shall be paid by Producer within thirty days of receipt of Distribution Provider's invoice. The invoice provided by Distribution Provider shall consist of the hourly rate multiplied by the hours incurred by Distribution Provider and will separately specify the amount of time spent on-site from that spent in roundtrip travel to the Commissioning Test site. Additional cost, if any, will be specified on the invoice. If the initial Commissioning Test verification is not successful through the fault of Distribution Provider, that visit will not be considered the initial Commissioning Test verification. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 244

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
5. COMMISSIONING TESTING (Cont'd.)
- c. Other Checks and Tests
- Other checks and tests that may need to be performed include:
- (1) Verifying final Protective Function settings
  - (2) Trip test (L.5.g)
  - (3) In-service tests (L.5.h)
- d. Certified Equipment
- Generating Facilities qualifying for interconnection through the Fast Track process incorporate Certified Equipment that have, at a minimum, passed the Type Tests and Production Tests described in this Rule and are judged to have little or no potential impact on Distribution Provider's Distribution or Transmission System. For such Generating Facilities, it is necessary to perform only the following tests:
- (1) Protective Function settings that have been changed after Production Testing will require field verification. Tests shall be performed using injected secondary frequencies, voltages and currents, applied waveforms, at a test connection using a Generator to simulate abnormal Distribution Provider voltage or frequency, or varying the set points to show that the device trips at the measured (actual) Distribution Provider voltage or frequency.
  - (2) The Non-Islanding function shall be checked by operating a load break disconnect switch to verify the Interconnection equipment ceases to energize Distribution Provider's Distribution or Transmission System and does not re-energize it for the required time delay after the switch is closed. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 245

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
5. COMMISSIONING TESTING (Cont'd.)
- d. Certified Equipment (Cont'd.)
- (3) The Non-Exporting function shall be checked using secondary injection techniques. This function may also be tested by adjusting the Generating Facility output and local loads to verify that the applicable Non-Exporting criteria (i.e., reverse power or underpower) are met.
- The Supplemental Review or an Interconnection Study may impose additional components or additional testing.
- e. Non-Certified Equipment
- Non-certified Equipment shall be subjected to the appropriate tests described in Type Testing (Section L.3) as well as those described in Certified Equipment Commissioning Tests (Section L.5.d). With Distribution Provider's approval, these tests may be performed in the factory, in the field as part of commissioning, or a combination of both. Distribution Provider, at its discretion, may also approve a reduced set of tests for a particular Generating Facility or, for example, if it determines it has sufficient experience with the equipment.
- f. Verification of Settings
- At the completion of Commission testing, Producer shall confirm all devices are set to Distribution Provider-approved settings. Verification shall be documented in the Commissioning Test Certification. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 246

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
5. COMMISSIONING TESTING (Cont'd.)
- g. Trip Tests
- Interconnection Protective Functions and devices (e.g. reverse power relays) that have not previously been tested as part of the Interconnection Facilities with their associated interrupting devices (e.g. contactor or circuit breaker) shall be trip tested during commissioning. The trip test shall be adequate to prove that the associated interrupting devices open when the protective devices operate. Interlocking circuits between Protective Function devices or between interrupting devices shall be similarly tested unless they are part of a system that has been tested and approved during manufacturing.
- h. In-service Tests
- Interconnection Protective Functions and devices that have not previously been tested as part of the Interconnection Facilities with their associated instrument transformers or that are wired in the field shall be given an in-service test during commissioning. This test will verify proper wiring, polarity, CT/PT ratios, and proper operation of the measuring circuits. The in-service test shall be made with the power system energized and carrying a known level of current. A measurement shall be made of the magnitude and phase angle of each Alternating Current (AC) voltage and current connected to the protective device and the results compared to expected values. For protective devices with built-in Metering Functions that report current and voltage magnitudes and phase angles, or magnitudes of current, voltage, and real and reactive power, the metered values may be used for in-service testing. Otherwise, portable ammeters, voltmeters, and phase-angle meters shall be used. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 247

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**6. PERIODIC TESTING**

Periodic Testing of Interconnection-related Protective Functions shall be performed as specified by the manufacturer, or at least every four years. All Periodic Tests prescribed by the manufacturer shall be performed. Producer shall maintain Periodic Test reports or a log for inspection by Distribution Provider. Periodic Testing conforming to Distribution Provider test intervals for the particular Line Section may be specified by Distribution Provider under special circumstances, such as high fire hazard areas. Batteries used to activate any Protective Function shall be checked and logged once per month for proper voltage. Once every four years, the battery must be either replaced or a discharge test performed.

**7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS**

This Section describes the additional Type Tests necessary to qualify a device as Certified under this Rule. These Type Tests are not contained in Underwriters Laboratories UL 1741 Standard *Inverters, Converters and Controllers for Use in Independent Power Systems*, or other referenced standards.

**a. Non-Exporting Test Procedures**

The Non-Exporting test is intended to verify the operation of relays, controllers and inverters designed to limit the export of power and certify the equipment as meeting the requirements of Screen I, Options 1 and 2, of the review process. Tests are provided for discrete relay packages and for controllers and inverters with the intended Functions integrated.

(L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 248

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- i) Discrete Reverse Power Relay Test
- This version of the Non-Exporting test procedure is intended for discrete reverse power and underpower relay packages provided to meet the requirements of Options 1 and 2 of Screen I. It should be understood that in the reverse power application, the relay will provide a trip output with power flowing in the export (toward Distribution Provider's Distribution or Transmission System) direction.
- Step 1: Power Flow Test at Minimum, Midpoint and Maximum Pickup Level Settings
- Determine the corresponding secondary pickup current for the desired export power flow of 0.5 secondary watts (the minimum pickup setting, assumes 5 amp and 120V CT/PT secondary). Apply nominal voltage with minimum current setting at zero (0) degrees phase angle in the trip direction. Increase the current to pickup level. Observe the relay's (LCD or computer display) indication of power values. Note the indicated power level at which the relay trips. The power indication should be within 2% of the expected power. For relays with adjustable settings, repeat this test at the midpoint, and maximum settings. Repeat at phase angles of 90, 180 and 270 degrees and verify that the relay does not operate (measured watts will be zero or negative). (L)

(Continued)





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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 249

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- i) Discrete Reverse Power Relay Test (Cont'd.)
- Step 2: Leading Power Factor Test
- Apply rated voltage with a minimum pickup current setting (calculated value for system application) and apply a leading power factor load current in the non-trip direction (current lagging voltage by 135 degrees). Increase the current to relay rated current and verify that the relay does not operate. For relays with adjustable settings, this test should be repeated at the minimum, midpoint, and maximum settings.
- Step 3: Minimum Power Factor Test
- At nominal voltage and with the minimum pickup (or ranges) determined in Step 1, adjust the current phase angle to 84 or 276 degrees. Increase the current level to pickup (about 10 times higher than at 0 degrees) and verify that the relay operates. Repeat for phase angles of 90, 180 and 270 degrees and verify that the relay does not operate.
- Step 4: Negative Sequence Voltage Test
- Using the pickup settings determined in Step 1, apply rated relay voltage and current at 180 degrees from tripping direction, to simulate normal load conditions (for three-phase relays, use Ia at 180, Ib at 60 and Ic at 300 degrees). Remove phase-1 voltage and observe that the relay does not operate. Repeat for phases-2 and 3. (L)

(Continued)





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Sheet 250

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- i) Discrete Reverse Power Relay Test (Cont'd.)
- Step 5: Load Current Test
- Using the pickup settings determined in Step 1, apply rated voltage and current at 180 degrees from the tripping direction, to simulate normal load conditions (use Ia at 180, Ib at 300 and Ic at 60 degrees). Observe that the relay does not operate.
- Step 6: Unbalanced Fault Test
- Using the pickup settings determined in Step 1, apply rated voltage and 2 times rated current, to simulate an unbalanced fault in the non-trip direction (use Va at 0 degrees, Vb and Vc at 180 degrees, Ia at 180 degrees, Ib at 0 degrees, and Ic at 180 degrees). Observe that the relay, especially single phase, does operate properly.
- Step 7: Time Delay Settings Test
- Apply Step 1 settings and set time delay to minimum setting. Adjust the current source to the appropriate level to determine operating time, and compare against calculated values. Verify that the timer stops when the relay trips. Repeat at midpoint and maximum delay settings. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 251

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- i) Discrete Reverse Power Relay Test (Cont'd.)
- Step 8: Dielectric Test
- Perform the test described in IEC 414 using 2 kV RMS for 1 minute.
- Step 9: Surge Withstand Test
- Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand capability test described in L.3.e.
- ii) Discrete Underpower Relay Test
- This version of the Non-Exporting test procedure is intended for discrete underpower relay packages and meets the requirements of Option 2 of Screen I. A trip output will be provided when import power (toward Producer's load) drops below the specified level.
- Note: For an underpower relay, pickup is defined as the highest power level at which the relay indicates that the power is less than the set level. (L)

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 252

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- ii) Discrete Underpower Relay Test (Cont'd.)
- Step 1: Power Flow Test at Minimum, Midpoint and Maximum Pickup Level Settings
- Determine the corresponding secondary pickup current for the desired power flow pickup level of 5% of peak load minimum pickup setting. Apply rated voltage and current at 0 (zero) degrees phase angle in the direction of normal load current.
- Decrease the current to pickup level. Observe the relay's (LCD or computer display) indication of power values. Note the indicated power level at which the relay trips. The power indication should be within 2% of the expected power. For relays with adjustable settings, repeat the test at the midpoint, and maximum settings. Repeat at phase angles of 90, 180 and 270 degrees and verify that the relay operates (measured watts will be zero or negative).
- Step 2: Leading Power Factor Test
- Using the pickup current setting determined in Step 1, apply rated voltage and rated leading power factor load current in the normal load direction (current leading voltage by 45 degrees). Decrease the current to 145% of the pickup level determined in Step 1 and verify that the relay does not operate. For relays with adjustable settings, repeat the test at the minimum, midpoint, and maximum settings. (L)

(Continued)



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Sheet 253

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- ii) Discrete Underpower Relay Test (Cont'd.)
- Step 3: Minimum Power Factor Test
- At nominal voltage and with the minimum pickup (or ranges) determined in Step 1, adjust the current phase angle to 84 or 276 degrees. Decrease the current level to pickup (about 10% of the value at 0 degrees) and verify that the relay operates. Repeat for phase angles 90, 180 and 270 degrees and verify that the relay operates for any current less than rated current.
- Step 4: Negative Sequence Voltage Test
- Using the pickup settings determined in Step 1, apply rated relay voltage and 25% of rated current in the normal load direction, to simulate light load conditions. Remove phase 1 voltage and observe that the relay does not operate. Repeat for Phases-2 and 3.
- Step 5: Unbalanced Fault Test
- Using the pickup settings determined in Step 1, apply rated voltage and two times rated current, to simulate an unbalanced fault in the normal load direction (use Va at 0 degrees, Vb and Vc at 180 degrees, Ia at 0 degrees, Ib at 180 degrees, and Ic at 0 degrees). Observe that the relay (especially single-phase types) operates properly. (L)

(Continued)



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Sheet 254

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- ii) Discrete Underpower Relay Test (Cont'd.)
- Step 6: Time Delay Settings Test
- Apply Step 1 settings and set time delay to minimum setting. Adjust the current source to the appropriate level to determine operating time, and compare against calculated values. Verify that the timer stops when the relay trips. Repeat at midpoint and maximum delay settings.
- Step 7: Dielectric Test
- Perform the test described in IEC 414 using 2 kV RMS for 1 minute.
- Step 8: Surge Withstand Test
- Perform the surge withstand test described in IEEE C37.90.1.1989 or the surge withstand test described in Section L.3.e. (L)

(Continued)



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Sheet 255

**L. CERTIFICATION AND TESTING CRITERIA (Cont'd.)**

(L)

**7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER  
STANDARDS (Cont'd.)**

**a. Non-Exporting Test Procedures (Cont'd.)**

**iii) Tests for Inverters and Controllers with Integrated Functions**

Inverters and controllers designed to provide reverse or underpower functions shall be tested to certify the intended operation of this function. Two methods are acceptable:

Method 1: If the inverter or controller utilizes external current/voltage measurement to determine the reverse or underpower condition, then the inverter or controller shall be functionally tested by application of appropriate secondary currents and potentials as described in the Discrete Reverse Power Relay Test, Section L.7.a.i of this Rule.

Method 2: If external secondary current or voltage signals are not used, then unit-specific tests must be conducted to verify that power cannot be exported across the PCC for a period exceeding two seconds. These may be factory tests, if the measurement and control points are integral to the unit, or they may be performed in the field.

**iv) Tests for Inadvertent Export Inverters**

Test requirements for certified inverters with integrated functions for Inadvertent Export shall verify the performance requirements specified in Section Mm of this Rule.

(L)

(Continued)



**ELECTRIC RULE NO. 21**  
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Sheet 256

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- v) Interim Tests for Non-Export AC/DC Converters ("Converter")
- Step 1: Limitation of Back-feed Under Steady State Conditions
- Apply the nominal DC operating voltage of the Converter across its DC terminals with a battery source or simulated equivalent of a battery source. Vary the battery source by 100%, 75%, 50%, 25%, and 10% of Converter rated output power. The measured steady-state DC current component at each of the AC terminals of the Converter is required to be less than 0.5% of the Converter's rated RMS AC current. This test is to be repeated for 80% nominal DC operating voltage and for 125% nominal DC operating voltage. Testing requirements can be modified upon mutual agreement of the Distribution Provider and the Applicant.
- Step 2: Back-feed Under Fault Conditions – DC Output Shorted
- With a battery source or simulated equivalent of a battery source connected to the DC terminals, apply rated conditions of the Converter then short its DC terminals for 200 milliseconds. After 5 cycles of inducing the short circuit, record the measured peak current at each of the AC terminals of the Converter. These peak currents within this time interval are each required to be less than 0.5% of the Converter's rated RMS AC current. Testing requirements can be modified upon mutual agreement of the Distribution Provider and the Applicant. (L)

(Continued)



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Sheet 257

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- a. Non-Exporting Test Procedures (Cont'd.)
- v) Interim Tests for Non-Export AC/DC Converters ("Converter") (Cont'd.)
- Step 3: Back-feed Under Fault Conditions – AC Input Shorted: Phase-Ground, Phase-Phase, and 3-Phase
- With a battery source or simulated equivalent of a battery source connected to the DC terminals, apply rated conditions of the Converter, then apply a short between any two phases on the grid side of the Converter for 200 milliseconds. After 5 cycles of inducing the short circuit, record the measured peak current at each of the AC terminals of the Converter. These peak currents within this time interval are each required to be less than 0.5% of the Converter's rated RMS AC current. This test is to be repeated for phase-ground and 3-phase shorts. Testing requirements can be modified upon mutual agreement of the Distribution Provider and the Applicant.
- Step 4: Back-feed Under Fault Conditions – Component Faults
- Distribution Provider can elect to test for back-feed under the condition of a short circuit across certain components which are internal to the Converter. Potential tests can include inducing a short circuit across different terminals for electronic switches and/or across different terminals for internal transformers. Ultimately, the components used for testing will be chosen on a case-by-case basis and will depend on the Converter's circuit topology. Testing requirements can be modified upon mutual agreement of the Distribution Provider and the Applicant.
- Step 5: Harmonics Testing
- Under normal loading conditions at 10%, 25%, 50%, 75%, and 100% of the Converter's rated power output, conduct harmonic current distortion measurements on each of the AC terminals. Measurements should be below the maximum harmonic current distortion requirements given in IEEE 1547-4.3.3. (L)

(Continued)





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Sheet 258

- L. CERTIFICATION AND TESTING CRITERIA (Cont'd.) (L)
7. TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS (Cont'd.)
- b. In-rush Current Test Procedures
- This test will determine the maximum In-rush Current drawn by the Generator.
- i) Locked-Rotor Method
- Use the test procedure defined in NEMA MG-1 (manufacturer's data is acceptable if available).
- ii) Start-up Method
- Install and setup the Generating Facility equipment as specified by the manufacturer. Using a calibrated oscilloscope or data acquisition equipment with appropriate speed and accuracy, measure the current draw at the Point of Interconnection as the Generating Facility starts up and parallels with Distribution Provider's Distribution or Transmission System. Startup shall follow the normal, manufacturer-specified procedure. Sufficient time and current resolution and accuracy shall be used to capture the maximum current draw within 5%. In-rush Current is defined as the maximum current draw from Distribution Provider during the startup process, using a 10-cycle moving average. During the test, Distribution Provider source, real or simulated, must be capable of maintaining voltage within +/- 5% of rated at the connection to the unit under test. Repeat this test five times. Report the highest 10-cycle current as the In-rush Current. A graphical representation of the time-current characteristic along with the certified In-rush Current must be included in the test report and made available to Distribution Provider. (L)

(Continued)

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Sheet 259

**M. INADVERTENT EXPORT**

(L)

Under certain operating conditions, an Applicant may choose to completely offset their facility load by installing generation systems which are optimally sized to meet their peak demand with load following functionality on the Generator controls to ensure conditional export of electrical power from the Generating Facility to Distribution Provider's Distribution or Transmission System. In situations where the loading changes rapidly and/or the Generator cannot ramp down quickly enough, the Generating Facility may need to export small amounts of power for limited duration. The event of exporting uncompensated power for a short time is referred to as Inadvertent Export.

The following are the minimum requirements for Inadvertent Export systems. Other factors relevant to the interconnection study process (e.g. 15% screen results, short circuit current ratio, etc.) may necessitate additional technical requirements (e.g. reclose block, transfer trip, ground bank, etc.) that are not explicitly noted here. Inadvertent Export may not be available for interconnections to Networked Secondary Systems.

1. For Inadvertent Export interconnection requests, additional Protective Functions and equipment to detect Distribution or Transmission System faults (per Distribution Provider's standard practices) may be required over and above the basic Protective Functions and equipment associated with the four options in the Export Screen. Protective Functions may include, but are not limited to, directional overcurrent/voltage-restraint overcurrent Protective Functions for line-to-line fault detection and overcurrent/overvoltage Protective Functions for line-to-ground detection. The addition of a ground bank or ground detector may also be necessary.

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Sheet 260

**M. INADVERTENT EXPORT (Cont'd.)**

(L)

2. The effect on equipment ratings can be mitigated by limiting the amount of inadvertent export allowed. To a large degree, Voltage Regulation may be similarly handled. The amount of Inadvertent Export is dependent on specific Distribution Provider requirements and should be limited to the lesser of the following values:
  - a. 50% of the Generating Facility Capacity, or
  - b. 10% of the continuous conductor rating in watts at 0.9 power factor for the lowest rated feeder conductor upstream of the GF (i.e. 200kW @ 12kV), or
  - c. 110% of the largest load block in the facility, or
  - d. 500kW or some other maximum level indicated by Distribution Provider
3. In addition to the limits above, the following are required:
  - a. A reverse power Protective Function will be provided to trip the connected Generator(s) within two seconds if the proposed amount of Inadvertent Export is exceeded.
  - b. The frequency of Inadvertent Export occurrences should be less than two occurrences per 24-hour period.
  - c. A separate reverse power or underpower Protective Function will be required (in addition to the reverse power Protective Function described in 3a. above) to trip the connected Generator(s) if the duration of reverse power or underpower (i.e. ANY export) exceeds 60 seconds.

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

Sheet 261

**Mm. INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS (L)**  
**UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NON-**  
**ISLANDING) INVERTERS**

The following are the minimum requirements for Inadvertent Export systems that meet the criteria specified below. Other factors relevant to the interconnection study process (e.g., 15% screen results, short circuit current ratio, etc.) may necessitate additional technical requirements (e.g., reclose block, transfer trip, ground bank, etc.) that are not explicitly noted here. Inadvertent Export may not be available for interconnections to Networked Secondary Systems.

The certified control functions internal to the inverter control or external control system may be used to replace the discrete reverse/under power relay functions described in Section M provided the requirements outlined below are met.

- 1) All of the following requirements must be met by the Generating Facility to qualify for Inadvertent Export under this Section.
  - a. The Generating Facility must utilize only UL-1741 certified or UL-1741 SA listed grid support non-islanding inverters; and,
  - b. The Generating Facility must have an aggregate maximum nameplate capacity of 500 kVA or less; and,
  - c. The Generating Facility's total energy export must not exceed its nameplate rating (kVA-gross) multiplied by 0.1 hours per day over a rolling 30-day period (e.g., for a 100 kVA-gross nameplate Generating Facility, the maximum energy allowed to be exported for a 30-day period is 300 kWh) ; and,
  - d. Export from the Generating Facility across the PCC to the Distribution System is less than 100 kVA.

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GENERATING FACILITY INTERCONNECTIONS

Sheet 262

- Mm. INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS (L)  
UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NON-  
ISLANDING) INVERTERS (Cont'd.)
- 2) To govern the level of Inadvertent Export allowable under this Section,  
the Generating Facility must utilize a NRTL-certified control system or  
NRTL-certified inverter system that meets all of the following  
requirements.
    - a. Must result in the Generating Facility disconnecting from the  
Distribution System, ceasing to energize the Distribution System or  
halting energy production within two (2) seconds after either:
      - i. The period of continuous export exceeds 30 seconds;
      - or,
      - ii. The level of export exceeds 100 kVA.
    - b. Must monitor that the total energy export is maintained within the  
allowable energy export outlined above 1.c and provide an indication  
or notification (e.g., electronic, alarm) if that energy export limit is  
exceeded.
    - c. Failure of the of the control or inverter system for more than thirty (30)  
seconds, resulting from loss of control signal, loss of control power or  
a single component failure or related control sensing of the control  
circuitry, must result in the Generating Facility entering Non-Export  
operation where no energy is exported across to the PCC to the  
Distribution System.
- Interim approval of the control or inverter system may be permitted upon  
mutual agreement of PG&E and the Producer. (L)

(Continued)



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

Sheet 263

**Mm. INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS  
UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NON-  
ISLANDING) INVERTERS (Cont'd.)**

(L)

**3) Applicability of Engineering Review Screens.**

Inadvertent Export systems that meet the requirements described herein are processed under Initial Review Screens A through J as described in Section H. If these systems fail Screen J, they then bypass Screens K and L and are processed under Screens M and M1 as described below.

**Screen M:** Is the aggregate Generating Facility capacity on the Line Section less than 15% of Line Section peak load for all line sections bound by automatic sectionalizing devices?

- If Yes (pass), Initial Review is complete.
- If No (fail), continue to Screen M1.

**Screen M1:** Is the aggregate of all distributed energy resources (DER) causing reverse power flow (1) at a line section with a voltage regulator device(s) or (2) at a protection device, including the circuit breaker / field recloser?<sup>\*,\*\*</sup>

- If No (pass), existing DER does not cause reverse power flow at (1) or (2) and Initial Review is complete.
- If Yes (fail), existing DER causes reverse power flow at (1) or (2); fail Initial Review and Supplemental Review is required.

\* For the purposes of applying Screen M1 herein, Distribution Provider shall utilize a zero coincidence factor when considering the impact of other Inadvertent Export systems that meet the requirements of Section Mm (i.e., projects that qualify for Option 6 under Section G.1.i) such that those Inadvertent Export systems do not impact Screen M1's aggregate analysis determination for the individual Inadvertent Export project being evaluated.

\*\* The presence of existing non-certified DER on the line section may require additional review to ensure safe and reliable grid operation.

(L)

(Continued)



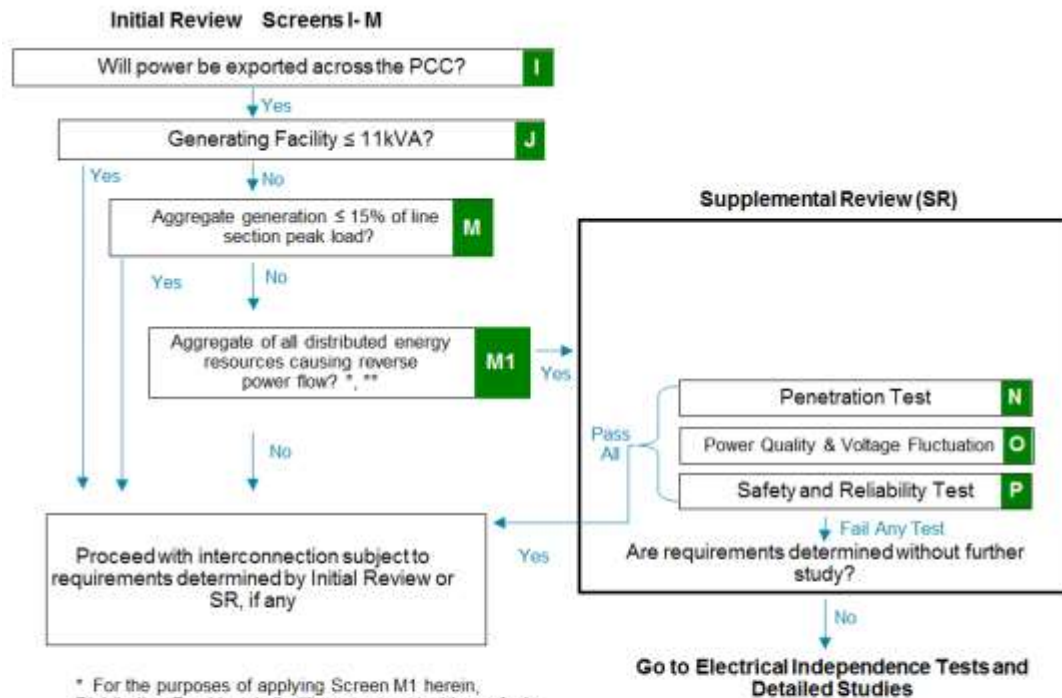
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Sheet 264

**Mm. INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS  
UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NON-  
ISLANDING) INVERTERS (Cont'd.)**

(L)

**3) Applicability of Engineering Review Screens. (Cont'd.)**



\* For the purposes of applying Screen M1 herein, Distribution Provider shall utilize a zero coincidence factor when considering the impact of other Inadvertent Export systems that meet with the requirements of Section Mm (i.e., projects that qualify for Option 6 under Section G.1.i) such that those Inadvertent Export systems do not impact Screen M1's aggregate analysis determination for the individual analysis determination for the individual Inadvertent Export project being evaluated.

\*\* The presence of existing non-certified DER on the line section may require additional review to ensure safe and reliable grid operation.

(L)

(Continued)





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

Sheet 265

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

(P)(L)

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

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

(P)/(L)

(Continued)





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

Sheet 266

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

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

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

(P)(L)

(Continued)

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

Sheet 267

Mm2. OPTION 9: Limited Export Utilizing Certified Power Control Systems (P)/(L)

The following are minimum requirements for limited export systems that use certified power control systems (PCS) with an open loop response time (OLRT) no more than two seconds to maintain a level of export that is lower than the nameplate rating. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

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

(P)/(L)

(Continued)



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

Sheet 268

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

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

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

(P)(L)

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

Sheet 269

**Mm3. OPTION 10: Non-Export with Inadvertent Export Utilizing Certified Power (P)/(L)  
Control Systems**

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

1. Have a nameplate capacity equal to or less than 1,000 kVA.
2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Non-Export may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the non-exporting functionality in accordance with the relevant CRD or UL published standard.
3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not export (zero-export).
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

(P)(L)

(Continued)



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

Sheet 270

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

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

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

(P)(L)

(Continued)



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

Sheet 271

**Mm4. OPTION 11: Limited Export with Inadvertent Export Utilizing Certified Power (P)/(L)  
Control Systems**

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

1. Have a nameplate capacity equal to or less than 1,000 kVA.
2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Limited export systems may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the export limiting functionality in accordance with the relevant CRD or UL published standard.
3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not to exceed the proposed level of export.
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

(P)(L)

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

Sheet 272

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

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

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

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*San Francisco, California*

Cal. P.U.C. Sheet No. 51918-E  
Cal. P.U.C. Sheet No. 50936-E

## Sheet 273

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(P)

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

Sheet 274

- N. EXPEDITED INTERCONNECTION PROCESS FOR NON-EXPORT ENERGY STORAGE GENERATING FACILITIES (Cont'd.) (L)
2. GENERATING FACILITY ELIGIBILITY CRITERIA
- An Applicant's Generating Facility must meet and adhere to the following criteria.
- a. The Generating Facility must be comprised solely of the following specific categories of generation technology: Non-Exporting battery storage.
  - b. The Generating Facility must have an aggregate maximum inverter nameplate rating of no greater than 500 kW. There is no limitation on an energy storage device's kWh capacity rating.
  - c. The Generating Facility must be located behind an existing single retail meter and Point of Common Coupling with a single, clearly marked and accessible disconnect. No other Generators, other than isolated back-up Generators, may be at the same Point of Interconnection or Point of Common Coupling.
  - d. The Generating Facility must utilize Option 3 or Option 4 to meet the non-export protection requirements of Screen I in Section G.1.i.
  - e. The Generating Facility must have a single or coordinated control system for all charging functions if utilizing multiple inverters. The control system must also ensure that there is no increase in the Interconnection Customer's existing peak load demand.
  - f. The Generating Facility must utilize only inverter-based, UL 1741 and UL 1741 SA-listed equipment. Additionally, all installed equipment must meet Distribution Provider's current electric service requirements with no violations or variances. (L)

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 275

**O. Non-Export AC/DC CONVERTER ELIGIBILITY CRITERIA**

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Applicants with Non-Export AC/DC Converters who meet the eligibility criteria below qualify for the expedited interconnection process outlined in Section N of this Rule.

1. The Non-Export AC/DC Converter must have an aggregate maximum inverter nameplate rating of no greater than 500 kW. There is no limitation on an energy storage device's kWh capacity rating.
2. Applicant's Interconnection Request must be eligible for and select the Fast Track Process.
3. Applicant's Interconnection Request must pass Fast Track Initial Review and not require any Interconnection Facilities, Distribution Upgrades or Network Upgrades to remain eligible under this Section.
4. Applicants selecting this section shall use the corresponding interconnection agreement type provided for Non-Export AC/DC Converters eligible under this Section. As such, Interconnection Requests that select the Cost Envelope Option are not eligible.
5. Applicant's Non-Export AC/DC converter must meet the Certification requirements in the Section C Definition of "Non-Export AC/DC Converters".

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 276

| <b>Appendix A</b><br>Forms Associated with Rule 21<br>Generating Facility Interconnections |                                                                                                                                                                                       |                    |                                                                                             |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------|
| Form Number                                                                                | Title                                                                                                                                                                                 | Associated Tariffs | Use Guidance                                                                                |
| <b>Pre-Application Request</b>                                                             |                                                                                                                                                                                       |                    |                                                                                             |
| 79-1181                                                                                    | Rule 21 Pre-Application Report Request                                                                                                                                                | Rule 21            | For Generator Developer to request basic info about local distribution circuit              |
| <b>Study Agreement</b>                                                                     |                                                                                                                                                                                       |                    |                                                                                             |
| 79-1162                                                                                    | Rule 21 Detailed Study Agreement                                                                                                                                                      | Rule 21            | Independent Study and Distribution Group Study Process Study Agreement                      |
| <b>NEM and Non-Export Interconnection Forms</b>                                            |                                                                                                                                                                                       |                    |                                                                                             |
| 79-978                                                                                     | Interconnection Agreement for Net Energy Metering of Solar or Wind Electric Generating Facilities of 1,000 kW or Less, Other Than Facilities of 30 kW or Less                         | NEM, Rule 21       | Solar and/or Wind > 30 kW and ≤ 1 MW expanded NEM used with Form 79-1174-02                 |
| 79-978-02                                                                                  | Interconnection Agreement for Net Energy Metering (NEM2) of Solar or Wind Electric Generating Facilities of 1,000 Kilowatts or Less, Other than Facilities of 30 Kilowatts or Less    | NEM2, Rule 21      | Solar and/or Wind > 30 kW and ≤ 1 MW expanded NEM2 used with Form 79-1174-02                |
| 79-997                                                                                     | Interconnection Agreement for Net Energy Metering of Biogas Digester Generating Facilities                                                                                            | NEM, Rule 21       | NEMBIO (Closed to new applicants), NEMBIOA Interconnection Agreement used with Form 79-1174 |
| 79-1010                                                                                    | Interconnection Agreement for Net Energy Metering of Fuel Cell Generating Facilities                                                                                                  | NEM, Rule 21       | NEMFC Interconnection Agreement used with Form 79-1174                                      |
| 79-1069                                                                                    | Generating facility Interconnection Agreement (Multiple Tariff)                                                                                                                       | NEM, Rule 21       | NEMMT Interconnection Agreement used with Form 79-1174                                      |
| 79-1069-02                                                                                 | Generating Facility Interconnection Agreement (Multiple Tariff NEM2MT)                                                                                                                | NEM2, Rule 21      | NEM2MT Interconnection Agreement used with Form 79-1174-02                                  |
| 79-1109<br>***                                                                             | Virtual Net Energy Metering Application and Interconnection Agreement For The Building Owner of Multifamily Affordable Housing With A Solar Generating Facility of 1 Megawatt or Less | NEM, Rule 21       | NEMV Interconnection Agreement used with Form 79-974                                        |

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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 277

| <b>Appendix A (Cont'd.)</b><br>Forms Associated with Rule 21<br>Generating Facility Interconnections |                                                                                                                                                                                                                                                                    |                    |                                                                                     |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|
| Form Number                                                                                          | Title                                                                                                                                                                                                                                                              | Associated Tariffs | Use Guidance                                                                        |
| <b>NEM and Non-Export Interconnection Forms (Cont'd.)</b>                                            |                                                                                                                                                                                                                                                                    |                    |                                                                                     |
| 79-1193                                                                                              | AGREEMENT AND CUSTOMER AUTHORIZATION Net Energy Metering (NEM) Interconnection For Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts Or Less with Energy Storage of 10 Kilowatts Or Less or Energy Storage with Power Control System Certification  | NEM                | For NEM pair storage scenarios using Power Control Systems to ensure NEM integrity  |
| 79-1193-02                                                                                           | AGREEMENT AND CUSTOMER AUTHORIZATION Net Energy Metering (NEM2) Interconnection For Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts Or Less with Energy Storage of 10 Kilowatts Or Less or Energy Storage with Power Control System Certification | NEM2               | For NEM2 pair storage scenarios using Power Control Systems to ensure NEM integrity |
| 79-1109-02***                                                                                        | NEM2VMSH Virtual Net Energy Metering Application and Interconnection Agreement for the Building Owner of Multifamily Affordable Housing with a Solar Generating Facility of 1 Megawatt or Less                                                                     | NEM2VMSH, Rule 21  | NEM2VMSH Interconnection Agreement used with Form 79-1174-02                        |
| 79-1151A                                                                                             | Net Energy Metering Interconnection for Solar And/or Wind Electric Generating Facilities Of 30 Kilowatts Or Less Agreement and Customer Authorization                                                                                                              | NEM, Rule 21       | NEMS Interconnection Agreement be used with 79-1151B Application                    |
| 79-1151A-02                                                                                          | Agreement And Customer Authorization - Net Energy Metering (NEM2) Internconnection For Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts Or Less                                                                                                    | NEM2, Rule 21      | NEM2S Application to be used with 79-1151A Interconnection Agreement                |
| 79-1151B                                                                                             | Net Energy Metering Interconnection For Solar And/or Wind Electric Generating Facilities Of 30 Kilowatts Or Less Application                                                                                                                                       | NEM, Rule 21       | NEMS Application to be used with 79-1151A Interconnection Agreement                 |
| 79-1151B-02                                                                                          | Application - Net Energy Metering (NEM2) Interconnection For Solar And/Or Wind Electric Generating Facilities Of 30 Kilowatts Or Less                                                                                                                              | NEM2, Rule 21      | NEM2S Application to be used with 79-1151A-02 Interconnection Agreement             |
| 79-1124***                                                                                           | Eligible Low Income Development Virtual Net Energy Metering Application and Interconnection Agreement for Multifamily Affordable Housing with Solar Generation Totaling 1 Megawatt or Less                                                                         | NEMVMASH, Rule 21  | NEMVMASH Interconnection Agreement                                                  |

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(Continued)



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

Sheet 278

| <b>Appendix A (Cont'd.)</b><br>Forms Associated with Rule 21<br>Generating Facility Interconnections |                                                                                                                                                                                                       |                      |                                                                                                           |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------|
| Form Number                                                                                          | Title                                                                                                                                                                                                 | Associated Tariffs   | Use Guidance                                                                                              |
| <b>NEM and Non-Export Interconnection Forms (Cont'd.)</b>                                            |                                                                                                                                                                                                       |                      |                                                                                                           |
| 79-1124-02***                                                                                        | Eligible Low Income Development Virtual Net Energy Metering (NEM2VMSH) Application and Interconnection Agreement for Multifamily Affordable Housing with Solar Generation Totaling 1 Megawatt or Less | NEM2VMSH, Rule 21    | NEM2VMSH Interconnection Agreement                                                                        |
| 79-1131***                                                                                           | NEMV Application and Interconnection Agreement for a Solar (PV) or Wind Generating Facility of 1 MW or Less <i>Serving Multiple Tenants Served at a Single Property Delivery Point</i>                | NEM, Rule 21         | NEMV Interconnection Agreement                                                                            |
| 79-1131-02***                                                                                        | NEM2V Application and Interconnection Agreement for a Solar (PV) or Wind Generating Facility of 1 MW or Less <i>Serving Multiple Tenants Served at a Single Property Delivery Point</i>               | NEM2V, Rule 21       | NEM2V Interconnection Agreement                                                                           |
| 79-1137                                                                                              | Interconnection Agreement for Net Energy Metering for a Renewable Electrical Generation Facility of 1,000 kW or Less, Except Solar or Wind (SB 489)                                                   | NEM, Rule 21         | NEMV, NEMEXP, NEMEXPM Interconnection Agreement typically used with Forms 79-974 and 79-1142 Applications |
| 79-1137-02                                                                                           | Interconnection Agreement for Net Energy Metering (NEM2/NEM2V) for a Renewable Electricity Generation Facility of 1,000 Kilowatts or Less, Except Solar or Wind                                       | NEM2, NEM2V, Rule 21 | NEM2V, NEM2EXP, NEM2EXPM Interconnection Agreement typically used with Forms 79-1174-02                   |
| 79-1142***                                                                                           | NEMV Interconnection Application for a Renewable Electrical Generation Facility of 1 Megawatt or Less                                                                                                 | NEM, Rule 21         | Used with Form 79-1137 (L)                                                                                |
| 79-973                                                                                               | Generating Facility Interconnection Agreement For Non-Export Generating Facilities (Rule 21 Interconnection Agreement)                                                                                | Rule 21              | Interconnection Agreement used for RESBCT and non-NEM generation with Application 79-974 and 79-1112      |
| 79-992                                                                                               | Customer Generation Agreement (Third party Generator on Premises, Non-Exporting)                                                                                                                      | Rule 21              | Used with Forms 79-1174                                                                                   |
| 79-1070                                                                                              | Export Addendum to Generating Facility Interconnection Agreement for Non-Export Generating Facilities (Form 79-973) Sized 2 Megawatts or Less                                                         | Rule 21              | Export addendum used with Form 79-973                                                                     |
| 79-1136                                                                                              | PG&E Interconnection Agreement For an Existing Small Generating Facility Interconnecting to the Distribution System under Rule 21                                                                     | Rule 21              | Used for existing QFs with Form 79-974 (L)                                                                |

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(Continued)



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

Sheet 279

| <b>Appendix A (Cont'd.)</b><br>Forms Associated with Rule 21<br>Generating Facility Interconnections |                                                                                                                                                                                                              |                                                                       |                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Form Number                                                                                          | Title                                                                                                                                                                                                        | Associated Tariffs                                                    | Use Guidance                                                                                                                                                                                                                                                                                                      |
| <b>Other NEM and Non-Export Forms (Cont'd.)</b>                                                      |                                                                                                                                                                                                              |                                                                       |                                                                                                                                                                                                                                                                                                                   |
| 79-1192                                                                                              | Interconnection Agreement for Non-Export Storage Generating Facilities 500KW or Less                                                                                                                         | Rule 21                                                               | Used for expedited interconnection of non-export energy storage, pursuant to Rule 21 Section N, PG&E AL 4941-E & E-A and D.16-06-052, & Attachment C, Section II.1                                                                                                                                                |
| 79-1199                                                                                              | Agreement And Customer Authorization Non-Export Stand-Alone Energy Storage Of 30 Kilowatts Or Less                                                                                                           | Rule 21                                                               | Interconnection Agreement For non-export storage ≤ 30 kW                                                                                                                                                                                                                                                          |
| 79-1206-02                                                                                           | Eligible Low-Income Development Virtual Net Energy Metering (NEM2VSOM) Interconnection Agreement For The Solar On Multifamily Affordable Housing (SOMAH) Program With Solar Generation Totaling 1 Mw Or Less | NEM2VSOM                                                              | NEM2VSOM Interconnection agreement for solar 1 MW or less.                                                                                                                                                                                                                                                        |
| 79-1130                                                                                              | Request to Opt-out of / Opt-in to Compensation for Surplus Electricity                                                                                                                                       | NEM                                                                   | AB 920- Opt not to receive compensation for net annual excess energy                                                                                                                                                                                                                                              |
| 79-1202<br>****                                                                                      | Load Aggregation Appendix                                                                                                                                                                                    | NEM, NEM2, Rule 21                                                    | Use as an Appendix with Form 79-1151A, 79-1151A-02, 79-978, 79-978-02, 79-1137, 79-1137-02, 79-1069 or 79-1069-02                                                                                                                                                                                                 |
| 79-1155                                                                                              | Schedules NEM, NEMV, NEMVMASH, Net Surplus Electricity (NSE) Renewable Energy Credits Compensation                                                                                                           | NEM, Rule 21                                                          |                                                                                                                                                                                                                                                                                                                   |
| 79-1155-02                                                                                           | Schedules NEM2, NEM2V, NEM2VMASH, Net Surplus Electricity (NSE) Renewable Energy Credits Compensation                                                                                                        | NEM2 NEM2V NEM2VMASH, Rule 21                                         |                                                                                                                                                                                                                                                                                                                   |
| 79-1174                                                                                              | Rule 21 Generator Interconnection Application                                                                                                                                                                | NEM (NEMEXP, NEMMT and NEMA), NEMFC, NEMV, NEMVMASH, RES-BCT, Rule 21 | Rule 21 customer interconnection application form for expanded net-energy metered (all NEM > 30 kw and all non-Solar/Wind NEM), NEMFC, NEMV, NEMVMASH, RES-BCT, and non-export and limited export Rule 21 generation. (Standard NEM for solar and/or wind ≤ 30 kw will continue to use the 79-1151B application.) |

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

Sheet 280

| <b>Appendix A (Cont'd.)</b><br>Forms Associated with Rule 21<br>Generating Facility Interconnections |                                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Form Number                                                                                          | Title                                                                                                                                                                             | Associated Tariffs                                                          | Use Guidance                                                                                                                                                                                                                                                                                                         |
| <b>Other NEM and Non-Export Forms (Cont'd.)</b>                                                      |                                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                                      |
| 79-1174-02                                                                                           | Rule 21 Generator Interconnection Application                                                                                                                                     | NEM2 (NEM2EXP, NEM2MT and NEM2A), NEMFC, NEM2V, NEM2VMESH, RES-BCT, Rule 21 | Rule 21 customer interconnection application form for expanded net-energy metered (all NEM2 > 30 kw and all non-Solar/Wind NEM), NEMFC, NEM2V, NEM2VMESH, RES-BCT, and non-export and limited export Rule 21 generation. (Standard NEM for solar and/or wind ≤ 30 kw will continue to use the 79-1151B application.) |
| <b>Export for Sale Interconnection Forms</b>                                                         |                                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                                      |
| 79-1145                                                                                              | Rule 21 Exporting Generator Interconnection Request                                                                                                                               | Rule 21                                                                     | Preferred online application:<br><a href="https://www.pge.com/en_US/large-business/services/alternatives-to-pge/electric-generation-interconnection.page">https://www.pge.com/en_US/large-business/services/alternatives-to-pge/electric-generation-interconnection.page</a>                                         |
| 79-1197                                                                                              | Local Government Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) Re-Allocation Request                                                                            | RES-BCT                                                                     | Use to establish RES-BCT benefiting account re-allocations                                                                                                                                                                                                                                                           |
| 79-1198-02                                                                                           | Interconnection Agreement For Net Energy Metering (NEM2) And Renewable Electrical Generating Facility Sized Greater Than 1,000 Kw                                                 | NEM2                                                                        | FT and Detailed Study Interconnection Agreement for >1MW NEM2 Generating Facilities                                                                                                                                                                                                                                  |
| 79-1200                                                                                              | Rule 21 Generator Interconnection Agreement For Exporting Generating Facilities                                                                                                   | Rule 21                                                                     | FT and Detailed Study Interconnection Agreement for Exporting Generating Facilities                                                                                                                                                                                                                                  |
| <b>Other Agreements</b>                                                                              |                                                                                                                                                                                   |                                                                             |                                                                                                                                                                                                                                                                                                                      |
| 79-280                                                                                               | Agreement for Installation of Allocation of Special Facilities for Parallel Operation of Non-Utility-Owned Generation and/or Electrical Standby Service (Electric Rules 2 and 21) | Rule 21                                                                     | Special Facilities Agreement to be used with Form 79-702                                                                                                                                                                                                                                                             |
| 79-702                                                                                               | Appendix A: Detail of Special Facilities Charges to be used in concert with form 79-280                                                                                           | Rule 21                                                                     | Used with Form 79-280                                                                                                                                                                                                                                                                                                |

\*\*\* The application section of these forms is replaced by 79-1174.

\*\*\*\* For NEMA expanded customers, use the online 79-1174 form.

(Continued)





*San Francisco, California*

Cal. P.U.C. Sheet No. 51926-E  
Cal. P.U.C. Sheet No. 50944-E

## Sheet 281

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| Submitted  | November 4, 2021 |
| Effective  |                  |
| Resolution |                  |





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Advice 5915-E-B  
Decision D.20-09-035

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

Submitted  
Effective  
Resolution

November 4, 2021



*San Francisco, California*

Cal. P.U.C. Sheet No. 51928-E\*\*  
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## Sheet 20

| RULE      | TITLE OF SHEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CAL P.U.C.<br>SHEET NO. |
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| Advice   | 5915-E-B    | Issued by                          | Submitted  | November 4, 2021 |
| Decision | D.20-09-035 | <b>Robert S. Kenney</b>            | Effective  |                  |
|          |             | Vice President, Regulatory Affairs | Resolution |                  |

## **Attachment 2**

### **Redline Tariff Revisions**

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

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

| Redline Text Color                                                                  | Advice Letter | Subject                                                                                                                                                                               | Comments                                                                                                |
|-------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|  | 6014-E-A      | Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 60 Days from Issuance)                                           | Pending Approval                                                                                        |
|  | 6286-E        | Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3                                                       | Effective on December 8, 2021 pending final disposition                                                 |
|  | 6363-E        | Modifications to Electric Rule 21 Pursuant to Decision 20-09-035 Ordering Paragraphs 5 and 8                                                                                          | Approved, but is not effective until March 17, 2022.                                                    |
|  | 5915-E-B      | Second Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3 (due 120 Days from Issuance) for Ordering Paragraphs 6 and 11. | In this advice letter, the redline tariff revisions do not show sheets that only have location changes. |
|  | 6286-E-A      | Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Ordering Paragraphs 7, 49, 50 Decision 20-09-035 for Working Group 2 and 3                                         | Effective on December 8, 2021 pending final disposition                                                 |



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

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

Sheet 4

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Advice 5988-E-A  
Decision D.20-09-035

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

Submitted  
Effective  
Resolution

May 19, 2021  
May 19, 2021



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

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*San Francisco, California*

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**C. DEFINITIONS (Cont'd.)**

**Field Testing:** Testing performed in the field to determine whether equipment meets Distribution Provider's requirements for safe and reliable Interconnection.

**Function:** Some combination of hardware and software designed to provide specific features or capabilities. Its use, as in Protective Function, is intended to encompass a range of implementations from a single-purpose device to a section of software and specific pieces of hardware within a larger piece of equipment to a collection of devices and software.

**Generating Facility:** All Generators, electrical wires, equipment, and other facilities, excluding Interconnection Facilities, owned or provided by Producer for the purpose of producing electric power, including storage.

**Generating Facility Capacity:** The net capacity of the Generating Facility and the aggregate net capacity of the Generating Facility where it includes multiple Generators.

**Generation Profile:** The active power output of a Generating Facility over a period of time. The Generation Profile may be less than the Gross Nameplate Capacity at certain times, for example when using a typical PV Generation Profile or a Limited Generation Profile.

(N)  
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(N)

**Generator:** A device converting mechanical, chemical, or solar energy into electrical energy, including all of its protective and control functions and structural appurtenances. One or more Generators comprise a Generating Facility.

**Generator Interconnection Agreement:** An agreement between Distribution Provider and Producer providing for the Interconnection of a Generating Facility that gives certain rights and obligations to effect or end Interconnection. For the purpose of this Rule, Net Energy Metering or power purchase agreements authorized by the Commission are also defined as Generator Interconnection Agreements.

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Sheet 24

**C. DEFINITIONS (Cont'd.)**

**Good Utility Practice:** Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

**Governmental Authority:** Any federal, state, local or other governmental regulatory or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, or other governmental authority having jurisdiction over the Parties, their respective facilities, or the respective services they provide, and exercising or entitled to exercise any administrative, executive, police, or taxing authority or power; provided, however, that such term does not include Interconnection Customer, Distribution Provider, or any Affiliate thereof.

**Gross Rating; Gross Nameplate Rating; Gross Capacity or Gross Nameplate Capacity:** The total gross generating capacity of a Generator or Generating Facility as designated by the manufacturer(s) of the Generator(s).

**Host Load:** The electrical power, less the Generator auxiliary load, consumed by the Customer, to which the Generating Facility is connected.

**Inadvertent Export:** The unscheduled and uncompensated export of real power\* from a Generating Facility (GF) for a limited duration as specified in Sections M<sub>1</sub> and Mm<sub>and Mm3</sub>.

(T)  
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**Independent Study Process:** The interconnection study process set forth in Section F.3.d.

**Initial Review:** See Section F.2.a.

**In-rush Current:** The current determined by the In-rush Current Test.

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**In-Service Date:** The estimated date upon which Applicant reasonably expects it will be ready to begin use of Distribution Provider's Interconnection Facilities.

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\* For the purposes of Rule 21, real power is the same as active power.

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

Sheet 25

**C. DEFINITIONS (Cont'd.)**

**Integration Capacity Analysis (ICA) Values:** Values which represent the maximum capacity that can be interconnected at a given Point of Interconnection without exceeding Distribution Provider equipment thermal limits or any of the Distribution System voltage, power quality, protection, and operational flexibility (safety) limits, each of which is independently calculated.

**Integration Capacity Analysis – Operational Flexibility 576 (ICA-OF 576) Profile:** Annual Profile composed of 576 hours where each hour is represented by its ICA-OF Value.

**Integration Capacity Analysis – Operational Flexibility (ICA-OF) Values:** The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, protection, and operational flexibility ICA Values.

**Integration Capacity Analysis – Static Grid 576 (ICA-SG 576) Profile:** Annual Profile composed of 576 hours where each hour is represented by its ICA-SG Value.

**Integration Capacity Analysis – Static Grid (ICA-SG) Values:** The minimum ICA value at a given Point of Interconnection from the set of the thermal, voltage, power quality, and protection ICA Values.

**Interconnection; Interconnected:** The physical connection of a Generating Facility in accordance with the requirements of this Rule so that Parallel Operation with Distribution Provider's Distribution or Transmission System can occur (has occurred).

**Interconnection Agreement:** See Generator Interconnection Agreement.

**Interconnection Customer:** See Applicant.

**Interconnection Facilities:** The electrical wires, switches and related equipment that are required in addition to the facilities required to provide electric Distribution Service to a Customer to allow Interconnection. Interconnection Facilities may be located on either side of the Point of Common Coupling as appropriate to their purpose and design. Interconnection Facilities may be integral to a Generating Facility or provided separately. Interconnection Facilities may be owned by either Producer or Distribution Provider.

(Continued)



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

Sheet 26

**C. DEFINITIONS (Cont'd.)**

**Interconnection Facilities Study:** A study conducted by Distribution Provider for an Interconnection Customer under the Independent Study Process to determine a list of facilities (including Distribution Provider's Interconnection Facilities, Distribution Upgrades, and Network Upgrades as identified in the Interconnection System Impact Study), the cost of those facilities, and the time required to interconnect the Generating Facility with Distribution Provider's Distribution or Transmission System. The scope of the study is defined in Section G.3.c.

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**Interconnection Financial Security:** Any of the financial instruments listed in Section F.4.a.

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**Interconnection Request:** An Applicant's request to interconnect a new Generating Facility, or to increase the capacity of, or make a Material Modification to the operating characteristics of, an existing Generating Facility that is interconnected with Distribution Provider's Distribution or Transmission System.

**Interconnection Study:** A study to establish the requirements for Interconnection of a Generating Facility with Distribution Provider's Distribution System or Transmission System, pursuant to this Rule.

**Interconnection System Impact Study:** An engineering study conducted by Distribution Provider for an Interconnection Customer under the Independent Study Process that evaluates the impact of the proposed interconnection on the safety and reliability of Distribution Provider's Distribution and/or Transmission System and, if applicable, an Affected System. The scope of the study is defined in Section G.3.c.i.

**Island; Islanding:** A condition on Distribution Provider's Distribution System in which one or more Generating Facilities deliver power to Customers using a portion of Distribution Provider's Distribution System that is electrically isolated from the remainder of Distribution Provider's Distribution System.

**Large Generating Facility:** A Generating Facility having a Generating Facility Capacity of more than 20 MW.

**Like for like:** For inverters, like-for-like means certified, same nameplate or smaller, same fault current or smaller. For solar panels, like-for-like means certified, same CEC-AC rating of the system or smaller. For batteries, like-for-like means same or less kWh & kW rating and same operating profile. For transformers, like-for-like means same connection type, same or smaller impedance and capacity.

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

Sheet 27

**C. DEFINITIONS (Cont'd.)**

**Line Section:** That portion of Distribution Provider's Distribution or Transmission System connected to a Customer bounded by automatic sectionalizing devices or the end of the distribution line.

**Local Furnishing Bond:** Tax-exempt bonds utilized to finance facilities for the local furnishing of electric energy, as described in Internal Revenue Code, 26 U.S.C. § 142(f).

**Local Furnishing Distribution Provider:** Any Distribution Provider that owns facilities financed by Local Furnishing Bonds.

**Mandatory Operation:** The Smart Inverter operates at maximum available current without tripping during Distribution Provider's Transmission or Distribution System excursions outside the region of continuous operation. Any functions that protect the Smart Inverter from damage may operate as needed.

**Material Modification:** Those modifications that have a material impact on cost or timing of any Interconnection Request with a later queue priority date or a change in Point of Interconnection. A Material Modification does not include a change in ownership of a Generating Facility, (ii) a modification described in Table F.1, nor (iii) a modification described in Tables Ee.1, 2 or 3 that does not require a new interconnection request.

**Metering:** The measurement of electrical power in kilowatts (kW) and/or energy in kilowatt-hours (kWh), and if necessary, reactive power in kVAR at a point, and its display to Distribution Provider, as required by this Rule.

**Metering Equipment:** All equipment, hardware, software including meter cabinets, conduit, etc., that are necessary for Metering.

**Momentary Cessation:** The Smart Inverter momentarily reduces current output to the Distribution Provider's Transmission or Distribution System to below 10% of the maximum continuous output current rating. The Smart Inverter is allowed to increase current output to the Distribution Provider's Transmission or Distribution System without any intentional reconnection delay once voltage exits the Momentary Cessation region and enters a Permissive Operation region or Continuous Operation region.

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

Sheet 28

**C. DEFINITIONS (Cont'd.)**

**Momentary Parallel Operation:** The Interconnection of a Generating Facility to the Distribution and Transmission System for one second (60 cycles) or less.

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**Nationally Recognized Testing Laboratory (NRTL):** A laboratory accredited to perform the Certification Testing requirements under this Rule.

**Net Energy Metering (NEM):** Metering for the receipt and delivery of electricity between Producer and Distribution Provider pursuant to California Public Utilities Code (PUC) sections 2827, 2827.1 (as currently implemented by Commission Decision (D.)16-01-044), 2827.8, or 2827.10.

**NEM-1:** Refers to Interconnection Requests for service pursuant to Schedules NEM, NEMV, and NEMVMASH.

**NEM-2:** Refers to Interconnection Requests for service pursuant to Schedules NEM2, NEM2V, NEM2VMASH, and NEM2VSOM.

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**Net Rating or Net Nameplate Rating:** The Gross Rating minus the consumption of electrical power of the auxiliary load.

**Network Upgrades:** Delivery Network Upgrades and Reliability Network Upgrades.

**Networked Secondary System:** An AC distribution system where the secondaries of the distribution transformers are connected to a common bus for supplying electricity directly to consumers. There are two types of secondary networks: grid networks (also referred to as area networks or street networks) and Spot Networks. Synonyms: Secondary Network. Refer to IEEE 1547.6 for additional detail.

**Non-Emergency:** Conditions or situations that are not Emergencies, including but not limited to meter reading, inspection, testing, routine repairs, replacement, and maintenance.

**Nominal:** Standard frequency and voltage.

**Non-Export; Non-Exporting:** When the Generating Facility is sized and designed such that the Generator output is used for Host Load only and is designed to prevent the transfer of electrical energy from the Generating Facility to Distribution Provider's Distribution or Transmission System.

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

Sheet 52

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

**2. INTERCONNECTION REQUEST PROCESS (Cont'd.)**

**b. Applicant Selects a Study Process**

An Applicant may select one of two interconnection evaluation processes in accordance with the following eligibility requirements:

**i) Fast Track Eligibility**

~~Non-Exporting Generating Facilities and NEM-1 Generating Facilities are eligible for Fast Track evaluation regardless of the Gross Nameplate Rating of the proposed Generating Facility. NEM-2 Generating Facilities and Exporting Generating Facilities with a Gross Nameplate Rating no larger than 3.0 MW on a 12 kV or higher voltage interconnection point for PG&E are also eligible for Fast Track evaluation.~~

~~For an Exporting Generating Facility that agrees to the installation of Distribution Provider approved protective devices at Applicant's cost such that the Exporting Generating Facility's net export will never exceed the Fast Track eligibility limits, the Generating Facility's net export will be considered for purposes of Fast Track eligibility. However, these Interconnection Requests will be required to complete Supplemental Review and Applicants should pre-pay for Supplemental Review at the time the Interconnection Request is submitted.~~

The Distribution Provider shall evaluate Non-Exporting Generating Facilities and NEM-1 Generating Facilities under the Fast Track Review Process described in Section F.2 below. Applicants for all other Generating Facilities may request that the Distribution Provider evaluate their project under the Fast Track Review Process described in Section F.2 below. Customers are encouraged to review the ICA for information relevant to their project.

**ii) Detailed Study Eligibility**

Interconnection Requests that are not eligible for Fast Track evaluation must apply for Detailed Study. An Applicant may also choose to apply directly for Detailed Studies. Detailed Study shall require (i) an Independent Study Process, (ii) a Distribution Group Study Process, or (iii) a WDT Transmission Cluster Study Process. The specific study process used will depend on the results of the Electrical Independence Tests for the Transmission

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**Pacific Gas and  
Electric Company**

*San Francisco, California*

Cancelling Revised  
Revised

Cal. P.U.C. Sheet No. 42349-E  
Cal. P.U.C. Sheet No. 40327-E

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and Distribution Systems.

(Continued)

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| <i>Decision</i> | 16-06-052 | <b>Robert S. Kenney</b>                   | <i>Effective</i>  | June 30, 2018 |
|                 |           | <i>Vice President, Regulatory Affairs</i> | <i>Resolution</i> |               |



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

Sheet 53

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

**2. INTERCONNECTION REQUEST PROCESS (Cont'd.)**

**b. Applicant Selects a Study Process (Cont'd.)**

**iii) Request for Deliverability Assessment**

Unless specified otherwise in the Interconnection Request, Generating Facilities eligible to be studied under the Fast Track Process, Independent Study Process or Distribution Group Study Process will be assumed to have selected Energy-Only Deliverability Status. Nothing herein will prohibit an Applicant from seeking a deliverability assessment in accordance with the WDT. Applicants studied under the WDT Transmission Cluster Study Process may seek a deliverability assessment in accordance with the applicable provisions of the WDT.

Applicant may submit a request to convert their Interconnection Request to the Federal Energy Regulatory Commission (FERC) jurisdiction Wholesale Distribution Tariff (WDT) process subject to PG&E's WDT Section 6.8.1.1 requirements. Additional information is available at: <https://www.pge.com/eqi>

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**c. Applicant Completes an Interconnection Request**

All Applicants shall submit a complete and valid Interconnection Request. When applicable per Table E.1, a nonrefundable \$800 Interconnection Request fee, and for Applicants that elect Detailed Study in the Interconnection Request, a study deposit shall be required per instructions in the Interconnection Request. Applicants who proceed to Detailed Study after Fast Track will provide a Detailed Study deposit as specified in Section E.3.a.

Applicant shall submit a separate Interconnection Request for each Point of Interconnection. An Interconnection Request for the expansion of capacity of an existing operating Generating Facility shall be treated the same as an Interconnection Request for a new Generating Facility pursuant to this Rule.

- i) Interconnection Requests for the Independent Study Process will be accepted throughout the year, except during the Distribution Group Study windows. All Detailed Study Interconnection Requests (except those applying directly to the WDT Transmission Cluster Study Process) submitted during the Distribution Group Study Windows will be processed as

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Sheet 53

Distribution Group Study Process Applicants.

(Continued)

|                 |           |                                           |                   |               |
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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 66

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

**4. INTERCONNECTION COST RESPONSIBILITY (Cont'd.)**

**f. Summary Tables (Cont'd.)**

**Table E.3 Summary of Producer Cost Responsibility for Multiple Tariff Interconnections**

| Existing<br>Generating<br>Facility                                                                                                                                                                                                                                                           | New<br>Generating<br>Facility | Interconnection<br>Request Fee |                | Supplemental<br>Review Fee |                | Detailed<br>Study<br>Cost |                | Interconnection<br>Facilities Cost |    | Distribution<br>Upgrades<br>Cost |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------|----------------|----------------------------|----------------|---------------------------|----------------|------------------------------------|----|----------------------------------|------------------|
|                                                                                                                                                                                                                                                                                              |                               | YES                            | NO             | YES                        | NO             | YES                       | NO             | YES                                | NO | YES                              | NO               |
| NEM                                                                                                                                                                                                                                                                                          | Non-NEM,<br>NEM-2<br>(>1 MW)  | X                              |                | X                          |                | X                         |                | X                                  |    | X <sup>b</sup>                   |                  |
| NEM-1                                                                                                                                                                                                                                                                                        | NEM-1                         |                                | X              |                            | X              |                           | X              | X                                  |    |                                  | X                |
| NEM-1                                                                                                                                                                                                                                                                                        | NEM-2<br>(≤1MW)*              | X                              |                |                            | X              |                           | X              | X                                  |    |                                  | X                |
| Non-NEM                                                                                                                                                                                                                                                                                      | NEM-1                         |                                | X <sup>c</sup> |                            | X <sup>c</sup> |                           | X <sup>c</sup> | X                                  |    |                                  | X <sup>b,c</sup> |
| Non-NEM                                                                                                                                                                                                                                                                                      | NEM-2<br>(>1 MW)              | X                              |                | X                          |                | X                         |                | X                                  |    | X                                |                  |
| Non-NEM                                                                                                                                                                                                                                                                                      | NEM-2<br>(≤1MW)*              | X                              |                |                            | X <sup>c</sup> |                           | X <sup>c</sup> | X                                  |    |                                  | X <sup>b,c</sup> |
| Simultaneous NEM and<br>Non-NEM                                                                                                                                                                                                                                                              |                               | X                              |                | X                          |                | X                         |                | X                                  |    | X <sup>b</sup>                   |                  |
| a) Except as provided in Section D.13.e                                                                                                                                                                                                                                                      |                               |                                |                |                            |                |                           |                |                                    |    |                                  |                  |
| b) Proration will be based upon the annual expected energy output (kWh) derived from the nameplate of the Generator(s) modified by technology-specific capacity/availability factors of all NEM and non-NEM Generators for the costs that cannot be clearly assigned to each type of tariff. |                               |                                |                |                            |                |                           |                |                                    |    |                                  |                  |
| c) Change of operation of a non-NEM eligible Generator at any time to export is treated as a simultaneous NEM and non-NEM Interconnection Request, resulting in associated costs being allocated to Producer.                                                                                |                               |                                |                |                            |                |                           |                |                                    |    |                                  |                  |

**g. Cost Reconciliation**

Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider shall provide Applicant a detailed reconciliation of the costs on interconnection facilities and distribution upgrades within 12 months of project completion.

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

Sheet 75

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS**

**a. Initial Review**

Upon receipt of a complete and valid Interconnection Request, Distribution Provider shall perform Initial Review using the process in Section G.1. The Initial Review determines if (i) the Generating Facility qualifies for Fast Track Interconnection through Initial Review, or (ii) the Generating Facility requires a Supplemental Review. Absent extraordinary circumstances, Distribution Provider shall notify Applicant in writing of the results of Initial Review within fifteen (15) Business Days following validation of an Interconnection Request.

As part of the evaluation of Screen M, when Integration Capacity Analysis Values are available at the requested Point of Interconnection, Distribution Provider will determine if Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated. If Distribution Provider determines that the Integration Capacity Analysis Values at the proposed Point of Interconnection need to be updated, the Distribution Provider will update the values for the proposed Point of Interconnection using the Integration Capacity Analysis tool on the specific electrical node or by running the Integration Capacity Analysis on all the electrical nodes in the circuit. Distribution Provider shall not perform additional Integration Capacity Analysis as part of the interconnection process of projects with less than 30 kilovolt amperes nameplate capacity. Distribution Provider shall share the results of any Integration Capacity Analysis updates with the Applicant and provide an explanation of changes to grid conditions or the interconnection queue which led to the need to obtain updated Integration Capacity Analysis Values. Distribution Provider shall comply with confidentiality provisions and data redaction policies.

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Decision D.20-09-035

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Submitted  
Effective  
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May 19, 2021  
May 19, 2021





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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 75

F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)

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2. FAST TRACK INTERCONNECTION REVIEW PROCESS

a. Initial Review (Cont'd)

For all Interconnection Requests that pass Initial Review and do not require Interconnection Facilities or Distribution Upgrades, Distribution Provider shall provide Applicant with a Generator Interconnection Agreement within fifteen (15) Business Days of providing notice of Initial Review results. For Interconnection Requests that pass Initial Review but do require Interconnection Facilities or Distribution Upgrades, within fifteen (15) Business Days of providing notice of Initial Review results, Distribution Provider shall provide Applicant with a non-binding cost estimate of the Interconnection Facilities or Distribution Upgrades. For those Interconnection Requests where Applicant has selected the Cost Envelope Option, within ten (10) Business Days of providing Applicant the non-binding cost estimate for the required Interconnection Facilities and/or Distribution Upgrades, Applicant shall provide the Distribution Provider the Cost Envelope Option deposit, in accordance with Section F.7.a.i.3. If Applicant fails to provide the Cost Envelope Option deposit in accordance with Section F.7.a.i.3, Applicant's request for the Cost Envelope Option shall be deemed withdrawn and the Interconnection Request shall not be eligible for the Cost Envelope Option.

For all Interconnection Requests that pass Initial Review, refer to Section F.2.e for cost responsibility and time frames for completing the Generator Interconnection Agreement.

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| Resolution |              |



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 85

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**e. Execution of the Generator Interconnection Agreement (Cont'd.)**

shall negotiate concerning the cost estimate, or any disputed provisions of the appendices to a draft Generator Interconnection Agreement, for not more than ninety (90) Calendar Days after Distribution Provider provides Applicant with the Generator Interconnection Agreement. If Applicant determines that negotiations are at an impasse, it may request termination of the negotiations and initiate Dispute Resolution procedures pursuant to Section K. If Applicant fails to sign the Generator Interconnection Agreement or initiate Dispute Resolution within ninety (90) Calendar Days, the Interconnection Request shall be deemed withdrawn.

After Applicant, or a Producer where those are different entities, has executed the Generator Interconnection Agreement, Distribution Provider will commence design, procurement, construction and installation of Distribution Provider's Distribution Upgrades and/or Interconnection Facilities that have been identified in the Generator Interconnection Agreement. Distribution Provider and Producer will use good faith efforts to meet schedules in accordance with the requirements of the Generator Interconnection Agreement and estimated costs as appropriate. Producer is responsible for all applicable costs associated with Parallel Operation to support the safe and reliable operation of the Distribution System and Transmission System as set forth in Section E.4.

Distribution Provider and Producer shall negotiate in good faith concerning a schedule for the construction of Distribution Provider's Interconnection Facilities and Distribution Upgrades.

Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider shall schedule a mitigation work scoping meeting no later than 10 business days after receiving the payment for the engineering advance.

Distribution Provider shall provide quarterly updates on substation upgrades to Producers whose projects are dependent on a substation upgrade.

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

Sheet 88

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Independent Study Process**

**i) Scoping Meeting**

Within five (5) Business Days after Distribution Provider notifies Applicant that the Interconnection Request has passed Screens Q and R and is thus eligible for the Independent Study Process, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant and Distribution Provider for a scoping meeting. Distribution Provider shall inform Applicant of the Detailed Study start date.

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The purpose of the scoping meeting shall be: (i) to discuss reasonable Commercial Operation Dates and alternative interconnection options; (ii) to exchange information, including any transmission data that would reasonably be expected to impact Applicant's interconnection options; (iii) to analyze such information; and (iv) to determine feasible Points of Interconnection and eliminate alternatives given resources and available information.

Distribution Provider will bring to the scoping meeting, as reasonably necessary to accomplish its purpose, such already available technical data, including, but not limited to; (i) general facility loadings, (ii) general instability issues, (iii) general short circuit issues, (iv) general voltage issues, and (v) general reliability issues.

Applicant will bring to the scoping meeting, in addition to the technical data in Attachment A of the Rule 21 Exporting Generating Facility Interconnection Request form, any system studies previously performed. Distribution Provider, the CAISO, if applicable, and Applicant will also bring to the meeting personnel and other resources as may be reasonably required to accomplish the purpose of the meeting in the time allocated for the meeting. On the basis of the meeting, Applicant shall designate its Point of Interconnection. The duration of the meeting shall be only what is sufficient to accomplish its purpose.

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|          |             | Vice President, Regulatory Affairs | Resolution |              |



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 97

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**b. Independent Study Process (Cont'd.)**

**ix) Interconnection Facilities Study Results Meeting**

If requested by Applicant, a results meeting shall be held among Distribution Provider, the CAISO, if applicable, and Applicant to discuss the results of the Interconnection Facilities Study, including assigned cost responsibility. Within five (5) Business Days of the request, Distribution Provider shall contact Applicant to establish a date agreeable to Applicant, Distribution Provider and the CAISO, if applicable, for the results meeting.

Within thirty (30) Calendar Days after the Interconnection Facilities Study results meeting, Distribution Provider shall tender a draft Generator Interconnection Agreement, together with draft appendices, to Applicant.

**x) Second and Third Postings of Interconnection Financial Security**

Applicant will post its second and third postings of Interconnection Financial Security as set forth in Sections F.4.c and F.4.d based on the cost responsibility for Network Upgrades, Distribution Upgrades, and Distribution Provider's Interconnection Facilities set forth in the final Interconnection Facilities Study, or the final Interconnection System Impact Study if the Interconnection Facilities Study is waived in accordance with Section F.3.b.vii.

**c. Distribution Group Study Process**

**i) Initiation of Distribution Study Process**

Applicants that apply for the Independent Study Process that pass Screen Q but fail Screen R will be eligible for inclusion in a Distribution Study Group. Applicant must submit all materials required to complete their Interconnection Request no later than ten (10) Business Days after the close of the relevant Distribution Group Study window. This includes notification from Applicant that they want to proceed with the Distribution Group Study Process, if applicable, in accordance with Section F.3.a. Distribution Provider shall inform Applicant of the Detailed Study start date.

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

Sheet 111

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**c. Distribution Group Study Process (Cont'd.)**

**xvi) Automatic Timing Extension**

If during any six month period, the number of Interconnection Requests exceeds by fifty (50) percent the number of active Interconnection Request in the preceding six month period, the study timelines for Distribution Group Studies begun during the next twelve (12) months will automatically increase as follows. The time to complete the DGS Phase I Interconnection Study pursuant to Section F.3.c.iv will increase from sixty (60) Business Days to one hundred twenty (120) Business Days. The time to complete the DGS Phase II Interconnection Study pursuant to Section F.3.c.x will increase from sixty (60) Business Days to one hundred twenty (120) Business Days. The time to tender a draft Generator Interconnection Agreement pursuant to F.3.e.i will increase from thirty (30) Calendar Days to forty-five (45) Calendar Days. Distribution Provider will notify Applicants in the Distribution Study Group in writing after commencement of DGS Phase I Interconnection Study of the extension.

**d. WDT Transmission Cluster Study Process**

If Applicant's Interconnection Request fails Screen Q or elects to be studied under the WDT Transmission Cluster Study Process, Applicant shall have the option of applying for Interconnection under the WDT Transmission Cluster Study Process of the Wholesale Distribution Tariff in accordance with its provisions. If Applicant fails Screen Q, Applicant's Interconnection Request shall be deemed withdrawn under this Rule regardless of whether Applicant applies for Interconnection under the WDT. Distribution Provider shall inform Applicant of the Detailed Study start date.

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

Sheet 115

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS (Cont'd.)**

**e. Generator Interconnection Agreement (Cont'd.)**

**ii) Negotiation (Cont'd.)**

DGS Phase II Interconnection Facilities Study report (or the final DGS Phase I Interconnection Study report if the DGS Phase II Interconnection Study is waived) in the case of the Distribution Group Study Process or Interconnection Facilities Study report (or final Interconnection System Impact Study report if the Interconnection Facilities Study is waived) in the case of the Independent Study Process, it shall be deemed to have withdrawn its Interconnection Request.

Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider will send an invoice to Applicant within five business days of execution of the Interconnection Agreement.

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Unless agreed to otherwise between Applicant and Distribution Provider, Distribution Provider shall schedule a mitigation work scoping meeting no later than 10 business days after receiving the payment for the engineering advance.

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**iii) Extensions of Commercial Operation Date**

Extensions of the Commercial Operation Date will be agreed upon in the executed Generator Interconnection Agreement. Reasonable Commercial Operation Dates will be discussed at the DGS Phase II Interconnection Study results meeting, or the DGS Phase I Interconnection Study results meeting if the DGS Phase II Interconnection Study results meeting is waived, in the case of the Distribution Group Study Process, the Interconnection Facilities Study results meeting, or the Interconnection System Impact Study results meeting if the Interconnection Facilities Study is waived in the case of the Independent Study Process. A request for an extension of the Commercial Operation Date after the Generator Interconnection Agreement is executed will be agreed to provided that, the Producer is still responsible for funding any Distribution Upgrades and Network Upgrades as specified in the Generator Interconnection Agreement and under the same payment schedule agreed upon in the Generator Interconnection Agreement. This provision has no impact on any power purchase

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**Pacific Gas and  
Electric Company**

*San Francisco, California*

Revised  
Cancelling Revised

Cal. P.U.C. Sheet No. 49844-E  
Cal. P.U.C. Sheet No. 42411-E

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

Sheet 115

agreement terms.

(Continued)

*Advice* 5988-E-A  
*Decision* D.20-09-035

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

|                   |                     |
|-------------------|---------------------|
| <i>Submitted</i>  | <u>May 19, 2021</u> |
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| <i>Resolution</i> | <u></u>             |





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

Sheet 140

**F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)**

**7. COST ENVELOPE OPTION (Cont'd.)**

**f. Modifications**

Under the Independent Study Process, any requested modifications, including required updates to costs under the Cost Envelope Option, shall be made in accordance with Section F.3.b.v. If Applicant elects to proceed with re-evaluation of the costs under the Cost Envelope Option pursuant to Section F.3.b.v, Distribution Provider shall complete the re-evaluation within the sum of the time allowed for each step utilized by the Distribution Provider for preparation of the initial Cost Envelope Estimate pursuant Section F.3.b from receipt of all required technical data related to the proposed changes and payment of the estimated cost of the re-evaluation.

**g. Tender of the Generator Interconnection Agreement Under the Cost Envelope Option**

Negotiation and execution of the Generator Interconnection Agreement shall be in accordance with Section F.2.e for Interconnection Requests evaluated under the Fast Track Process, and in accordance with Section F.3.e.ii for Interconnection Requests evaluated under the Independent Study Process.

**8. DESIGN AND CONSTRUCTION TIMELINE**

Subject to emergencies, delays from other agencies, and other reasons, the standard timeline for design and construction of interconnection-related Distribution Upgrades is as follows:

- i) 60 business days for design and 60 business days for construction, or
- ii) Design and construction timelines as agreed to between Applicant and Distribution Provider.

The 60-day clock commences upon payment and after Applicant has done everything necessary on its end to prepare for construction.

(N)

(N)

(Continued)





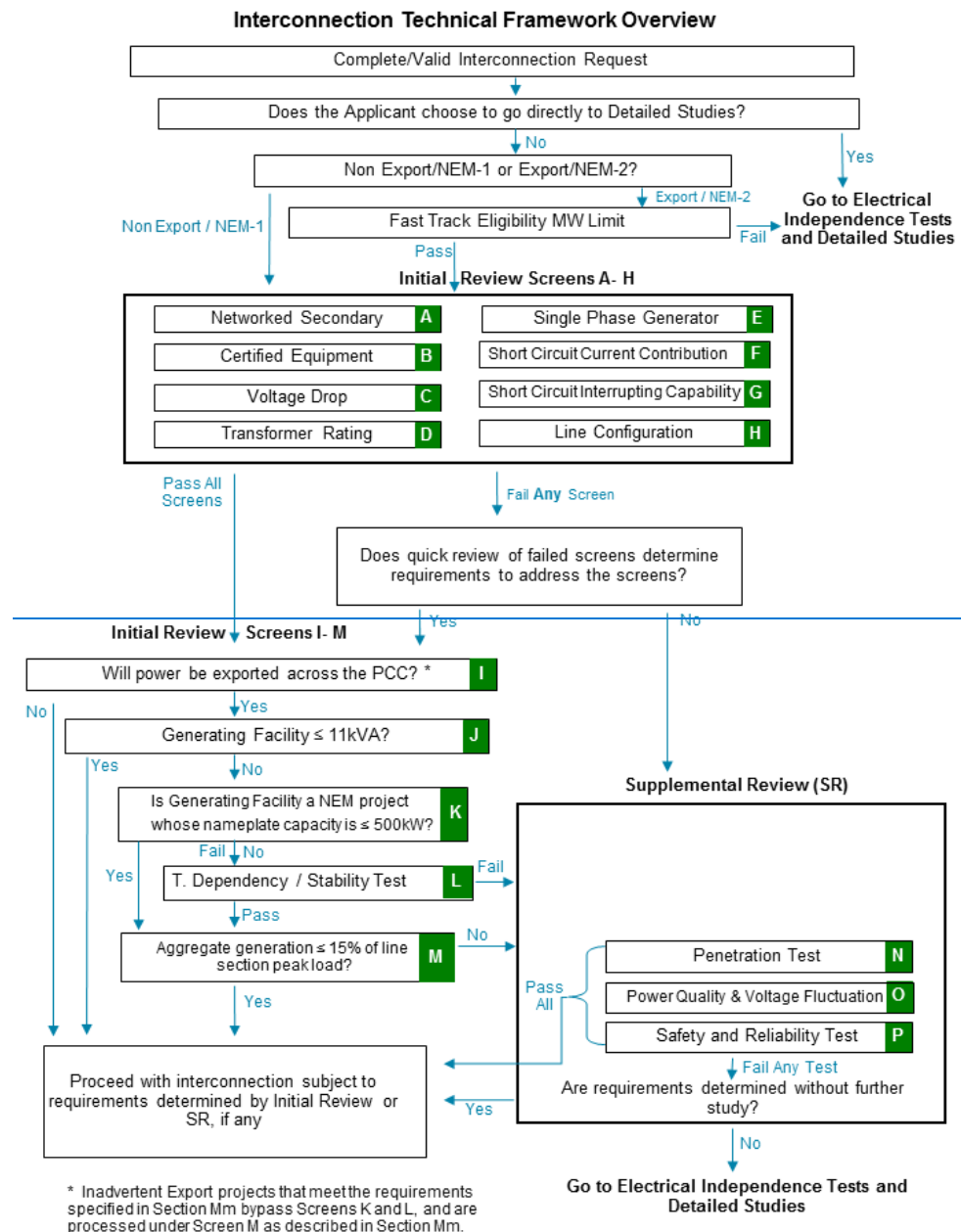
**ELECTRIC RULE NO. 21**  
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Sheet 141

**G. ENGINEERING REVIEW DETAILS**

Delete table below:

(P)



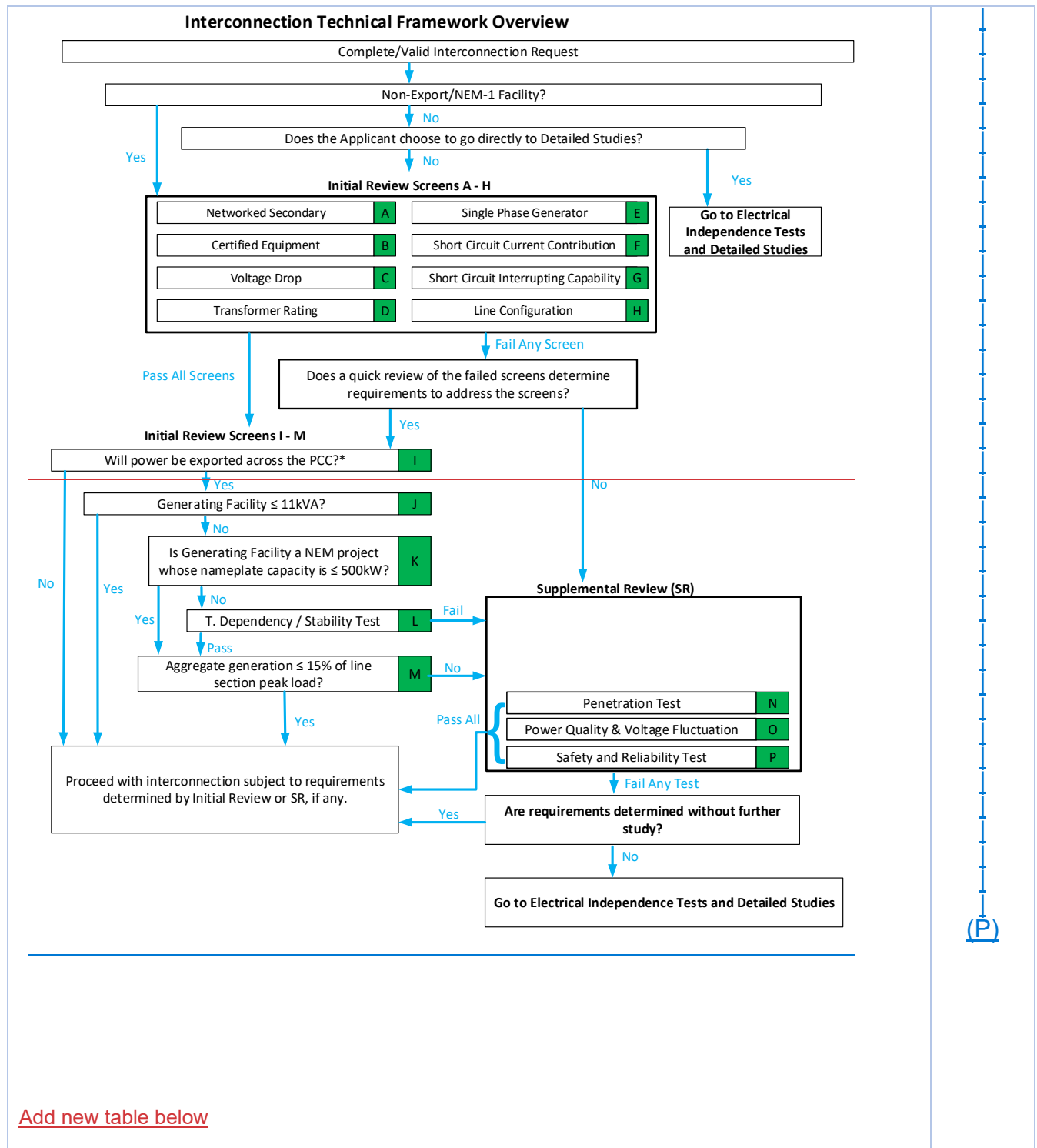
Delete pending table below:

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

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Add new table below

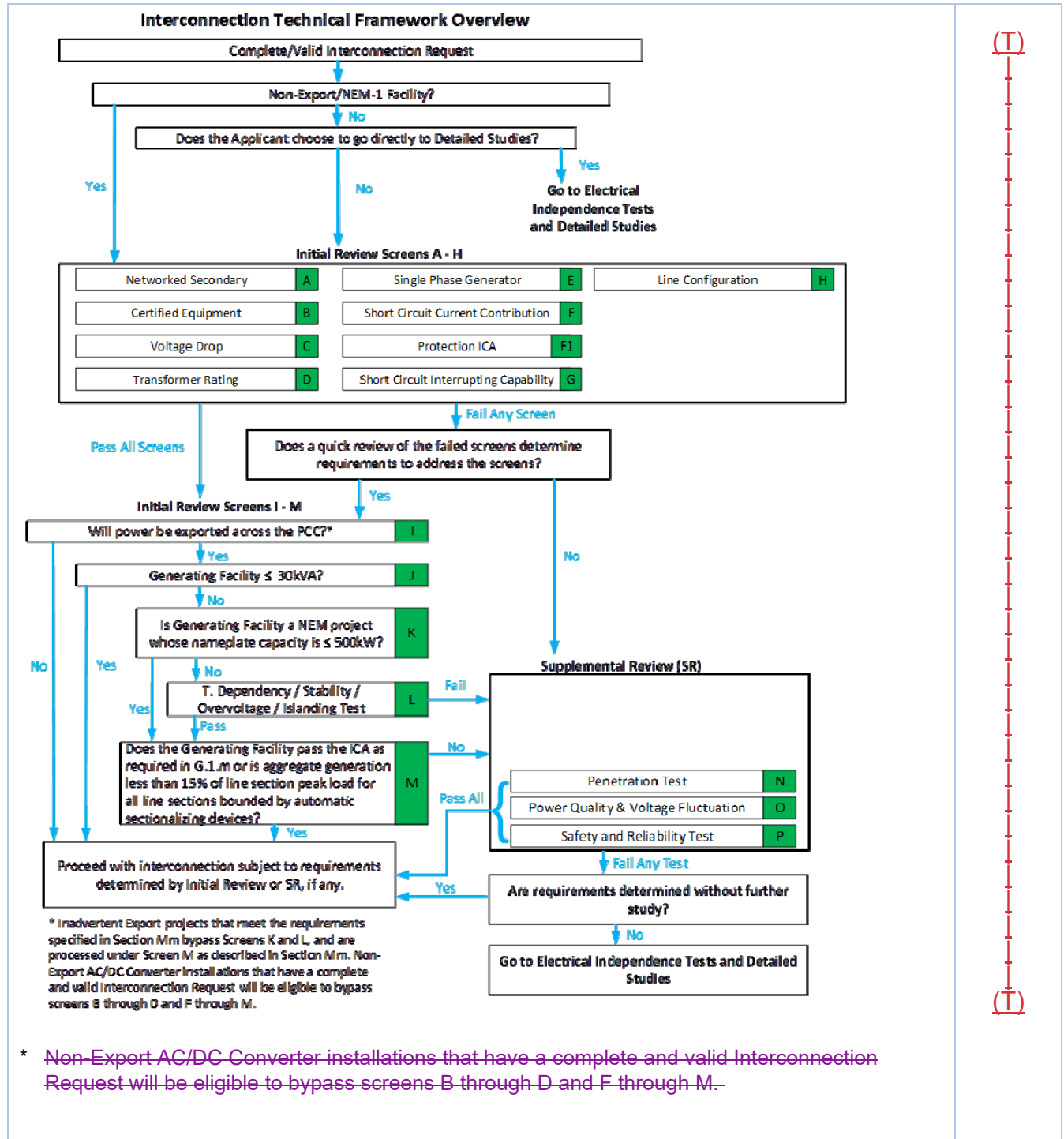
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**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 141



(Continued)



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

Sheet 147

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

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

- e. Screen E: Does the Single-Phase Generator cause unacceptable imbalance? (Cont'd.)

Significance: Generating Facilities connected to a single-phase transformer with 120/240 V secondary voltage must be installed such that the aggregated gross output is as balanced as practicable between the two phases of the 240 volt service. When Distribution Provider's analysis determines a transformer change is required. Distribution Provider will furnish the customer with an explanation of why the change is needed.

- f. Screens F and F1:

(P)

Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits?

(P)

(P)

- If Yes (pass), continue to Screen F1G.
- If No (fail), continue to Screen F1G pursuant to Section G.1.

(P)

(P)

Note: This Screen does not apply to Generating Facilities with a Gross Rating of 3044 kVA or less.

(T)

When measured at primary side (high side) of the Dedicated Distribution Transformer serving a Generating Facility, the sum of the Short Circuit Contribution Ratios of all Generating Facilities connected to Distribution Provider's Distribution System circuit that serves the Generating Facility must be less than or equal to 0.1.

Significance: If the Generating Facility passes this sScreen, it can be expected that it will have no significant impact on Distribution Provider's Distribution System's short circuit duty, fault detection sensitivity, relay coordination or fuse-saving schemes.

(P)

(Continued)



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

Sheet 148

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

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

f. Screens F and F1:

Screen F1: Is the per unit short circuit current contribution under allowable levels?

Is the short circuit current contribution less than or equal to 1.2 per unit or is the Generating Facility Gross Nameplate Rating multiplied by its per unit contribution less than the Protection Integrated Capacity Analysis (ICA) Value<sup>1</sup> multiplied by 1.2 per unit?

- If Yes to either (pass), continue to Screen G.
- If No to both (fail), continue to Screen G pursuant to Section G.1.

Significance: Generating systems with a per unit short circuit contribution of 1.2 or less can bypass this screen and directly use the ICA because ICA calculations assume that Generating Facilities have a per unit short circuit contribution of 1.2. For Generating Facilities with a per unit short circuit contribution greater than 1.2, the Distribution Provider will use the Protection ICA Value<sup>1</sup> at the point of interconnection in conjunction with the Generating Facility's per unit short circuit contribution to determine whether the facility passes Screen F1.

**g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?**

Does the proposed Generating Facility, in aggregate with other Generating Facilities on the distribution circuit, cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Request equipment on the system to exceed 87.5 % of the short circuit interrupting capability; or is the Interconnection proposed for a circuit that already exceeds 87.5 % of the short circuit interrupting capability?

- If Yes (fail) continue to Screen H pursuant to Section G.1.
- If No (pass), continue to Screen H

<sup>1</sup>The protection limit is one of the components of the ICA Value that pertains to sensing faults on the grid.

(Continued)



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

Sheet 149

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

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

g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?  
(Cont'd)

Note: This Screen does not apply to Generating Facilities with a Gross Rating of ~~3044~~ kVA or less.

Significance: If the Generating Facility passes this screen, it can be expected that it will not cause any of Distribution Provider's equipment to be overstressed.

(L)  
↓  
(L)  
(T)/(L)  
(L)  
↓  
(L)

**h. Screen H: Is the line configuration compatible with the Interconnection type?**

- If Yes (pass), continue to Screen I.
- If No (fail), continue to Screen I pursuant to Section G.1.

Note: This Screen does not apply to Generating Facilities with a Gross Rating of ~~3044~~ kVA or less

(T)

Line Configuration Screen: Identify primary distribution line configuration that will serve the Generating Facility. Based on the type of Interconnection to be used for the Generating Facility, determine from Table G.1 if the proposed Generating Facility passes the Screen.

**Table G-1**  
**Type of Interconnection**

| Primary Distribution<br>Line Type Configuration                                                     | Type of Interconnection<br>to be made to<br>Primary Distribution Line | Result/Criteria                                                                                                                 |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Three-phase, three-wire                                                                             | Any type                                                              | Pass Screen                                                                                                                     |
| Three-phase, four-wire                                                                              | Single-phase,<br>line-to-neutral                                      | Pass Screen                                                                                                                     |
| Three-phase, four-wire<br>(For any line that has such a<br>section OR mixed three-wire & four-wire) | All others                                                            | To pass, aggregate<br>Generating Facility nameplate<br>rating must be less than<br>or equal to 10% of Line<br>Section peak load |

(Continued)

Advice 5988-E-A  
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May 19, 2021  
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**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 150

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

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

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

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

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

- If Yes, Continue to Screen J. This includes Options 5, ~~and 6~~, 9, 10, and 11 ~~below~~.
- If No, then to ensure that the Generating Facility does not export across the PCC, the Generating Facility must incorporate one of the first four options shown Options 1, 2, 3, 4, 7, or 8 below. Following that selection, Screen J, K, L, and M are skipped and Initial Review is complete. If Option 8 is used, see section Mm2 to determine screen application.

(P)  
(P)/(P)

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(P)

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

(Continued)

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

Sheet 152

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

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

**i. Screen I: Will power be exported across the PCC? (Cont'd.)**

Option 4 (Relative Generating Facility Rating): This option, when used, requires the Net Rating of the Generating Facility to be so small in comparison to its host facility's minimum load, that the use of additional Protective Functions is not required to ensure that power will not be exported to Distribution Provider's Distribution or Transmission System. This option requires the Generating Facility capacity to be no greater than 50% of Producer's verifiable minimum Host Load over the past 12 months.

Option 5: Inadvertent Export as described in Section M.

Option 6: Inadvertent Export utilizing UL-1741 or UL-1741 SA/SB listed grid support (Non-Islanding) inverters as described in Section Mm.

(P)

Option 7: Non-Export utilizing Non-Export AC/DC Converter as described in Section O.

(P)

Option 8: Non-Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm1.

Option 9: Limited Export utilizing Certified Power Control Systems with an open loop response time no more than two seconds as described in Section Mm2.

Option 10: Non-Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm3.

Option 11: Limited Export with Inadvertent Export utilizing Certified Power Control Systems with an open loop response time greater than two seconds and no more than ten seconds as described in Section Mm4.

(P)

(Continued)





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

Sheet 153

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(P)/(L)

1. INITIAL REVIEW SCREENS (Cont'd.)

i. Screen I: Will power be exported across the PCC? (Cont'd.)

Significance:

1. If it can be assured that the Generating Facility will not export power, Distribution Provider's Distribution or Transmission System does not need to be studied for load-carrying capability or Generating Facility power flow effects on Distribution Provider voltage regulators.
2. This Screen permits the use of reverse-power or minimum-power relaying as a Non-Islanding Protective Function (Option 1, 2, and 3).
3. This Screen allows, under certain defined conditions, for Generating Facilities that incorporate Certified Non-Islanding protection to qualify for interconnection through the Fast Track process without implementing reverse power or minimum power Protective Functions (Option 3).

(P)/(L)

(Continued)



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

Sheet 153

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

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

- j. Screen J: Is the Gross Rating of the Generating Facility ~~3044~~ kVA or less? (T)

- If Yes (pass), skip Screens K, L and M; Initial Review is complete.
- If No (fail), continue to Screen K.<sup>i</sup>

Significance: The Generating Facility will have a minimal impact on fault current levels and any potential line overvoltages from loss of Distribution Provider's Distribution System neutral grounding.

- k. Screen K: Is the Generating Facility a Net Energy Metering (NEM) Generating Facility with nameplate capacity less than or equal to 500 kW?

- If Yes (pass), skip screen L and continue to screen M.
- If No (fail), continue to screen L.

Significance: The purpose of this Screen is solely to facilitate interconnection of NEM facilities below this size threshold by allowing such facilities to bypass Screen M. The use of nameplate capacity expedites the Initial Review analysis. In Supplemental Review, the net export will be analyzed.

<sup>i</sup> Inadvertent Export systems that meet the requirements specified in Section Mm bypass Screens K and L, and are processed under Screen M as described in Section Mm.

(Continued)



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

Sheet 154

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

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

**I. Screen L: Transmission Dependency, and ~~Transmission~~ Stability, Overvoltage, and Islanding Tests**

(P)  
(P)

Is the Interconnection Request for an area where: (i) there are known, or posted, transient/dynamic stability limitations, or (ii) the proposed Generating Facility has interdependencies, known to Distribution Provider, with earlier-queued Transmission System interconnection requests, or (iii) islanding conditions are possible based on PG&E's currently adopted and published screening policies with respect to antiislanding, or (iv) transmission ground fault overvoltage is possible based on PG&E's currently adopted and published screening policies with respect to overvoltage screening. Where (i) or (ii) or (iii) or (iv) above are met, the impacts of this Interconnection Request to the Transmission System may require Detailed further Study.

(P)

(P)

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—  
(P)

- If Yes (fail), Supplemental Review is required.
- If No (pass), continue to Screen M.

Significance: Special consideration must be given to those areas identified as having current or future (due to currently-queued interconnection requests) grid stability concerns.

PG&E will temporarily apply anti-islanding tests until the resolution of **Issue 18\*** in R. 17-07-007, Working Group Four Report made effective in PG&E's tariffs.

(P)

—  
(P)

\* Issue 18 is "Should the Commission adopt changes to anti-islanding screen parameters to reflect research on islanding risks when using UL 1741-certified inverters in order to avoid unnecessary mitigations? If yes, what should those changes entail?"

(P)

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(P)

(Continued)



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

Sheet 155

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(N)

1. INITIAL REVIEW SCREENS (Cont'd.)

m. Screen M: When ICA Values are available at the requested Point of Interconnection, the Distribution Provider shall compare the ICA Values to the Gross Nameplate Rating or typical PV Generation Profile.

For Interconnection Requests based on Gross Nameplate Rating:

a. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-SG 576 Profile? or

b. Is the Generating Facility aggregate Gross Nameplate Rating greater than 90% of the lowest value in the ICA-OF 576 Profile?

If the response is "yes" to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

For Interconnection Requests based on typical PV Generation Profile:

a. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-SG 576 value in any hour? or

b. Is the Generating Facility Generation Profile based on PV Watts or equivalent greater than 90% of the ICA-OF 576 value in any hour?

If the response is "yes" to either a) or b), the Interconnection Request fails Screen M and must be evaluated under the Supplemental Review to determine mitigation requirements.

(N)

(Continued)



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

Sheet 155

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

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

**m. Screen M (Cont'd.):**

Is the aggregate Generating Facility capacity on the Line Section less than 15% of Line Section peak load for all line sections bounded by automatic sectionalizing devices? ~~\*(Cont'd.)~~

- If Yes (pass), Initial Review is complete.
- If No (fail), Supplemental Review is required.

When ICA information is not available at the requested Point of Interconnection, Screen M should be evaluated as follows:

Significance:

1. Low penetration of Generating Facility capacity will have a minimal impact on the operation and load restoration efforts of Distribution Provider's Distribution System.
2. The operating requirements for a high penetration of Generating Facility capacity may be different since the impact on Distribution Provider's Distribution System will no longer be minimal, therefore requiring additional study or controls.

The purpose of this Screen is solely to identify if the Generating Facility needs additional study and is not intended as justification for limiting the penetration of generation on a line section.

**2. SUPPLEMENTAL REVIEW SCREENS**

The Supplemental Review consists of Screens N through P. If any of the Screens are not passed, a quick review of the failed Screen(s) will determine the requirements to address the failure(s) or that Detailed Studies are required. In certain instances, Distribution Provider may be able to identify the necessary solution and determine that Detailed Studies are unnecessary. Some examples of solutions that may be available to mitigate the impact of a failed Screen are:

1. Replacing a fixed capacitor bank with a switched capacitor bank.
2. Adjustment of line regulation settings.

(Continued)



U 39

**Pacific Gas and  
Electric Company**

*San Francisco, California*

|            |         |                       |         |
|------------|---------|-----------------------|---------|
|            | Revised | Cal. P.U.C. Sheet No. | 49884-E |
| Cancelling | Revised | Cal. P.U.C. Sheet No. | 42451-E |

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

Sheet 155

3. Simple reconfiguration of the distribution circuit.

~~<sup>ii</sup> Inadvertent Export systems that meet the requirements specified in Section Mm are processed under Screen M as described in Section Mm.~~

(Continued)

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

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

Sheet 156

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

**2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)**

**a. Screen N: Penetration Test**

If Integration Capacity Analysis Values are available at the requested Point of Interconnection, evaluate Screen N as follows:

i) Penetration Level Using Generating ICA Profile:

For Interconnection Requests based on Gross Nameplate Rating: Is the Generating Facility aggregate Gross Nameplate Rating equal to or below 90% of the lowest value in the ICA-SG 576 Profile?

For Interconnection Requests based on typical PV Generation Profile: Is the Generating Facility Generation Profile, based on PV Watts or equivalent, equal to or below 90% the ICA-SG value at each hour in the ICA-SG 576 Profile?

ii) Screen F1: Did the Interconnection Request pass Screen F1?

If yes to both of the above (pass), continue to Screen O.

If "no" to either or both of the above (fail), a quick review of the failure within Supplemental Review may determine the requirements to address the failure; otherwise Electrical Independence Tests or Detailed Studies are required.

- If the failure(s) that cannot be addressed in Supplemental Review, the Distribution Provider will conduct a review to identify the reasons why further studies are required.

(N)

(N)

(Continued)



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

Sheet 156

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(N)

2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)

a. Screen N: Penetration Test (Cont'd)

ii) Screen F1: Did the Interconnection Request pass Screen F1 (Cont'd)?

- o If the failure(s) cannot be addressed in Supplemental Review, and generation is 100% or less of the applicable ICA value (lowest value of the ICA-SG profile or lowest value at each hour) the Distribution Provider must identify a reason why a specific technical constraint is not captured by the ICA and the why the project must proceed to Electrical Independence Tests and Detailed Studies.
- o If voltage is a prevailing constraint, then the smart inverter default volt/var function will be used in power flow analysis for the evaluation of the proposed project. This will reveal if the proposed project causes any voltage impacts of concern. If concerns related to steady state voltage, thermal, or protection exist and the Distribution Provider can identify simple upgrades through power flow analysis (e.g., installation of voltage regulator devices or protection devices to mitigate reduction of reach), then the Distribution Provider will determine the mitigation requirements within Screen N. When larger upgrades or complex protection evaluation is required, Screen N will fail, and the technical evaluation will be conducted under the Detailed Study process.
- o If no reason for further study is identified, or if requirements to address the failure can be identified in screen N, proceed to Screen O.
- o Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens if Applicant elects to proceed.
- o If Integration Capacity Analysis Values are not available, evaluate Screen N as follows:

(N)

(Continued)





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GENERATING FACILITY INTERCONNECTIONS**

Sheet 157

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(N)

2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)

a. Screen N: Penetration Test (Cont'd)

(N)

Where 12 months of line section minimum load data is available, can be calculated, can be estimated from existing data, or determined from a power flow model, is the aggregate Generating Facility capacity on the Line Section less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility?

(L)

- If yes (pass), continue to Screen O.
- If no (fail), a quick review of the failure may determine the requirements to address the failure; otherwise Electrical Independence Tests and Detailed Studies are required. Continue to Screen O. (Note: If Electrical Independence tests and Detailed Studies are required, Applicants will continue to the Electrical Independence Tests and Detailed Studies after review of the remaining Supplemental Review Screens, if Applicant elects to proceed.)

Note 1: If none of the above options are available, this screen defaults to Screen M.

Note 2: The type of Generating Facility technology will be taken into account when calculating, estimating, or determining circuit or Line Section minimum load relevant for the application of this screen. For solar Generating Facilities with no battery storage, daytime minimum load will be used (i.e., 10 am to 4 pm for fixed panel solar Generating Facilities and 8 am to 6 pm for solar Generating Facilities utilizing tracking systems), while absolute minimum load will be used for all other Generating Facility technologies.

Note 3: When this screen is being applied to a NEM Generating Facility, the net export in kW, if known, that may flow across the Point of Common Coupling into Distribution Provider's Distribution System will be considered as part of the aggregate generation.

(L)

(Continued)



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

Sheet 183

**Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING  
REQUIREMENTS (Cont'd.)**

The inverter requirements are intended to be consistent with UL 1741 - Supplement SA using Section Hh of Rule 21 as the source requirement document and ANSI/IEEE 1547-2003 and 1547a Standard for Interconnecting Distributed Resources with Electric Power Systems (IEEE 1547 including amendment 1547a), where possible. In the event of conflict between this Rule, and UL 1741 - Supplement SA, and/or IEEE 1547-2003 or IEEE 1547a, this Rule shall take precedence. Exceptions are taken to IEEE 1547 Clauses 4.1.4.2 Distribution Secondary Spot Networks and Clauses 4.1.8.1 or 5.1.3.1, which address Protection from Electromagnetic Interference. Rule 21 does not adopt the Generating Facility power limitation of 10 MW incorporated in IEEE 1547.

The Smart Inverter default settings and default activation states may be modified upon mutual agreement between Applicant or Producer and Distribution Provider.

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

Process for changing default settings for new Interconnection Requests:

(P)

Distribution Provider, in the study process for new Generating Facilities, may determine and provide the optimum Smart Inverter Settings for the reactive power settings, including changes to the reactive power default settings (Example: Deactivate Volt/Var and activate Fixed Power Factor at given power factor).

Distribution Provider, in the study process for new Generating Facilities, may determine and provide the optimum Smart Inverter Settings for the Ramp Rate settings depending on the Generating Facility technology (such as solar, storage).

Distribution Provider, in the study process for new Generating Facilities, may determine the optimum Smart Inverter Settings for the volt/watt settings including changes to the default settings (Example: Change the volt/watt set points). The Applicant may select to agree on the new settings or select to perform upgrades to operate using the existing default volt/watt settings.

Default settings for voltage ride-through, frequency ride-through requirements, and Frequency/Watt should not be modified on an individual project basis unless the Interconnection Studies have determined that the default settings may not meet grid reliability requirements.

Process for changing default settings for Generating Facilities with an  
executed Interconnection Agreement:

(Continued)



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**GENERATING FACILITY INTERCONNECTIONS**

Sheet 183

When grid changes or Generating Facility changes require that the Smart Inverter operating parameters be reevaluated, the Distribution Provider or Producer may request changes to the Smart Inverter operating parameters. The request must include the reason for and timing of the proposed changes. The requested changes must be within the Smart Inverter function adjustability limits, must be within the limits specified in this tariff, and must be mutually agreed upon.

(P)

**1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS**

The Protective Functions and requirements of this Rule are designed to protect Distribution Provider's Distribution and Transmission System and not the Generating Facility. A Producer shall be solely responsible for providing adequate protection for its Generating Facility and Interconnection Facilities. Producer's Protective Functions shall not impact the operation of other Protective Functions on Distribution Provider's Distribution and Transmission System in a manner that would affect Distribution Provider's capability of providing reliable service to its customers.

**a. Protective Functions Required**

Smart Inverters operating in parallel with Distribution Provider's Distribution or Transmission System shall be equipped with the following Protective Functions to sense abnormal conditions on Distribution Provider's Distribution or Transmission System and cause the Smart Inverter to be automatically disconnected from Distribution Provider's Distribution or Transmission System or to prevent the Smart Inverter from being connected to Distribution Provider's Distribution or Transmission System inappropriately:

- (i) Over and under voltage trip functions and over and under frequency trip functions;

(Continued)

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

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

Sheet 214

**I. THIRD-PARTY INSTALLATIONS, RESERVATION OF UNUSED FACILITIES,  
AND REFUND OF SALVAGE VALUE**

**1. INTERCONNECTION FACILITIES AND DISTRIBUTION UPGRADES**

Except as provided for in the Generator Interconnection Agreement of this Rule, Interconnection Facilities connected to Distribution Provider's side of the PCC and Distribution Upgrades shall be provided, installed, owned, and maintained by Distribution Provider at Producer's expense.

**2. THIRD-PARTY INSTALLATIONS**

~~Subject to the approval of Distribution Provider, a~~ Producer may, at its option, employ a qualified contractor that meets the Contractor Qualifications set forth under Electric Rule 15, Section G, to provide and install Interconnection Facilities or Distribution Upgrades, to be owned and operated by Distribution Provider, on Distribution Provider's side of the PCC.\* Such Interconnection Facilities and Distribution Upgrades shall be installed in accordance with Distribution Provider's design and specifications. Upon final inspection and acceptance by Distribution Provider, Producer shall transfer ownership of such Producer installed Interconnection Facilities or Distribution Upgrades to Distribution Provider and such facilities shall thereafter be owned and maintained by Distribution Provider at Producer's expense. Producer shall pay Distribution Provider's reasonable cost of design, administration, and monitoring of the installation for such facilities to ensure compliance with Distribution Provider's requirements. Producer shall also be responsible for all costs, including any income tax liability, associated with the transfer of Producer installed Interconnection Facilities and Distribution Upgrades to Distribution Provider.

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\* Only duly authorized employees of utility are allowed to connect to, disconnect from, or perform any work upon Utility's facilities.

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

Sheet 217

**J. METERING, MONITORING AND TELEMETERING (Cont'd.)**

**3. NET GENERATION OUTPUT METERING (Cont'd.)**

- iii) Accuracy and type of required Metering consistent with purposes of collecting data;
- iv) Cost of Metering relative to the need for and accuracy of the data;
- v) The Generating Facility's size relative to the cost of the Metering/monitoring;
- vi) Other means of obtaining the data (e.g. Generating Facility logs, proxy data, etc.);
- vii) Requirements under any Generator Interconnection Agreement with Producer.

The requirements in this Section may not apply to Metering of Generating Facilities operating under Distribution Provider's Net Energy Metering tariffs. Nothing in this Section J.3 supersedes Section D.4, Compliance with Laws, Rules and Tariff Schedules.

Distribution Provider will report to the Commission or designated authority, on a quarterly basis, the rationale for requiring Net Generation Output Metering equipment in each instance along with the size and location of the facility.

The standard timeline for installation of Net Generation Output Meters is as follows:

- i) 20 business for design and 20 business days for construction, or
- ii) design and construction timelines as agree with the customer.

The 20-day clock commences upon payment and after the customer had done everything necessary on their end to prepare for construction. By mutual agreement, Applicant and Distribution Provider may agree to a timeline that is different from the timeline described above.

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**4. POINT OF COMMON COUPLING (PCC) METERING**

For purposes of assessing Distribution Provider's charges for retail service, Producer's PCC Metering shall be reviewed by Distribution Provider, and if required, replaced to ensure that it will appropriately measure electric power according to the provisions of the Customer's electric service Tariff. Where required, the Customer's existing meter may be replaced with a bi-directional meter so that power deliveries to and from Producer's site can be separately recorded. Alternately,

(Continued)



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

Sheet 255

(N)

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

(P)

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

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

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|-------------------|---------------------|
| <i>Submitted</i>  | <u>May 19, 2021</u> |
| <i>Effective</i>  | <u>May 19, 2021</u> |
| <i>Resolution</i> |                     |





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

Sheet 255

(N)

Mm2. OPTION 9: Limited Export Utilizing Certified Power Control Systems

(P)

The following are minimum requirements for limited export systems that use certified power control systems (PCS) with an open loop response time (OLRT) no more than two seconds to maintain a level of export that is lower than the nameplate rating. It should be noted that other factors relevant to the Interconnection Study process may necessitate additional technical requirements that are not explicitly noted here.

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

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

Sheet 255

(N)

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

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

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

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Decision D.20-09-035

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May 19, 2021



**ELECTRIC RULE NO. 21**  
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Sheet 255

(N)

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

(P)

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

1. Have a nameplate capacity equal to or less than 1,000 kVA.
2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Non-Export may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the non-exporting functionality in accordance with the relevant CRD or UL published standard.
3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not export (zero-export).
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.

4.6. Maintain voltage fluctuations at the limits specified in Electric Rule 2

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

Sheet 255

(N)

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

(P)

The Ddistribution Pprovider evaluating Ggenerating Ffacilities requesting interconnection under this section shall:

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

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

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

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

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

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

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

Sheet 255

(N)

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

(P)

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

1. Have a nameplate capacity equal to or less than 1,000 kVA.
2. Use a PCS that passes the requirements of the 2019 Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol. Limited export systems may use a PCS that pass later published revisions to the CRD test protocol, or may use a PCS that is certified to the UL 1741 certification standard, if UL incorporates the test protocol for PCS into UL 1741 in the future. The NRTL evaluation must have determined that the PCS conforms to the export limiting functionality in accordance with the relevant CRD or UL published standard.
3. Use a PCS that is certified with an OLRT of no more than ten seconds, as provided in the PCS's specification data sheets.
4. Set the PCS to not to exceed the proposed level of export.
5. Use only UL 1741 listed grid-support non-islanding inverters as approved by this tariff.
6. Maintain voltage fluctuations at the limits specified in Electric Rule 2.

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

Sheet 255

(N)

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

(P)

The Ddistribution Pprovider evaluating Ggenerating Ffacilities requesting  
interconnection under this section shall:

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

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

Sheet 255

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**N. EXPEDITED INTERCONNECTION PROCESS FOR NON-EXPORT ENERGY  
STORAGE GENERATING FACILITIES**

Applicants with Interconnection Requests for Non-Export Energy Storage Generating Facilities who meet the requirements outlined below are eligible for expedited interconnection in accordance with the Fast Track Process technical review requirements of Section F.2.<sup>4</sup> Applicants with Non-Export AC/DC Converters that meet the requirements outlined in O. below are also eligible.

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**1. ELIGIBILITY REQUIREMENTS**

Applicants seeking to interconnect a Generating Facility under the provisions of this Section N must meet the following eligibility requirements.

- a. Applicant must electronically submit a completed Interconnection Request, including completing all application fields and submitting all supporting documentation necessary to facilitate the expedited review as required by Distribution Provider. Such documentation may include, but is not limited to, single line diagrams with specific details, manufacturer data sheets for proposed equipment, description of control systems, validation of the right to do business in the state, etc. Distribution Provider shall clearly communicate these requirements as part of the application process. Applicant shall select this process option in the Interconnection Request.
- b. Applicant's Generating Facility must meet the requirements outlined in Section N.2 below.
- c. Applicant's Interconnection Request must be eligible for and select the Fast Track Process.
- d. Applicant's Interconnection Request must pass Fast Track Initial Review and not require any Interconnection Facilities, Distribution Upgrades or Network Upgrades to remain eligible under this Section. As such, Interconnection Requests that select the Cost Envelope Option are not eligible.
- e. Applicants selecting this section shall use the corresponding interconnection agreement type provided for eligible Generating Facilities.

<sup>4</sup>—In accordance with Advice 4941-E-A, the provisions provided for in Section N are being implemented under a pilot approach with a July 1, 2017 through June 30, 2018 reporting period. As such, the provisions may be continued, modified and/or withdrawn as determined by the Commission

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

|                                          |                                        |                                         |
|------------------------------------------|----------------------------------------|-----------------------------------------|
| AT&T                                     | East Bay Community Energy Ellison      | Pioneer Community Energy                |
| Albion Power Company                     | Schneider & Harris LLP Energy          | Public Advocates Office                 |
|                                          | Management Service                     |                                         |
| Alta Power Group, LLC                    | Engineers and Scientists of California | Redwood Coast Energy Authority          |
| Anderson & Poole                         |                                        | Regulatory & Cogeneration Service, Inc. |
|                                          |                                        | SCD Energy Solutions                    |
| Atlas ReFuel                             | GenOn Energy, Inc.                     | San Diego Gas & Electric Company        |
| BART                                     | Goodin, MacBride, Squeri, Schlotz &    |                                         |
|                                          | Ritchie                                |                                         |
| Barkovich & Yap, Inc.                    | Green Power Institute                  | SPURR                                   |
| California Cotton Ginners & Growers Assn | Hanna & Morton                         | San Francisco Water Power and Sewer     |
| California Energy Commission             | ICF                                    | Sempra Utilities                        |
|                                          | IGS Energy                             |                                         |
| California Hub for Energy Efficiency     | International Power Technology         | Sierra Telephone Company, Inc.          |
| Financing                                |                                        | Southern California Edison Company      |
|                                          | Intertie                               | Southern California Gas Company         |
| California Alternative Energy and        |                                        | Spark Energy                            |
| Advanced Transportation Financing        | Intestate Gas Services, Inc.           | Sun Light & Power                       |
| Authority                                | Kelly Group                            | Sunshine Design                         |
| California Public Utilities Commission   | Ken Bohn Consulting                    | Tecogen, Inc.                           |
| Calpine                                  | Keyes & Fox LLP                        | TerraVerde Renewable Partners           |
|                                          | Leviton Manufacturing Co., Inc.        | Tiger Natural Gas, Inc.                 |
| Cameron-Daniel, P.C.                     |                                        |                                         |
| Casner, Steve                            | Los Angeles County Integrated          | TransCanada                             |
| Cenergy Power                            | Waste Management Task Force            | Utility Cost Management                 |
| Center for Biological Diversity          | MRW & Associates                       | Utility Power Solutions                 |
|                                          | Manatt Phelps Phillips                 | Water and Energy Consulting Wellhead    |
| Chevron Pipeline and Power               | Marin Energy Authority                 | Electric Company                        |
| City of Palo Alto                        | McKenzie & Associates                  | Western Manufactured Housing            |
|                                          |                                        | Communities Association (WMA)           |
| City of San Jose                         | Modesto Irrigation District            | Yep Energy                              |
| Clean Power Research                     | NLine Energy, Inc.                     |                                         |
| Coast Economic Consulting                | NRG Solar                              |                                         |
| Commercial Energy                        |                                        |                                         |
| Crossborder Energy                       | OnGrid Solar                           |                                         |
| Crown Road Energy, LLC                   | Pacific Gas and Electric Company       |                                         |
| Davis Wright Tremaine LLP                | Peninsula Clean Energy                 |                                         |
| Day Carter Murphy                        |                                        |                                         |
|                                          |                                        |                                         |
| Dept of General Services                 |                                        |                                         |
| Don Pickett & Associates, Inc.           |                                        |                                         |
| Douglass & Liddell                       |                                        |                                         |