

**PUBLIC UTILITIES COMMISSION**

505 VAN NESS AVENUE



September 21, 2021

**Advice Letter 5988-E-A**

Erik Jacobson  
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San Francisco, CA 94177

**SUBJECT: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3**

Dear Mr. Jacobson:

Advice Letter 5988-E-A is effective as of May 19, 2021.

Sincerely,

A handwritten signature in cursive script that reads "Edward Randolph".

Edward Randolph  
Deputy Executive Director for Energy and Climate Policy/  
Director, Energy Division

May 19, 2021

**Advice 5988-E-A**

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

**Subject: Supplemental: Advice Letter Modifying Electric Rule 21 Pursuant to Decision 20-09-035 for Working Group 2 and 3**

**Purpose**

Pacific Gas and Electric Company (PG&E) hereby submits this Supplemental Tier 1 Advice Letter (“AL”) to update Electric Rule 21 - *Generating Facility Interconnections* - in compliance with the California Public Utilities Commission (“CPUC”, “Commission”) Decision (“D.”) D.20-09-035<sup>1</sup> (“WG 2 & 3 Decision”) Ordering Paragraph (“OP”) 55 and as described below, to address OP issues that parties have reached consensus on how to resolve as described below,. For those OP issues where there is consensus has not yet been reached, PG&E will submit a new advice letter. This approach is being undertaken based on Energy Division guidance. This supplemental replaces AL 5988-E 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.<sup>2</sup>

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

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

### 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.<sup>3</sup>

### 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.<sup>4</sup>

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

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

<sup>4</sup> Working Group Two Final [Report](#) filed jointly by the Utilities.

working groups and the Interconnection Discussion Forum<sup>5</sup> 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 Report<sup>6</sup> was issued followed by a workshop.

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

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

#### Vehicle to Grid Subgroup

An August 23, 2019 Ruling issued in R. 17-07-007 and in R.18-12-006 (the *Rulemaking to Continue the Development of Rates and Infrastructure for Vehicle Electrification*) established the V2G AC Subgroup with meetings to begin on September 11, 2019. The purpose of this subgroup is to discuss and identify existing standards to fulfill safety requirements for the interconnection of mobile inverters. The ruling directed a final recommendations report from the subgroup to be filed on December 6, 2019.

A workshop on the subgroup report was held on December 17, 2019.

On December 11, 2019, the V2G Final Report was issued<sup>7</sup>.

On January 6, 2020, the following parties filed comments to the December 6, 2019, Final V2G AC subgroup report.

On January 13, 2020, various parties filed replies to the comments on the V2G AC subgroup report.

#### 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 based on the recommendations of Working Groups Two and Three and the Vehicle-to-Grid

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<sup>5</sup> 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]

<sup>6</sup> Working Group Three Final [Report](#) filed by SDG&E

<sup>7</sup> Final [Report](#) of the Vehicle to Grid Alternating Current Interconnection Subgroup.

Alternating Current Interconnection Subgroup (V2G AC Subgroup) and the D. 20-09-035 was issued September 30, 2020.

#### Decision.21-01-027

On January 21, 2021, the CPUC issued D. 21-01-027 *Correcting Errors in Decision 20-09-035*. It noted for the purposes of this advice letter that references to ordering paragraph numbers 47, 50, 51, 53, should reference final decision ordering paragraph number(s) 46, 49, 50, 52.<sup>8</sup>

#### Protests to AL 5988-E

On October 30, 2020, AL 5988-E was timely submitted to the CPUC. Protests were received from The Interstate Renewable Energy Council, Inc. (IREC) and from California Solar & Storage Association (CALSSA) on November 19, 2020. PG&E responded to those protests on date. Since that time five other advice letters have been submitted pursuant to D. 20-09-035<sup>9</sup>. To resolve AL 5988-E, Energy Division encouraged us to work with the protesting parties to resolve the consensus items for AL 5988-E. SCE thereupon coordinated a series of meeting in March and April with IREC (whose protest issues more or less aligned with those of CALSSA) to see where consensus could be achieved. Additionally, in mid- to late April Energy Division proposed that we split the supplemental Advice Letters into a supplemental advice letter for consensus issues (this advice letter), and a new advice letter for those issues where we could not achieve consensus with the protesting parties.

D. 20-09-035 OP 55 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 to only include the items germane to this 30-day Advice Letter, the following ordering paragraphs with consensus items will be addressed.

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<sup>8</sup> See D. 20-09-035 OP1 Table labeled *Decision 20-09-035 Ordering Paragraph Corrections*, last line under OP 55.

<sup>9</sup> [AL 6014-E](#) on November 30, 2020, [AL 5915-E](#) on January 28, 2021, [AL 6058-E](#) on January 28, 2021, [AL 6093-E](#) on February 22, 2021, and [AL 6141-E](#) on March 30, 2021. Additionally, two other advice letters were submitted in the same proceeding R.17-07-007 for Working Group 1 per D.19-03-013 and Resolution E-5035: both [AL 6154-E](#) and [AL 6155-E](#) on April 8, 2021.

<u>OP</u> <sup>10</sup>	Tier 1 Submit 30 days after issuance of decision	Issue Description	Consensus item?
7*	X	all sizes non-exporting projects skip Rule 21 Screens K, L, & M	Non-census
13*	X	update Screen P for new smart inverter capabilities	consensus
14*	X	prepay for Supplemental Review when paying for Initial Review	consensus
46*	X (for 27a.i)	allow i) smart inverter default settings to be changed; ii) IEEE 1547, 1547.1 updates; iii) requests for non-default inverter settings.	consensus
49*	X	allow power control system for non-export and limited export interconnections.	Non-census
50*	X	inadvertent export, projects must meet the following six specifications:	Non-census
52	X (SCE only) <sup>11</sup>	PCS pre-approved list	

IREC notes in its protest generally that although some ordering paragraphs were not explicitly protested, the Commission should ensure “that Rule 21 is as consistent as possible across each of the IOUs’ tariffs...with all changes except the one provision specific to SCE set forth in OP 52.

Therefore, based on the above identified Ordering Paragraphs, in this supplemental PG&E updated its proposed tariff revisions for the consensus items as addressed below.

<sup>10</sup> As corrected In D. 21-01-027.

<sup>11</sup> OP 52 in the table only applies to SCE. OP 52 states: “Proposal A-B 4 is adopted for customers of Southern California Edison (SCE) only. SCE shall revise its Rule 21 tariff to require SCE customers applying for interconnection with a power control system to use only the systems on a pre-approved list.”

## Tariff Changes

### 1. Ordering Paragraph 7 – Skipping Screens K, L and M

Ordering Paragraph 7 requires:

*“Option B of Proposal 8i is adopted whereby non-exporting projects of all sizes skip Interconnection Rule 21 Screens K, L, and M. Proposal 8i will be revisited during the ratesetting phase of Rulemaking 17-07-007.”*

IREC in its protest notes, “PG&E’s advice letter also updates the engineering screen flowchart to indicate that screens K, L, and M are skipped, while the other two advice letters contain no flowchart updates” and “requests the use of consistent language across each of the respective tariffs.” to reflect that non-exporting projects of all sizes may skip screens K, L, and M.

Also, “The advice letters employ slightly different language when describing the options on screen I under which a generating facility may qualify as exporting or non-exporting. IREC again requests that the IOUs use the same language in each of their respective tariffs to describe these options”

Finally, “IREC observes that PG&E’s proposed changes to the engineering screen flowchart may not be necessary. The flowchart clearly shows that if the facility qualifies as non-exporting under screen I, screens J, K, L, and M are skipped.”

OP 7 adopts Option B of Proposal 8i, “*whereby non-exporting projects of all sizes skip Rule 21 Screen K, L and M. Proposal 8i will be revisited during the ratemaking phase of Rulemaking 17-07-007.*”

Additionally, OPs 49 and 50 adopt Proposals A-B 1 and A-B 2, requiring that Rule 21 be modified to allow use of a power control systems (PCS) for non-export and limited-export interconnections applications.

These OPs also provide specification for non-export, limited export, and inadvertent export interconnection applications. In AL 5988-E, PG&E proposed to add a new Section Mm1 that documented the qualification criteria for non-export and limited export. PG&E also proposed a new Section Mm2 to address inadvertent export.

As noted above, IREC protested PG&E’s original proposed AL 5988-E tariff revisions pursuant to OP 7, as well as for the related OPs 49 and 50. While many aspects of these the protests to these three OPs have been resolved, further stakeholder discussions are still underway. Once resolved PG&E will address these ordering paragraphs, in a new proposed advice letter, consistent with guidance from the CPUC staff. PG&E withdraws the changes for this OP made in AL 5988-E.

## 2. Ordering Paragraph 13 – New Smart Inverter Capabilities

Ordering Paragraph 13 requires:

*“Proposal 8q is adopted. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall update **Screen P** of the Rule 21 Interconnection Application Process to account for new smart inverter capabilities.”*

[Emphasis added]

IREC’s protest notes, “Ordering Paragraph 13 requires an update to screen O to account for new smart inverter capabilities.... IREC requests that all IOUs adopt SDG&E’s language in their respective tariffs”

OP 13 adopts Proposal 8q and requires the utilities to “update **Screen P** of the Rule 21 Interconnection Process to account for new smart inverter capabilities” (emphasis added). D. 20-09-035 notes:

*Specifically, Rule 21 at Section G.2.c would be amended to add the following example of an item that may be considered under Screen P: ‘Will the proposed systems cause any voltage impacts considering the settings of the Volt-Var function and characteristics of the circuit segment?’”<sup>12</sup>*

However, D. 20-09-035 discussed the Commission’s intent to revise the consensus Proposal 8q: “...we adopt Proposal 8q, but we revise it to update **Screen O, not Screen P**, to account for new smart inverter capabilities...”<sup>13</sup> [emphasis added].

Accordingly, PG&E proposes to modify Rule 21 to update Section G.2.b to include the following question under Screen O: Power Quality and Voltage Tests. (Original Sheet **157**):

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<sup>12</sup> D. 20-09-035 p 33

<sup>13</sup> D. 20-09-035 p 48

**G. ENGINEERING REVIEW DETAILS****2. SUPPLEMENTAL REVIEW SCREENS (Cont'd.)****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
- 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).

### 3. Ordering Paragraph 14 - Supplemental Review Pre-Pay

Ordering Paragraph 14 requires:

*“Proposal 8r is adopted. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall revise the Rule 21 Interconnection Application Process to allow a customer to pre-pay for Supplemental Review when paying for Initial Review.”*

The text further explains:

*“Proposal 8r, supported by all working group participants, would add an upfront option to allow a customer to pre-pay for Supplemental Review when paying for Initial Review and opt to proceed straight to Supplemental Review without the optional Initial Results meeting, thus combining the two processes.”<sup>14</sup>*

IREC’s in its protest notes, *“Ordering Paragraph 14 requires the IOUs to update the interconnection application process to allow a customer to pre-pay for supplemental review when paying for initial review...IREC requests a common set of identical updates to each of the respective tariffs. This includes updates to section E.3 and the use of “Applicant” in all instances. IREC prefers the language used in SCE’s letter over that used in the other letters.”*

Also, *“PG&E’s ... [advice letter] characterize the procedure in some places as choosing to move to supplemental review or pre-paying the fee...IREC disagrees with this characterization. The applicant who chooses to pre-pay the supplemental review fee also elects to move to supplemental review.”*

Also, to address a pre-paid Supplemental Review option by identifying that the Applicant may pay the Supplemental Review Fee in advance (such as concurrently with the Interconnection Request Fee), PG&E proposes to:

- a) Update Rule 21 Table E.1
- b) Update Rule 21 section E.3,
- c) Update Rule 21 section F.1.b.,
- d) Update Rule 21 section F.2.a
- e) Rule 21 section F.2.b, and
- f) PG&E also updates related interconnection forms.

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<sup>14</sup> D. 20-09-035 p 33

a) PG&E makes the following changes to Table E.1 (Original sheet **55**)

TABLE E.1 Summary of Interconnection Request Fees, Deposits and Exemptions					
Generating Facility Type	Interconnection Request Fee	Supplemental Review Fee	Detailed Study Deposit	Additional Commissioning Test Verification	Cost Envelope Option Deposit****
Non-Net Energy Metering and > 1 MW NEM-2	\$800	\$2,500*	For a Generating Facility with a Gross Nameplate Rating of 5 MW or less and applying to the Independent Study Process, \$10,000 for a System Impact Study or the DGS Phase I Interconnection Study in the case of the Distribution Group Study Process; and \$15,000 for an Interconnection Facilities Study or DGS Phase II Interconnection Study in the case of the Distribution Group Study Process.  For a Generating Facility with a Gross Nameplate Rating above 5 MW, \$50,000 plus \$1,000 per MW of electrical output of the Generating Facility, or the increase in electrical output of the existing Generation Facility, as applicable, rounded up to the nearest whole MW, up to a maximum of \$250,000.	\$150/Person Hour**	\$2,500
≤ 1 MW NEM2***	\$145	\$0	\$0	N/A	\$2,500
NEM-1	\$0	\$0	\$0	N/A	\$2,500
Solar ≤ 1MW or less that does not sell power to Distribution Provider (per D.01-07-027) nor participate in NEM-1 or NEM-2	First \$5,000 of study fees waived			\$150/Person Hour**	\$2,500

\* Optional \$1,000 additional fault current study fee pursuant to Section F.2.c.ii. Pursuant to D. 20-09-035, Applicants have the option to pre-pay the non-refundable Supplemental Review Fee (such as concurrently with the Interconnection Request fee) or separately upon completion of the Initial Review.

\*\* Plus additional costs for travel, lodging and meals.

\*\*\* Applicants that participate in the Single-Family Affordable Solar Homes (SASH) program are exempt from the Interconnection Request fee.

\*\*\*\* Interconnection Requests that have selected the Cost Envelope Option and that subsequently qualify for and pass the Fast Track Process evaluation, as well as NEM Generating Facilities and Solar ≤ 1 MW Generating Facilities evaluated under the Independent Study Process, must provide the Cost Envelope Option deposit in accordance with Section F.7 to remain eligible for the Cost Envelope Option.

- b) PG&E makes the following changes to Section E.3 (Original Sheet **56**). Also, “interconnection Customer” is replaced with “Applicant” for consistency.

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont’d.)

3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT

The Interconnection Request fee shall be waived for NEM-1 Interconnection Requests and for non-NEM solar-powered Generating Facilities that do not sell power per Commission Decision 01-07-027. NEM-1 Generating Facilities are also exempt from any costs associated with Interconnection Studies.

NEM-2 Applicants are required to pay any applicable Interconnection Request fees and costs associated with Interconnection Studies pursuant to Table E.1. As noted in the table, SASH participants are exempt from the NEM-2 Interconnection Request Fee and NEM-2  $\leq 1$  MW Applicants are exempt from costs associated with Interconnection Studies.

Interconnection Study fees for non-NEM solar  $\leq 1$  MW Generating Facilities interconnecting to the Distribution System that do not sell power will be waived up to the amount of \$5,000.

The Applicant must pay the Interconnection Request Fee as outlined in Table E.1 with the Application. The Applicant may pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), or separately upon completion of the Initial Review.

For Applicants that pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be performed following the Initial Review. The Optional Initial Review Results Meeting will not be held, but the Optional Supplemental Review Results Meeting may be held following completion of the Supplemental Review.

## c) PG&amp;E makes the following changes to Section F.1.b (Sheet 71)

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

## 1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS (Cont'd.)

## b. Fast Track Review

Fast Track evaluation allows for rapid review of the Interconnection of those Generating Facilities that do not require Detailed Study. Regardless of study process, all Generating Facilities shall be designed to meet the applicable requirements of Section H which identifies Generating Facility Design and Operation Requirements.

Fast Track review consists of an Initial Review and, if required, a Supplemental Review. The need for Supplemental Review will be determined based on the results of Initial Review Screens A through M in Section G.1. Applicants that successfully pass Initial Review Screens A through M will be allowed to interconnect without Supplemental Review.

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 Supplemental Review is required, Distribution Provider will notify Applicant and Applicant must pay a nonrefundable Supplemental Review fee, per Table E-1 or withdraw its Interconnection Request. **If the Applicant pre-paid the Supplemental Review fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be conducted upon completion of the Initial Review.** Supplemental Review shall consist of the application of Screens N through P in Section G.2. Applicants that pass Screens N through P will be allowed to interconnect without additional review.

d) PG&E makes the following changes to Section F.2.a (Original Sheet 75)

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

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 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 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.

e) PG&E makes the following changes to Section F.2.b (Sheet **76**)

<p>F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)</p> <p>2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)</p> <p>b. Optional Initial Review Results Meeting</p> <p>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.</p> <p>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.</p>
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f) PG&E makes the following changes to Section F.2.c.ii pre-pay (Original Sheet **77-78**)

<p>F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)</p> <p>2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)</p> <p>c. Supplemental Review</p> <p>Supplemental Review</p> <p>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.</p> <p>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.</p> <p>iii) If the Applicant chooses to move to Supplemental Review or has pre-paid the non-refundable Supplemental Review fee, they have the</p>
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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. 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.

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.

g) Also, PG&E proposes to include the question:

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

\_\_\_\_\_ Yes    \_\_\_\_\_ No

in the following PG&E Filed Forms:

- 79-1174-A - *Rule 21 Exporting Generator Interconnection Request – Attachment A*
- 79-1174-02A - *Rule 21 Generator Interconnection Application – Attachment A (includes NEM-2)*
- 79-1145 - *Rule 21 Exporting Generator Interconnection Request*

#### 4. Ordering Paragraph 46 – Changing Smart Inverters Default Settings

Ordering Paragraph 46 requires:

*“46. Proposal 27a is adopted. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall revise Rule 21 to:*

- i) specifically allow smart inverter default settings to be changed;*
- ii) account for IEEE 1547 and IEEE 1547.1 updates being developed by the Smart Inverter Working Group; and*
- iii) establish a process for requesting and approving non default inverter settings.*

*Utilities shall include Rule 21 language changes necessary to implement Proposals **27a.i) and 27a.iii)** as directed in Ordering Paragraph 56 below.”*  
[formatting and emphasis added]

D.20-09-035 describes Proposal 27a as:

*“5.8.2. Issue 27: Proposal 27a Proposal 27a would add language to Rule 21 to clarify that “with mutual agreement, changes to default settings are allowed.” Further, the proposal would also allow for a revision to Rule 21 to account for IEEE 1547-2018 and IEEE 1547.1-2020 updated requirements and a process for requesting and approving non default inverter settings. Proposal 27a is a consensus proposal. The Working Group Three Report explains that this proposal would clarify that Utilities may approve the full range of alternative smart inverter settings that could be useful for facilitating interconnection or providing grid services.<sup>313</sup> This proposal recognizes that there is no current process to request and receive permission for non-default settings to provide these grid services and thus allows for a future process to occur.<sup>15</sup>*

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<sup>313</sup> *Id.* [Working Group Three Report] at 113.”

From the Working Group Three report<sup>16</sup>:

*“Proposal 27-a. Consensus Add within Rule 21 Section Hh language that states “with mutual agreement, changes to default settings are allowed.” And within six months after release of an updated UL 1741 standard that includes IEEE 1547.1-2019, take the following two actions:*

- (1) update Rule 21 to account for IEEE 1547 and IEEE 1547.1 requirements; and*
- (2) determine the process for requesting and approving inverter settings that are **different from the default settings**, including modifications to generating facility inverter settings requested by either the distribution provider or by the Generating Facility owner or operator.<sup>23</sup>*

[formatting and emphasis added]

<sup>23</sup> Reference is made to IEEE 1547.1-2019 in Proposal 27-a due to the expectation that the forthcoming update to IEEE 1547.1 will be released in 2019. Should the release be delayed into 2020, this proposal should be adjusted to state, “And within six months after release of an updated UL 1741 standard that includes IEEE 1547.1-2020...”

In IREC’s protest, it notes, SDG&E and PG&E propose adding the following language to section Hh: “*The Smart Inverter default settings and default activation states may be modified upon mutual agreement between Applicant and Distribution Provider.*”

It appears for this advice letter it can be assumed proposals “27a.i) and 27a.iii)” refer to the WG3 report 27-a (1) and 27-a (2), as both discuss changes to IEEE 1547 and IEEE 1547.1 and default settings.

OP 55 requires the utilities to address OP 46<sup>17</sup> section i) (see above) in this advice letter.

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<sup>16</sup> Working Group Three Report, p110

<sup>17</sup> D. 20-09-035 OP 55 references the table at the end of the decision that includes the note “(for 27a.i).”

PG&E makes the following changes to the start of Section Hh (Original sheet **182**)

#### 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.

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 and Distribution Provider.**

### 5. Ordering Paragraph 49 – PCS for Non-Export and Limited Export

Ordering Paragraph 49 Language requires:

*“Proposal A-B 1 is adopted.*

*Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall modify their Rule 21 tariffs to allow the use of a power control system for **non-export and limited export interconnection applications**.*

*Rule 21 shall be modified to establish the following five specifications that generating facilities must meet to be treated as **non-export or limited export**:*

- i) use a power control system that passes the requirements of the Underwriters Laboratory (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol;*

- ii) use a power control system that has an open-loop response time of no more than two seconds, as provided in the control systems specification data sheets, and must be able to reduce export power to the approved export limit within two seconds of exceeding the approved export limit;*
- iii) Use only UL 1741 certified and/or UL 1741 SA listed grid-support non-islanding inverters;*
- iv) set the power control system to zero-export or some non-zero controlled maximum export value; and*
- v) maintain voltage fluctuations at the limits specified in Electric Rule 2.*

*Once meeting these five specifications, Utilities shall evaluate **non-export** interconnection applications as such:*

- a power control system can demonstrate non-export operations under Screen I; Screen D shall be omitted;*
- and Screens F and G shall be reviewed based on the generating facility's gross nameplate rating.*

*Once meeting these five specifications, Utilities shall evaluate **limited-export** interconnections applications as such:*

- limited export value can determine G will be based on the generating facility's nameplate rating. the impacts to the grid and in Screens D, I, J, K, M, N, O, and P;*
- and Screens F and G will be based on the generating facility's nameplate rating.”*  
[formatting and emphasis added]

In IREC's protest, it notes that PG&E re-styled the five qualification criteria from OP 49 as six criteria, and requests that the tariffs reflect only the five criteria outlined in OP 49 to ensure consistency across each of the tariffs and to more precisely comply with the Commission's order.

IREC also observes that PG&E has added a requirement not present in OP 49 that the generating facility's power control system must pass the most recent Underwriters Laboratories (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol.

Finally, IREC has concerns with language in each of the tariffs that requires power control systems to reduce export power to approved limits within two seconds.

As PG&E proposed in Section 1 above of this advice letter regarding OP 7, while many aspects of these the protests to these three OPs have been resolved, further stakeholder discussions are still underway. Once resolved PG&E will address these ordering paragraphs, in a new proposed advice letter, consistent with guidance from the CPUC staff. PG&E withdraws the changes for this OP made in AL 5988-E.

## 6. Ordering Paragraph 50 - PCS for Inadvertent Export

Ordering Paragraph 50 requires:

*“Proposal A-B 2 is adopted. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company (Utilities) shall modify their Rule 21 tariffs to allow the use of **a power control system for non-export and limited-export applications**.*

*Rule 21 tariffs shall be modified to require that, to be treated as **inadvertent export**, a generating facility must meet the following six specifications:*

- i) use a power control system that passed testing in conformance with the Underwriters Laboratory (UL) Power Control Systems Certification Requirements Decision (CRD) test protocol;*
- ii) use a power control system with an open-loop response time of no more than ten seconds as provided in the control systems’ specification data-sheets;*
- iii) use only UL 1741 SA certified and/or UL 1741 SA listed grid-support non-islanding inverters;*
- iv) use a power control system set to zero-export or some non-zero controlled maximum export value;*
- v) maintain voltage fluctuations to the limits specified in Electric Rule 2; and*
- vi) have a nameplate capacity equal to or less than 1,000 kilovolt amperes.*

*Upon meeting the six specifications, the Utilities shall*

- review the facility as such: apply Screens A through M using the aggregate nameplate inverter rate;*
- during Supplemental Review the applicant shall identify, within 15 days, the frequency of inadvertent export, the real power level in*

*watts of inadvertent export and the time duration of inadvertent export;*

- *if distribution upgrades are identified, Screen P shall recognize power control parameters taking into account local feeder conditions;*
- *and only the largest facility in the line section shall be used for aggregate evaluation for subsequent interconnection requests.*

*Utilities shall consider a customer's operating profile and the magnitude, duration, and frequency of anticipated export during the review of Screen P."*

[formatting and emphasis added]

IREC notes in its protest, "*the proposed language in each of the advice letters fails to account for inadvertent export from facilities that limit their exports to some specified maximum value*" requesting that "*each tariff should include language that allows facilities with nameplate capacities less than 1,000 kVA and that limit their exports to qualify for review under the inadvertent export process*" and that "*that section Mm2 reflect the concerns expressed above for section Mm1 regarding potential future updates to the UL CRD test protocol and the requirement to reduce export below approved limits within ten seconds*"

As PG&E proposed in Section 1 above of this advice letter regarding OP 7, while many aspects of these the protests to these three OPs have been resolved, further stakeholder discussions are still underway. Once resolved PG&E will address these ordering paragraphs, in a new proposed advice letter, consistent with guidance from the CPUC staff. PG&E withdraws the changes for this OP made in AL 5988-E

## **7. Other Changes**

The Rule 21 Table of contents is updated to reflect the other tariff changes shown in this advice letter.

For convenience of the reader, PG&E has included redline revisions in Attachment B. Where Sample Forms have been revised, the entire Sample Form is included in Attachment A (clean version), but the redline version in Attachment B only includes the pages where the modification has occurred, and excludes pages of the form where only the advice letter number and date has been updated within the footer of the page to reflect this advice letter.

Like the Sample Forms, where Electric Rule 21 has been revised, the affected sheets are included in Attachment A. However, the redline tariff revisions in Attachment B do not include pages that merely show location changes.

### **Protests**

Pursuant to CPUC General Order 96-B, Section 7.5.1, PG&E hereby requests the protest period be waived.

### **Effective Date**

Pursuant to General Order (GO) 96-B, Rule 5.1, this supplemental advice letter is submitted with a Tier 1 designation. PG&E requests that this Tier 1 supplemental advice submittal become effective upon date of submittal, which is May 19, 2021.

### **Notice**

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

/S/

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

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

### **Attachments:**

**Attachment A** – Clean version of updated Tariffs  
**Attachment B** – Redline Tariff Revision



# 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) #: 5988-E-A

Tier Designation: 1

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

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

AL Type:  Monthly  Quarterly  Annual  One-Time  Other:

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

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

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

Confidential treatment requested?  Yes  No

If yes, specification of confidential information:

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

Resolution required?  Yes  No

Requested effective date: 5/19/21

No. of tariff sheets: 229

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, 5915-E, 6093-E, 6154-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 Dietz, c/o Megan Lawson  
Title: Director, Regulatory Relations  
Utility Name: Pacific Gas and Electric Company  
Address: 77 Beale Street, Mail Code B13U  
City: San Francisco, CA 94177  
State: California Zip: 94177  
Telephone (xxx) xxx-xxxx: (415)973-2093  
Facsimile (xxx) xxx-xxxx: (415)973-3582  
Email: [PGETariffs@pge.com](mailto:PGETariffs@pge.com)

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

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49768-E	Electric Sample Form 79-1145 Rule 21 Exporting Generator Interconnection Request Sheet 1	48626-E
49769-E	Electric Sample Form No. 79-1174-02A Rule 21 Generator Interconnection Application - Attachment A Sheet 1	49267-E
49770-E	Electric Sample Form No. 79-1174-A Rule 21 Generator Interconnection Application - Attachment A Sheet 1	49281-E
49771-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 2	42299-E
49772-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 3	42300-E
49773-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 4	42301-E
49774-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 5	42302-E
49775-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 6	42303-E
49776-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 7	42304-E
49777-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 8	42305-E
49778-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 9	42306-E
49779-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 10	42307-E
49780-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 11	42308-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49781-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 12	42309-E
49782-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 13	42310-E
49783-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 14	42311-E
49784-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 55	42352-E
49785-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 56	42353-E
49786-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 57	
49787-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 58	42354-E
49788-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 59	42355-E
49789-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 60	42356-E
49790-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 61	42357-E
49791-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 62	42358-E
49792-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 63	42359-E
49793-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 64	42360-E
49794-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 65	42361-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49795-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 66	42362-E
49796-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 67	42363-E
49797-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 68	42364-E
49798-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 69	46398-E
49799-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 70	42366-E
49800-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 71	42367-E
49801-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 72	42368-E
49802-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 73	42369-E
49803-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 74	42370-E
49804-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 75	42371-E
49805-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 76	42372-E
49806-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 77	42373-E
49807-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 78	42374-E
49808-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 79	42375-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49809-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 80	42376-E
49810-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 81	42377-E
49811-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 82	42378-E
49812-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 83	42379-E
49813-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 84	42380-E
49814-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 85	42381-E
49815-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 86	42382-E
49816-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 87	42383-E
49817-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 88	42384-E
49818-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 89	42385-E
49819-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 90	42386-E
49820-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 91	42387-E
49821-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 92	42388-E
49822-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 93	42389-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49823-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 94	42390-E
49824-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 95	42391-E
49825-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 96	42392-E
49826-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 97	42393-E
49827-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 98	42394-E
49828-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 99	42395-E
49829-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 100	42396-E
49830-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 101	42397-E
49831-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 102	42398-E
49832-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 103	42399-E
49833-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 104	42400-E
49834-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 105	42401-E
49835-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 106	42402-E
49836-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 107	42403-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49837-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 108	42404-E
49838-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 109	42405-E
49839-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 110	42406-E
49840-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 111	42407-E
49841-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 112	42408-E
49842-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 113	42409-E
49843-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 114	42410-E
49844-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 115	42411-E
49845-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 116	42412-E
49846-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 117	42413-E
49847-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 118	42414-E
49848-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 119	42415-E
49849-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 120	42416-E
49850-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 121	42417-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49851-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 122	42418-E
49852-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 123	42419-E
49853-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 124	42420-E
49854-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 125	42421-E
49855-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 126	42422-E
49856-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 127	42423-E
49857-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 128	42424-E
49858-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 129	42425-E
49859-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 130	42426-E
49860-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 131	42427-E
49861-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 132	42428-E
49862-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 133	42429-E
49863-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 134	42430-E
49864-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 135	42431-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49865-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 136	42432-E
49866-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 137	42433-E
49867-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 138	42434-E
49868-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 139	42435-E
49869-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 140	42436-E
49870-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 141	42437-E
49871-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 142	42438-E
49872-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 143	42439-E
49873-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 144	42440-E
49874-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 145	42441-E
49875-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 146	42442-E
49876-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 147	42443-E
49877-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 148	42444-E
49878-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 149	42445-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49879-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 150	42446-E
49880-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 151	42447-E
49881-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 152	42448-E
49882-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 153	42449-E
49883-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 154	42450-E
49884-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 155	42451-E
49885-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 156	42452-E
49886-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 157	42453-E
49887-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 158	42454-E
49888-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 159	42455-E
49889-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 160	42456-E
49890-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 161	42457-E
49891-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 162	42458-E
49892-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 163	42459-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49893-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 164	42460-E
49894-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 165	42461-E
49895-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 166	42462-E
49896-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 167	42463-E
49897-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 168	42464-E
49898-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 169	42465-E
49899-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 170	42466-E
49900-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 171	42467-E
49901-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 172	42468-E
49902-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 173	42469-E
49903-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 174	42470-E
49904-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 175	42471-E
49905-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 176	42472-E
49906-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 177	42473-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49907-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 178	42474-E
49908-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 179	42475-E
49909-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 180	42476-E
49910-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 181	42477-E
49911-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 182	42478-E
49912-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 183	42479-E
49913-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 184	42480-E
49914-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 185	42481-E
49915-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 186	42482-E
49916-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 187	42483-E
49917-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 188	42484-E
49918-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 189	42485-E
49919-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 190	42486-E
49920-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 191	42487-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49921-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 192	42488-E
49922-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 193	42489-E
49923-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 194	42490-E
49924-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 195	42491-E
49925-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 196	42492-E
49926-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 197	43700-E
49927-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 198	43701-E
49928-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 199	43702-E
49929-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 200	43703-E
49930-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 201	43704-E
49931-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 202	46381-E
49932-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 203	43706-E
49933-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 204	42500-E
49934-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 205	46382-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49935-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 206	42502-E
49936-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 207	42503-E
49937-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 208	46383-E
49938-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 209	43709-E
49939-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 210	46384-E
49940-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 211	43711-E*
49941-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 212	43712-E
49942-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 213	43713-E
49943-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 214	42510-E
49944-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 215	42511-E
49945-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 216	42512-E
49946-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 217	42513-E
49947-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 218	42514-E
49948-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 219	42515-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49949-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 220	42516-E
49950-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 221	42517-E
49951-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 222	42518-E
49952-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 223	42519-E
49953-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 224	42520-E
49954-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 225	42521-E
49955-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 226	42522-E
49956-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 227	42523-E
49957-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 228	42524-E
49958-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 229	42525-E
49959-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 230	42526-E
49960-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 231	42527-E
49961-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 232	42528-E
49962-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 233	42529-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49963-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 234	42530-E
49964-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 235	42531-E
49965-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 236	42532-E
49966-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 237	42533-E
49967-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 238	42534-E
49968-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 239	42535-E
49969-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 240	42536-E
49970-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 241	42537-E
49971-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 242	42538-E
49972-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 243	42539-E
49973-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 244	42540-E
49974-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 245	42541-E
49975-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 246	42542-E
49976-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 247	42543-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
49977-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 248	42544-E
49978-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 249	42545-E
49979-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 250	42546-E
49980-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 251	42547-E
49981-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 252	42548-E
49982-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 253	42549-E
49983-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 254	42550-E
49984-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 255	42551-E
49985-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 256	42552-E
49986-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 257	42553-E
49987-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 258	42554-E
49988-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 259	47362-E
49989-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 260	47363-E
49990-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 261	47364-E

<b>Cal P.U.C. Sheet No.</b>	<b>Title of Sheet</b>	<b>Cancelling Cal P.U.C. Sheet No.</b>
49991-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 262	47365-E
49992-E	ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 263	42559-E
49993-E	ELECTRIC TABLE OF CONTENTS Sheet 1	49762-E
49994-E	ELECTRIC TABLE OF CONTENTS Sheet 20	48752-E
49995-E	ELECTRIC TABLE OF CONTENTS Sheet 24	49260-E
49996-E	ELECTRIC TABLE OF CONTENTS Sheet 25	49302-E



**Electric Sample Form 79-1145**  
Rule 21 Exporting Generator  
Interconnection Request

Sheet 1

**Please Refer to Attached  
Sample Form**



# RULE 21 EXPORTING GENERATOR INTERCONNECTION REQUEST

1. The undersigned Applicant submits this request to interconnect its Generating Facility with the Pacific Gas and Electric Company (PG&E or Distribution Provider) Distribution System pursuant to Rule 21 (check only one):

- Detailed Study Process
- Fast Track Process

2. This Interconnection Request is for (check only one):

- A proposed new Generating Facility.
- An increase in the generating capacity or a Material Modification of an existing Generating Facility.

3. Applicant provides the following information:

a. Address (to the extent known) or location, including the county, of the proposed new Generating Facility site or, in the case of an existing Generating Facility, the name and specific location, including the county, of the existing Generating Facility;

Project Name:

Project Location:

Street Address:

City, State:

County:

Zip Code:

GPS Coordinates:

b. Maximum net megawatt electrical output (as defined by section 2.c. of Attachment A to this appendix) of the proposed new Generating Facility or the amount of net megawatt increase in the generating capacity of an existing Generating Facility;

Maximum net megawatt electrical output (MW): \_\_\_\_\_ or

Net Megawatt increase (MW): \_\_\_\_\_



**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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g. Applicant Data (set forth in Attachment A)

*The Applicant shall provide to the Distribution Provider the technical data called for in Attachment A.*

h. AC Disconnect Switch. List the AC disconnect switch that will be used at this Generating Facility (enter "N/A" if not applicable)

Disconnect Switch Manufacturer: \_\_\_\_\_

Disconnect Switch Model Number: \_\_\_\_\_

Disconnect Switch Rating (amps): \_\_\_\_\_

4. Application Fee and Detailed Study Deposit as specified in Rule 21 is required to complete this application. Upon receipt of this Interconnection Request and Attachment A, PG&E will send a separate invoice for the applicable fee or deposit. **PLEASE DO NOT INCLUDE ANY CHECKS/MONIES WITH THIS INTERCONNECTION REQUEST.** (Any checks/monies submitted with this IR will be returned to the sender and may result in a delay in the application process.)

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

\_\_\_\_\_ Yes \_\_\_\_\_ No

5. Attach evidence of Site Exclusivity as specified in Rule 21 Section E.2.d as applicable, and name(s), address(es) and contact information of site owner(s).

6. **Interconnection Request Instructions:** Complete this interconnection request and enter this information into PG&E's web-based form. (PG&E strongly recommends preparing all information and materials before starting the online interconnection request.) The online web-based form can be found at:

[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)

Questions concerning PG&E's online interconnection request process can be directed to the Electric Generation Interconnection Department at **rule21gen@pge.com..**

7 Representative of Applicant to contact:

[To be completed by Applicant]

Name:

Title:

Company Name:

Street Address:

City, State:

Zip Code:

Phone Number:

Fax Number:

Email Address:

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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8. If the Applicant also requires new Distribution Service, the Distribution Provider will coordinate these efforts with this application. The Applicant must also complete a PG&E Application for Service. Additional fees may be required if a service or line extension is required (in accordance with PG&E Electric Rules 15 and 16). Please contact PG&E's Building and Renovation Services Center (BRSC): 1-800-743-7782 to initiate the application for the new Distribution Service. Additional information will be required in conjunction with an application for new Distribution Service.
9. Applicant should be aware that if Applicant has not yet received Rule 21 Screen Q results from PG&E by March 15 following submittal of this IR, Applicant will need to submit, if Applicant voluntarily chooses to do so, an Interconnection Request under PG&E's FERC Wholesale Distribution Tariff (WDT) by the close of the CAISO cluster application window (refer to <http://www.caiso.com/docs/2002/06/11/2002061110300427214.html> for the exact date) in order to participate in the Transmission Cluster Study for the year. An application under WDT will not impact the results of this Rule 21 study.
10. This agreement at all times shall be subject to such modifications as the California Public Utilities Commission may direct from time to time in the exercise of its jurisdiction.

11. This Interconnection Request is submitted by:

Legal name of Applicant: \_\_\_\_\_

By (signature): \_\_\_\_\_

Name (type or print): \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

# PG&E'S RULE 21 EXPORTING GENERATOR INTERCONNECTION REQUEST

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## Attachment A to PG&E Rule 21 Exporting Generator Interconnection Request

### GENERATING FACILITY DATA

Each Applicant will complete Sections 1 and 2 of this Attachment A.

Each Applicant will complete the applicable data in Sections 3 through 6 of this Attachment A based on the type of generating facility(ies) requesting interconnection. (Section 3 for synchronous generators, Section 4 for induction generators, Section 5 for wind turbine generators, and Section 6 for inverter-based generators).

Each Applicant will complete Sections 7 through 10, as applicable.

At any time, Distribution Provider may require Applicant to provide additional technical data, or additional documentation supporting the technical data provided, as deemed necessary by the Distribution Provider to perform Interconnection Studies, other studies, or evaluations as set forth under Rule 21.

**1. Provide electronic copies of the following:**

- A. Site drawing to scale, showing generator location and Point of Interconnection with the Distribution Provider's Distribution System.
- B. Single-line diagram showing applicable equipment such as generating units, step-up transformers, auxiliary transformers, switches/disconnects of the proposed interconnection, including the required protection devices and circuit breakers. For wind and photovoltaic generator projects, the one line diagram should include the distribution lines connecting the various groups of generating units, the generator capacitor banks, the step up transformers, the distribution lines, and the substation transformers and capacitor banks at the Point of Interconnection with the Distribution Provider's Distribution System. This one-line drawing must be signed and stamped by a licensed Professional Engineer if the Generating Facility is larger than 50 kW.
- C. AC and DC schematics if available. Required for detailed study process.
- D. Description of operations.

Note: Electronic processing is preferred, however, if submitting via U.S. mail, provide one original print of items in A through D, above.

**2. Generating Facility General Information:**

- A. Total Generating Facility rated output (MW): \_\_\_\_\_
- B. Generating Facility auxiliary Load (MW): \_\_\_\_\_
- C. Project net capacity (MW): \_\_\_\_\_
- D. Standby Load when Generating Facility is off-line (MW): \_\_\_\_\_
- E. Number of Generating Units: \_\_\_\_\_  
(Please repeat the following items for each generator)
- F. Individual generator rated output (MW for each unit): \_\_\_\_\_
- G. Type (induction, synchronous, D.C. with inverter): \_\_\_\_\_
- H. Phase (3 phase or single phase): \_\_\_\_\_

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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**3. Synchronous Generator –Information:**

**3A Generator Information:**

(Please repeat the following for each generator)

- A. Manufacturer: \_\_\_\_\_
- B. Year Manufactured: \_\_\_\_\_
- C. Rated Generator speed (rpm): \_\_\_\_\_
- D. Rated MVA: \_\_\_\_\_
- E. Rated Terminal Voltage (kV): \_\_\_\_\_
- F. Rated Generator Power Factor Range: \_\_\_\_\_
- G. Generator Efficiency at Rated Load (%): \_\_\_\_\_
- H. Moment of Inertia (including prime mover): \_\_\_\_\_
- I. Inertia Time Constant (on machine base) H: \_\_\_\_\_ sec or MJ/MVA
- J. SCR (Short-Circuit Ratio - the ratio of the field current required for rated open-circuit voltage to the field current required for rated short-circuit current): \_\_\_\_\_
- K. Please attach generator reactive capability curves.
- L. Rated Hydrogen Cooling Pressure in psig (Steam Units only): \_\_\_\_\_
- M. Please attach a plot of generator terminal voltage versus field current that shows the air gap line, the open-circuit saturation curve, and the saturation curve at full load and rated power factor.

**3B Excitation System Information:**

(Please repeat the following for each generator)

- A. Indicate the Manufacturer \_\_\_\_\_ and Type \_\_\_\_\_ of excitation system used for the generator. For exciter type, please choose from 1 to 9 below or describe the specific excitation system.
  - (1) Rotating DC commutator exciter with continuously acting regulator. The regulator power source is independent of the generator terminal voltage and current.
  - (2) Rotating DC commutator exciter with continuously acting regulator. The regulator power source is bus fed from the generator terminal voltage.
  - (3) Rotating DC commutator exciter with non-continuously acting regulator (i.e., regulator adjustments are made in discrete increments).
  - (4) Rotating AC Alternator Exciter with non-controlled (diode) rectifiers. The regulator power source is independent of the generator terminal voltage and current (not bus-fed).

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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- (5) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers. The regulator power source is fed from the exciter output voltage.
  - (6) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers.
  - (7) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from the generator terminal voltage.
  - (8) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current (compound-source controlled rectifiers system).
  - (9) Other (specify): \_\_\_\_\_
- B. Attach a copy of the block diagram of the excitation system from its instruction manual. The diagram should show the input, output, and all feedback loops of the excitation system.
- C. Excitation system response ratio (ASA): \_\_\_\_\_
- D. Full load rated exciter output voltage: \_\_\_\_\_
- E. Maximum exciter output voltage (ceiling voltage): \_\_\_\_\_
- F. Other comments regarding the excitation system? \_\_\_\_\_
- 

**3C Turbine-Governor Information:**

(Please repeat the following for each generator)

Please complete Part A for steam, gas or combined-cycle turbines, Part B for hydro turbines, and Part C for both.

A. Steam, gas or combined-cycle turbines:

- (1) List type of unit (Steam, Gas, or Combined-cycle): \_\_\_\_\_
- (2) If steam or combined-cycle, does the turbine system have a reheat process (i.e., both high and low pressure turbines)? \_\_\_\_\_
- (3) If steam with reheat process, or if combined-cycle, indicate in the space provided, the percent of full load power produced by each turbine:  
Low pressure turbine or gas turbine: \_\_\_\_\_ %  
High pressure turbine or steam turbine: \_\_\_\_\_ %
- (4) For combined cycle plants, specify the plant net output capacity (MW) for an outage of the steam turbine or an outage of a single combustion turbine: \_\_\_\_\_

B. Hydro turbines:

- (1) Turbine efficiency at rated load: \_\_\_\_\_ %
- (2) Length of penstock: \_\_\_\_\_ ft

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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- (3) Average cross-sectional area of the penstock: \_\_\_\_\_ ft<sup>2</sup>
- (4) Typical maximum head (vertical distance from the bottom of the penstock, at the gate, to the water level): \_\_\_\_\_ ft
- (5) Is the water supply run-of-the-river or reservoir: \_\_\_\_\_
- (6) Water flow rate at the typical maximum head: \_\_\_\_\_ ft<sup>3</sup>/sec
- (7) Average energy rate: \_\_\_\_\_ kW-hrs/acre-ft
- (8) Estimated yearly energy production: \_\_\_\_\_ kW-hrs

C. Complete this section for each machine, independent of the turbine type.

- (1) Turbine manufacturer: \_\_\_\_\_
- (2) Maximum turbine power output: \_\_\_\_\_ MW
- (3) Minimum turbine power output (while on line): \_\_\_\_\_ MW
- (4) Governor information:
  - (a) Droop setting (speed regulation): \_\_\_\_\_
  - (b) Is the governor mechanical-hydraulic or electro-hydraulic (Electro-hydraulic governors have an electronic speed sensor and transducer.)? \_\_\_\_\_
  - (c) Other comments regarding the turbine governor system?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**3D Short Circuit Duty Information:**

For each generator, provide the following reactances expressed in p.u. on the generator base:

- X<sub>d</sub> – Direct Axis Synchronous Reactance: \_\_\_\_\_ p.u.
- X'<sub>d</sub> – Direct Axis Transient Reactance: \_\_\_\_\_ p.u.
- X''<sub>d</sub> – Direct Axis Subtransient Reactance: \_\_\_\_\_ p.u.
- X<sub>2</sub> – Negative Sequence Reactance: \_\_\_\_\_ p.u.
- X<sub>0</sub> – Zero Sequence Reactance: \_\_\_\_\_ p.u.

Generator Grounding (select one for each model):

- A. \_\_\_\_\_ Solidly grounded
- B. \_\_\_\_\_ Grounded through an impedance  
(Impedance value in p.u. on generator base. R: \_\_\_\_\_ p.u.  
X: \_\_\_\_\_ p.u.)
- C. \_\_\_\_\_ Ungrounded

**4. Induction Generator Information:**

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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(Please repeat the following for each generator)

- A. Motoring Power (kW): \_\_\_\_\_
- B.  $I_2^2t$  or K (Heating Time Constant): \_\_\_\_\_
- C. Rotor Resistance,  $R_r$ : \_\_\_\_\_
- D. Stator Resistance,  $R_s$ : \_\_\_\_\_
- E. Stator Reactance,  $X_s$ : \_\_\_\_\_
- F. Rotor Reactance,  $X_r$ : \_\_\_\_\_
- G. Magnetizing Reactance,  $X_m$ : \_\_\_\_\_
- H. Short Circuit Reactance,  $X_d''$ : \_\_\_\_\_
- I. Exciting Current: \_\_\_\_\_
- J. Temperature Rise: \_\_\_\_\_
- K. Frame Size: \_\_\_\_\_
- L. Design Letter: \_\_\_\_\_
- M. Reactive Power Required In Vars (No Load): \_\_\_\_\_
- N. Reactive Power Required In Vars (Full Load): \_\_\_\_\_
- O. Total Rotating Inertia, H: \_\_\_\_\_ Per Unit on kVA Base

**5. Wind Turbine Generator (WTG) Information:**

(Proposed projects may include one or more WTG types. Please repeat the following for each type of WTG).

- A. WTG Manufacturer and Model: \_\_\_\_\_
- B. Number of WTGs: \_\_\_\_\_
- C. WTG Type (check one):
  - \_\_\_\_\_ Type 1 (Squirrel-cage induction generator)
  - \_\_\_\_\_ Type 2 (Wound rotor induction machine with variable rotor resistance)
  - \_\_\_\_\_ Type 3 (Doubly-fed asynchronous generator)
  - \_\_\_\_\_ Type 4 (Full converter interface)
- D. Nameplate Rating (each WTG): \_\_\_\_\_ / \_\_\_\_\_ kW/kVA
- E. Rated Terminal Voltage: \_\_\_\_\_ kV
- F. For Type 1 or Type 2 WTGs:
  - (1) uncompensated power factor at full load: \_\_\_\_\_
  - (2) power factor correction capacitors at full load: \_\_\_\_\_ MVAR
  - (3) number of shunt stages and size: \_\_\_\_\_
  - (4) Please attach capability curve describing reactive power or power factor range from no output to full rated output, including the effect of shunt compensation
- G. For Type 3 or Type 4 WTGs:
  - (1) Maximum under-excited power factor at full load: \_\_\_\_\_
  - (2) Maximum over-excited power factor at full load: \_\_\_\_\_
  - (3) Control mode: \_\_\_\_\_ (voltage control, fixed power factor)
  - (4) Please attach capability curve describing reactive power or power factor range from no output to full rated output

**PG&E'S RULE 21**  
**EXPORTING GENERATOR INTERCONNECTION REQUEST**

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- H. Short Circuit Characteristics: Applicant to provide technical data related to the short circuit characteristics of proposed WTGs for short circuit duty study modeling purposes. For example, the applicant can provide manufacturer short circuit test data showing faulted condition for three phase and single-line-to-ground fault.

Distribution Provider may require testing verification of voltage and harmonic performance during commissioning test of WTG based generation projects.

**6. Inverter Based Generation Systems Information:**

Proposed inverter based generation projects may include one or more types of inverters. Please provide answers to the following for each type of inverter.

- A. Inverter Manufacturer and Model: \_\_\_\_\_  
B. Number of Inverters: \_\_\_\_\_  
C. Nameplate Rating (AC, each inverter): \_\_\_\_\_ / \_\_\_\_\_ kW  
D. Nameplate Voltage Rating (AC): \_\_\_\_\_ kV  
E. Maximum AC line current: \_\_\_\_\_ Amps  
F. Nameplate Power Factor Rating (AC): \_\_\_\_\_  
G. Please attach capability curve describing reactive power or power factor range from no output to full rated output  
H. Inverter control mode (e.g. voltage, power factor, reactive power): \_\_\_\_\_  
I. Short Circuit Characteristics: Applicant to provide technical data related to the short circuit characteristics of proposed inverter based generation systems. For example, the applicant can provide a sinusoidal waveform test data showing faulted condition at the AC side of the inverter for a three phase and single-line-to-ground fault.  
J. Harmonics Characteristics:  
(1) Inverter switching frequency: \_\_\_\_\_  
(2) Harmonic characteristics for each unit up to switching frequency: \_\_\_\_\_  
(3) Harmonic characteristics for aggregate generation facility: \_\_\_\_\_  
K. Inverter disconnection characteristics: Applicant to provide voltage sinusoidal waveform test data which shows the voltage characteristics during disconnection of inverter system from distribution system at 100% and at 50% of rated output.

Distribution Provider may require testing verification of voltage and harmonic performance during commissioning test of the inverter based generation systems.

**7. Step-Up Transformer Data:**

For each step-up transformer (e.g. main step-up transformers, padmount transformers), fill out the data form provided in Table 1.

# PG&E'S RULE 21

## EXPORTING GENERATOR INTERCONNECTION REQUEST

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### 8. Plant-Level Reactive Power Compensation Data:

Provide the following information for plant-level reactive power compensation, if applicable:

- A. Number of individual shunt capacitor banks: \_\_\_\_\_
- B. Individual shunt capacitor bank rated voltage (kV): \_\_\_\_\_
- C. Individual shunt capacitor bank size (kVAR at rated voltage): \_\_\_\_\_
- D. Planned dynamic reactive control devices (SVC, STATCOM): \_\_\_\_\_
- E. Control range: \_\_\_\_\_ kVAR (lead) \_\_\_\_\_ kVAR (lag)
- F. Control mode (e.g. voltage, power factor, reactive power): \_\_\_\_\_
- G. Please provide the overall plant reactive power control strategy

### 9. Load Flow and Dynamic Models:

**Only provide data in this section when requested by the Distribution Provider.**

The WECC Data Preparation Manual for Power Flow Base Cases and Dynamic Stability Data has established power flow and dynamic modeling requirements for generation projects in WECC base cases. In general, if the aggregate sum of generation on a bus exceeds 10 MVA, it should not be netted. Furthermore, the total netted generation in an area should not exceed five percent of the area's total generation. Based on current WECC modeling requirements, the following information will be required for all generation projects whose net capacity is greater than 10 MVA. The following information may also be required for generation projects less than 10 MVA on a case-by-case basis, based on the amount of generation in the area of the requested Point of Interconnection.

- A. Provide load flow model for the generating plant and its interconnection facilities in GE PSLF \*.epc format, including new buses, generators, transformers, interconnection facilities. An equivalent model is required for the plant with generation collector systems. This data should reflect the technical data provided in this Attachment A.
- B. For each generator, governor, exciter, power system stabilizer, WTG, or inverter based generator, select the appropriate dynamic models from the General Electric PSLF Program Manual and provide the required input data. Include any user written \*.p EPCL files to simulate inverter based plants' dynamic responses (typically needed for inverter based PV/wind plants). Provide a completed \*.dyd file that contains the information specified in this section.

The GE PSLF manual is available upon request from GE. There are links within the GE PSLF User's Manual to detailed descriptions of specific models, a definition of each parameter, a list of the output channels, explanatory notes, and a control system block diagram. In addition, GE PSLF modeling information and various modeling guidelines

## **PG&E'S RULE 21 EXPORTING GENERATOR INTERCONNECTION REQUEST**

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documents have been prepared by the WECC Modeling and Validation Work Group. This information is available on the WECC website ([www.wecc.biz](http://www.wecc.biz)).

If you require assistance in developing the models, we suggest you contact General Electric. Accurate models are important to obtain accurate study results. Costs associated with any changes in facility requirements that are due to differences between model data provided by the generation developer and the actual generator test data, may be the responsibility of the generation developer.

**PG&E'S RULE 21  
EXPORTING GENERATOR INTERCONNECTION REQUEST**

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TABLE 1

TRANSFORMER DATA  
(Provide for each level of transformation)

UNIT \_\_\_\_\_

NUMBER OF TRANSFORMERS \_\_\_\_\_ PHASE \_\_\_\_\_

RATING	H Winding	X Winding	Y Winding
Rated MVA	_____	_____	_____
Connection (Delta, Wye, Gnd.)	_____	_____	_____
Cooling Type (OA,OA/FA, etc.) :	_____	_____	_____
Temperature Rise Rating	_____	_____	_____
Rated Voltage	_____	_____	_____
BIL	_____	_____	_____
Available Taps (% of rating)	_____	_____	_____
Load Tap Changer? (Y or N)	_____	_____	_____
Tap Settings	_____	_____	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	_____	_____	_____
MVA Base	_____	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H \_\_\_\_\_ X \_\_\_\_\_ Y \_\_\_\_\_ N \_\_\_\_\_

PERCENT EXCITING CURRENT 100 % Voltage; \_\_\_\_\_ 110% Voltage \_\_\_\_\_

Supply copy of nameplate and manufacturer's test report when available.



**Electric Sample Form No. 79-1174-02A**  
Rule 21 Generator Interconnection Application - Attachment A

Sheet 1

**Please Refer to Attached  
Sample Form**

(Continued)

*Advice* 5988-E-A  
*Decision* D.20-09-035

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

*Submitted* May 19, 2021  
*Effective* May 19, 2021  
*Resolution* \_\_\_\_\_



# INTERCONNECTION APPLICATION (Form 79-1174-02)

## ATTACHMENT A

### CUSTOMER AND PROJECT INFORMATION

#### Part I - Selecting the Study Process

Please check one:

- Fast Track Process<sup>1</sup>.
- Greater than 1 MW generation facility,
- Detailed Study (not typical)
  - Will be either an Independent Study Process, Distribution Group Study Process or Transmission Cluster Study Process, dependent upon the Electrical Independence Tests.

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

\_\_\_\_\_ Yes \_\_\_\_\_ No

#### Part II – Identifying the Generating Facility Location and Responsible Parties

<i>Project Name:</i>

**A. Generating Facility Account Information** (What electric service will the Generating Facility be interconnected for parallel operation with PG&E? For aggregated electric accounts provide the primary account and meter information).

Name shown on PG&E service account	Electric Service Agreement ID number - 10-digits	Electric Badge (Meter) Number - 6-10 digits (alpha numeric)

**NOTE: Customer Electric account must match the customer's utility bill account information.**

		CA	
Meter Location Street Address	City	State	Zip - 5-digits

**Please check all that apply:**

- A New Generating Facility interconnection (at an existing service).
- Physical Changes to an interconnected Generating Facility with previous approval by PG&E (adding PV panels, adding energy storage as an addition or enhancement, changing inverters/turbines or changing load and/or operations).
- A New interconnection in conjunction with a new service.
  - An **Application for Service** must be completed. Additional fees may be required if a service or line extension is required (in accordance with PG&E Electric Rules 15 and 16). Please contact PG&E at 1-800-PGE-5000 or Rule21Gen@pge.com.
- An Interconnection under Direct Access (DA).

<sup>1</sup> See Electric Rule 21 for FAST TRACK requirements.



# INTERCONNECTION APPLICATION (Form 79-1174-02)

## ATTACHMENT A

### **CUSTOMER AND PROJECT INFORMATION**

- Customers applying for interconnection who are served under Direct Access by an Electric Service Provider (ESP) must contact their ESP directly for information regarding the options available under their Direct Access contract.
- An Interconnection under Community Choice Aggregation Service (CCA Service).
  - Customers applying for interconnection who are served under Community Choice Aggregation Service (CCA Service) by a Community Choice Aggregator (CCA) must contact their CCA directly for information regarding the options available under their CCA Service Program.
- An interconnected non-exporting Generating Facility (load always exceeds generation).

**B. Customer Account Contact Information -**

Mailing Address			
City		State	Zip - 5-digits
( ) - _____	( ) - _____		
Business Phone	Home Phone	Fax	Email

**C. Contractor Information (Must be completed even if Contractor will not serve as a PG&E contact).**

Contact		Company Name	
Mailing Address			
City		State	Zip - 5-digits
( ) - _____	( ) - _____		
Business Phone	Fax	Email	
<input type="checkbox"/> Yes <input type="checkbox"/> No			
Does Contractor have Contractors State License Board (CSLB) Number?	Contractors State License Board Number		

**D. Project Contact Information (Who is the project manager for this Generating Facility?)**

Contact		Company Name	
Mailing Address			



# INTERCONNECTION APPLICATION (Form 79-1174-02)

## ATTACHMENT A

### CUSTOMER AND PROJECT INFORMATION

City	State	Zip - 5-digits
( ) -	( ) -	
Business Phone	Fax	Email

What is the <b>maximum 3-phase fault current</b> that will be contributed by the Generating Facility to a 3-phase fault at the Point of Common Coupling (PCC)? (If the Generating Facility is single phase in design, please provide the contribution for a line-to-line fault).	_____ Amps
Please indicate the <b>short circuit interrupting rating</b> of the host Customer facility's service panel:	_____ Amps

Refer to PG&E's Rule 21, Section G, for significance and additional information. To determine this value, any transformers and/or significant lengths of interconnecting conductor used between each of the Generators (if there are more than one) that make up the Generating Facility and the PCC must be taken into account. The details, impedance, and arrangement of such transformers and interconnecting conductors should be shown on the single-line diagram that is provided. Consult an electrical engineer or the equipment supplier if assistance is needed in answering this question.

It is expected that most Applicants will want to reserve the flexibility to operate any or all of their Generators in parallel. If the design of the proposed Generating Facility limits the amount of generation that may be interconnected at any time to PG&E's Electric System, please describe the assumptions used in calculating the maximum fault current contribution value.

For Customer applying for interconnection under Schedules

- i) NEM2 – Net Energy Metering Service (including NEM2A – Load Aggregation, Or NEM2MT- Multiple Tariff- with a NEM2 eligible generator), or
- ii) NEM2V – Virtual Net Energy Metering Service, or
- iii) NEM2VMS- Virtual Net Energy Metering For Multifamily Affordable Housing (MASH/NSHP) With Solar Generator(s),

please note, pursuant to California Public Utilities Commission Decision (D.) 16-01-044:

**CEC Listed**

In order to promote the safety and reliability of the customer's Generating Facility, the applicant certifies that as a part its request for NEM2, that all major solar system components are on the verified equipment list maintained by the California Energy Commission and certifies that other equipment, as determined by PG&E, has safety certification from a nationally recognized testing laboratory.

**Warranties or Service Agreements**

Applicant certifies as a part of its interconnection request for NEM2 that:

- (i) a warranty of at least 10 years has been provided on all equipment and on its installation, or
- (ii) a 10-year service warranty or executed "agreement" has been provided ensuring proper maintenance and continued system performance.

**Interconnection Fees**

Customers on this tariff must pay for the interconnection of their Generation Facilities as provided in Electric Rule 21.



**Electric Sample Form No. 79-1174-A**  
Rule 21 Generator Interconnection Application - Attachment A

Sheet 1

**Please Refer to Attached  
Sample Form**

(Continued)

*Advice* 5988-E-A  
*Decision* D.20-09-035

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

*Submitted* May 19, 2021  
*Effective* May 19, 2021  
*Resolution* \_\_\_\_\_



# FORM 79-1174 - ATTACHMENT A - INTERCONNECTION APPLICATION - CUSTOMER AND PROJECT INFORMATION

## Part I - Selecting the Study Process<sup>1</sup>

This Application is not applicable for incentives and/or rebates offered by the Energy Resources Conservation and Development Commission (CEC), the CPUC or any other entity. Please contact those agencies directly or on their respective websites:

[www.energy.ca.gov](http://www.energy.ca.gov) and [www.cpuc.ca.gov](http://www.cpuc.ca.gov).

Please check one:

- Fast Track Process.
- Detailed Study (not typical)
  - Will be either an Independent Study Process, Distribution Group Study Process or Transmission Cluster Study Process, dependent upon the Electrical Independence Tests.

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

\_\_\_\_ Yes \_\_\_\_ No

## Part II – Identifying the Generating Facility Location and Responsible Parties

Project Name:

**A. Generating Facility Account Information** (What electric service will the Generating Facility be interconnected for parallel operation with PG&E? For aggregated electric accounts provide the primary account and meter information).

Name shown on PG&E service account	Electric Service Agreement ID number - 10-digits	Electric Badge (Meter) Number - 6-10 digits (alpha numeric)

**NOTE: Customer Electric account must match the customer's utility bill account information.**

		CA	
Meter Location Street Address	City	State	Zip - 5-digits

Please check all that apply:

- A New Generating Facility interconnection (at an existing service).
- Physical Changes to an interconnected Generating Facility with previous approval by PG&E (adding PV panels, adding energy storage as an addition or enhancement, changing inverters/turbines or changing load and/or operations).
- A New interconnection in conjunction with a new service.

<sup>1</sup> For selection of Study Process for Exporting Generating Facilities, please complete the Rule 21 Exporting Generating Facility Interconnection Request Form 79-1145.



# INTERCONNECTION APPLICATION (Form 79-1174)

## ATTACHMENT A

### CUSTOMER AND PROJECT INFORMATION

- An **Application for Service** must be completed. Additional fees may be required if a service or line extension is required (in accordance with PG&E Electric Rules 15 and 16). Please contact PG&E at 1-800-PGE-5000 or Rule21Gen@pge.com.
- An Interconnection under Direct Access (DA).
  - Customers applying for interconnection who are served under Direct Access by an Electric Service Provider (ESP) must contact their ESP directly for information regarding the options available under their Direct Access contract.
- An Interconnection under Community Choice Aggregation Service (CCA Service).
  - Customers applying for interconnection who are served under Community Choice Aggregation Service (CCA Service) by a Community Choice Aggregator (CCA) must contact their CCA directly for information regarding the options available under their CCA Service Program.
- An interconnected non-exporting Generating Facility (load always exceeds generation).

**B. Customer Account Contact Information -**

Mailing Address			
City	State	Zip - 5-digits	
( ) - _____	( ) - _____		
Business Phone	Home Phone	Fax	Email

**C. Contractor Information (Must be completed even if Contractor will not serve as a PG&E contact).**

Contact	Company Name		
Mailing Address			
City	State	Zip - 5-digits	
( ) - _____	( ) - _____		
Business Phone	Fax	Email	
<input type="checkbox"/> Yes <input type="checkbox"/> No			
Does Installer have Contractors State License Board (CSLB) Number?		Contractors State License Board Number	

**D. Project Contact Information (Who is the project manager for this Generating Facility?)**

Contact	Company Name
Mailing Address	



# INTERCONNECTION APPLICATION (Form 79-1174) ATTACHMENT A CUSTOMER AND PROJECT INFORMATION

City	State	Zip - 5-digits
( ) -	( ) -	
Business Phone	Fax	Email

What is the <b>maximum 3-phase fault current</b> that will be contributed by the Generating Facility to a 3-phase fault at the Point of Common Coupling (PCC)? (If the Generating Facility is single phase in design, please provide the contribution for a line-to-line fault).	_____ Amps
Please indicate the <b>short circuit interrupting rating</b> of the host Customer facility's service panel:	_____ Amps

Refer to PG&E's Rule 21, Section G, for significance and additional information. To determine this value, any transformers and/or significant lengths of interconnecting conductor used between each of the Generators (if there are more than one) that make up the Generating Facility and the PCC must be taken into account. The details, impedance, and arrangement of such transformers and interconnecting conductors should be shown on the single-line diagram that is provided. Consult an electrical engineer or the equipment supplier if assistance is needed in answering this question.

It is expected that most Applicants will want to reserve the flexibility to operate any or all of their Generators in parallel. If the design of the proposed Generating Facility limits the amount of generation that may be interconnected at any time to PG&E's Distribution System, please describe the assumptions used in calculating the maximum fault current contribution value.

**E. Customer Impacted by a Natural or Man-Made Disaster**

Customers who were taking service on the NEM tariff prior to the total or partial destruction of their system have the option to resume service on the same NEM tariff if a request for reapplication is received within two years from the date of destruction. To be eligible for this provision, all the following must be true:

1. You are the same PG&E customer of record pre-system destruction
2. You are now reapplying with a system that is sized to your most recent 12 months usage, or estimated usage that is determined by building size<sup>2</sup> (if applicable)
3. You are not operating the new (either completely new or partially new) system without written permission from PG&E
4. Your NEM Transition Period has not expired at the time of reapplication (see NEM Tariff)

Based on the above, select the appropriate box (check one):

- I am a Customer who was impacted by a Natural or Man-Made Disaster as described in the NEM Tariffs and the above statements are true. I will submit my application online at <https://www.egi-pge.com/> and will include the complete system currently onsite on the single line diagram. If my previous system was destroyed, I will also state this on the single line diagram.
- I am either ineligible for this provision or this provision does not apply to my application. In either case, I will submit my application online at <https://www.egi-pge.com/>.

<sup>2</sup> Building Size Calculation: Sq Ft X 3.23. Note: 2 watts/sq ft x 1/1,000 watts x 8,760 hrs/yr x 0.19 solar capacity factor = 3.32



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

Sheet 2

TABLE OF CONTENTS (Cont'd.)

D.	GENERAL, RULES, RIGHTS AND OBLIGATIONS (Cont'd.)		
8.	PRUDENT OPERATION AND MAINTENANCE REQUIRED	39	
9.	CURTAILMENT AND DISCONNECTION	40	
10.	LOCAL FURNISHING BONDS	40	
11.	COORDINATION WITH AFFECTED SYSTEMS	41	
12.	TRANSFERABILITY OF INTERCONNECTION REQUEST	41	
13.	SPECIAL PROVISIONS APPLICABLE TO CERTAIN NET ENERGY METERED APPLICANTS	41	
14.	SPECIAL PROVISIONS APPLICABLE TO NON-EXPORT ENERGY STORAGE GENERATING FACILITIES	45	
15.	COMPLIANCE WITH ESTABLISHED TIMELINES	45	
16.	MODIFICATION OF TIMELINES	45	
E.	INTERCONNECTION REQUEST SUBMISSION PROCESS	46	
1.	OPTIONAL STANDARD AND ENHANCED PRE-APPLICATION REPORTS	46	
a.	Standard Pre-Application Report	46	
b.	Enhanced Pre-Application Report	47	
2.	INTERCONNECTION REQUEST PROCESS	51	
a.	Applicant Initiates Contact with Distribution Provider	51	
b.	Applicant Selects a Study Process	52	
c.	Applicant Completes an Interconnection Request	53	
d.	Site Exclusivity	56	
3.	INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT	56	
a.	Detailed Study Deposit	57	(T)

(Continued)



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

Sheet 3

TABLE OF CONTENTS (Cont'd.)

E.	INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)		
4.	INTERCONNECTION COST RESPONSIBILITY	62	(T)
a.	Costs of Interconnection and Parallel Operation	62	
b.	Methodology and Timing of Cost Identification	62	
c.	Timing of Cost Identification	63	
d.	Producer Costs During Parallel Operation	63	
e.	Cost Allocation	63	
f.	Summary Tables	65	
5.	INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION	67	
a.	Acknowledgement of Interconnection Request	67	
b.	Deficiencies in Interconnection Request	67	
c.	Assignment of Queue Position	69	
d.	Publication of the Interconnection Queue	70	
F.	REVIEW PROCESS FOR INTERCONNECTION REQUESTS	71	
1.	OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS	71	
a.	Valid Interconnection Request	71	
b.	Fast Track Review	72	
c.	Detailed Studies	73	
d.	Compliance with Timelines	73	(T)

(Continued)



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

Sheet 4

TABLE OF CONTENTS (Cont'd.)

F.	REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)		
2.	FAST TRACK INTERCONNECTION REVIEW PROCESS	75	(T)
a.	Initial Review	75	
b.	Optional Initial Review Results Meeting	77	
c.	Supplemental Review	78	
d.	Optional Supplemental Review Results Meeting	82	
e.	Execution of the Generator Interconnection Agreement	83	
3.	DETAILED STUDY INTERCONNECTION REVIEW PROCESS	86	
a.	Detailed Study Track Selection Process	86	
b.	Independent Study Process	88	
c.	Distribution Group Study Process	97	
d.	Transmission Cluster Study Process	111	
e.	Generator Interconnection Agreement	113	
f.	Engineering & Procurement (E&P) Agreement	116	
4.	INTERCONNECTION FINANCIAL SECURITY	116	
a.	Types of Interconnection Financial Security	116	
b.	Initial Posting of Interconnection Financial Security	117	
c.	Second Posting of Interconnection Financial Security	119	
d.	Third Posting of Interconnection Financial Security	120	
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	121	(T)

(Continued)



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

Sheet 5

TABLE OF CONTENTS (Cont'd.)

F.	REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)		
5.	COMMISSIONING TESTING AND PARALLEL OPERATION	129	(T)
a.	Commissioning Testing	129	
b.	Parallel Operation or Momentary Parallel Operation	129	
6.	WITHDRAWAL	130	
7.	Cost Envelope Option	131	
a.	Eligibility for Cost Envelope Option	131	
b.	Cost Responsibility for Facilities Subject to Cost Envelope	133	
c.	Timing of Applicant's Selection of Cost Envelope and Payment of Deposit	134	
d.	Distribution Provider's Preparation of the Cost Envelope Estimate	136	
e.	Cost Elements Not Subject to Cost Envelope	137	
f.	Modifications	139	
g.	Tender of the Generator Interconnection Agreement Under the Cost Envelope Option	140	
G.	ENGINEERING REVIEW DETAILS	141	
1.	INITIAL REVIEW SCREENS	143	
a.	Screen A: Is the PCC on a Networked Secondary System?	143	
b.	Screen B: Is Certified Equipment used?	144	
c.	Screen C: Is the Starting Voltage Drop within acceptable limits?	145	(T)

(Continued)



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

Sheet 6

TABLE OF CONTENTS (Cont'd.)

G.	ENGINEERING REVIEW DETAILS (Cont'd.)		
1.	INITIAL REVIEW SCREENS (Cont'd.)		
	d. Screen D: Is the transformer or secondary conductor rating exceeded?	146	(T)
	e. Screen E: Does the Single-Phase Generator cause unacceptable imbalance?	146	
	f. Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits?	147	
	g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?	148	
	h. Screen H: Is the line configuration compatible with the Interconnection type?	149	
	i. Screen I: Will power be exported across the PCC?	150	
	j. Screen J: Is the Gross Rating of the Generating Facility 11 kVA or less?	153	
	k. Screen K: Is the Generating Facility a Net Energy Metering (NEM) Generating Facility with nameplate capacity less than or equal to 500kW?	153	
	l. Screen L: Transmission Dependency and Transmission Stability Test	154	
	m. Screen M: 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?	154	(T)

(Continued)



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

Sheet 7

TABLE OF CONTENTS (Cont'd.)

G.	ENGINEERING REVIEW DETAILS (Cont'd.)		
2.	SUPPLEMENTAL REVIEW SCREENS	155	(T)
a.	Screen N: Penetration Test	156	
b.	Screen O: Power Quality and Voltage Tests	157	
c.	Screen P: Safety and Reliability Tests	158	
3.	DETAILED STUDY SCREENS	160	
a.	Screen Q: Is the Interconnection Request electrically Independent of the Transmission System?	160	
b.	Screen R: Is the Interconnection Request independent of other earlier-queued and yet to be studied interconnection requests interconnecting to the Distribution System?	162	
c.	Independent Study Process and Distribution Group Study Process Interconnection Studies	163	
H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS	166	
1.	GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS	167	
a.	Protective Functions Required	167	
b.	Momentary Paralleling Generating Facilities	168	
c.	Suitable Equipment Required	168	
d.	Visible Disconnect Required	169	
e.	Drawings Required	170	
f.	Generating Facility Conditions Not Identified	171	(T)

(Continued)



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

Sheet 8

TABLE OF CONTENTS (Cont'd.)

H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)		
2.	PREVENTION OF INTERFERENCE	171	(T)
a.	Voltage Regulation	171	
b.	Voltage Trip Setting	172	
c.	Paralleling	175	
d.	Flicker	175	
e.	Integration with Distribution Provider's Distribution System Grounding	176	
f.	Frequency	176	
g.	Harmonics	178	
h.	Direct Current Injection	179	
i.	Power Factor	179	
3.	TECHNOLOGY SPECIFIC REQUIREMENTS	180	
a.	Technology Specific Requirements	180	
b.	Induction Generators	180	
c.	Inverters	181	
d.	Limitations on Inverters Not Classified as Smart Inverters	181	
e.	Non-Export AC/DC Converters	181	(T)

(Continued)



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

Sheet 9

TABLE OF CONTENTS (Cont'd.)

H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)		
4.	SUPPLEMENTAL GENERATING FACILITY REQUIREMENTS	181	(T)
a.	Fault Detection	181	
b.	Transfer Trip	182	
c.	Reclose Blocking	182	
Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS	182	
1.	GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS	183	
a.	Protective Functions Required	183	
b.	Momentary Paralleling Generating Facilities	184	
c.	Suitable Equipment Required	185	
d.	Visible Disconnect Required	185	
e.	Drawings Required	187	
f.	Generating Facility Conditions Not Identified	187	
2.	PREVENTION OF INTERFERENCE	187	
a.	Voltage Regulation	188	
b.	Voltage Trip and Ride-Through Settings	188	
c.	Paralleling	191	
d.	Flicker	191	
e.	Integration with Distribution Provider's Distribution System Grounding	191	(T)

(Continued)



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

Sheet 10

TABLE OF CONTENTS (Cont'd.)

Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)		
2.	PREVENTION OF INTERFERENCE (Cont'd.)		
	f. Frequency	192	(T)
	g. Harmonics	193	
	h. Direct Current Injection	194	
	i. Fixed Power Factor	194	
	j. Dynamic Volt/VAR Operations	195	
	k. Ramp Rate Requirements	197	
	l. Recommended Frequency-Watt Settings	197	
	m. Smart Inverters	199	
	n. Default Activation States for Phase 1 Functions	200	
	o. Load Shedding or Transfer	201	
	p. Default Activation States for Phase 1 Functions	201	
	q. Phase 3 Function	202	
	r. Load Shedding or Transfer	203	
3.	TECHNOLOGY SPECIFIC REQUIREMENTS	203	
4.	SUPPLEMENTAL SMART INVERTER REQUIREMENTS	204	
	a. Fault Detection	204	
	b. Transfer Trip	204	
	c. Reclose Blocking	204	
5.	COMMUNICATION REQUIREMENTS	205	
	a. Generating Facilities utilizing inverter-based technologies must adhere to all of the following communication protocol requirements:	205	(T)

(Continued)



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

Sheet 11

TABLE OF CONTENTS (Cont'd.)

Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)		
5.	COMMUNICATION REQUIREMENTS (Cont'd.)		
	b. Additional communication protocol requirements shall also apply to Generating Facilities utilizing inverter-based technologies as provided in the following documents	206	(T)
	c. Additional communication protocol requirements shall also apply to Generating Facilities utilizing inverter-based technologies as provided in the following documents:	207	
6.	SCHEDULING CAPABILITY REQUIREMENTS	208	
7.	MONITORING AND TELEMETRY REQUIREMENTS	210	
8.	CONTROL THROUGH COMMUNICATION CAPABILITIES	213	
I.	THIRD-PARTY INSTALLATIONS, RESERVATION OF UNUSED FACILITIES, AND REFUND OF SALVAGE VALUE	214	
	1. INTERCONNECTION FACILITIES AND DISTRIBUTION UPGRADES	214	
	2. THIRD-PARTY INSTALLATIONS	214	
	3. RESERVATION OF UNUSED FACILITIES	215	
	4. REFUND OF SALVAGE VALUE	215	
J.	METERING, MONITORING AND TELEMETERING	215	
	1. GENERAL REQUIREMENTS	215	
	2. METERING BY NON-DISTRIBUTION PROVIDER PARTIES	215	
	3. NET GENERATION OUTPUT METERING	216	
	4. POINT OF COMMON COUPLING (PCC) METERING	217	
	5. TELEMETERING	218	
	6. LOCATION	218	
	7. COSTS OF METERING	219	
	8. MULTIPLE TARIFF METERING	219	(T)

(Continued)



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

Sheet 12

TABLE OF CONTENTS (Cont'd.)

K.	DISPUTE RESOLUTION PROCESS	220	(T)
1.	SCOPE	220	
2.	PROCEDURES	220	
3.	PERFORMANCE DURING DISPUTE	222	
L.	CERTIFICATION AND TESTING CRITERIA	222	
1.	INTRODUCTION	222	
2.	CERTIFIED AND NON-CERTIFIED INTERCONNECTION EQUIPMENT	224	
a.	Certified Equipment	224	
b.	Non-Certified Equipment	225	
3.	TYPE TESTING	226	
a.	Type Tests and Criteria for Interconnection Equipment Certification	226	
b.	Anti-Islanding Test	228	
c.	Non-Export Test	228	
d.	In-rush Current Test	229	
e.	Surge Withstand Capability Test	229	
f.	Synchronization Test	230	
g.	Paralleling Device Withstand Test	231	
h.	Backfeed Test	231	(T)

(Continued)



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

Sheet 13

TABLE OF CONTENTS (Cont'd.)

L.	CERTIFICATION AND TESTING CRITERIA (Cont'd.)		
4.	PRODUCTION TESTING	231	(T)
5.	COMMISSIONING TESTING	232	
	a. Commissioning Testing	232	
	b. Review, Study, and Additional Commissioning Test Verification Costs	233	
	c. Other Checks and Tests	234	
	d. Certified Equipment	234	
	e. Non-Certified Equipment	235	
	f. Verification of Settings	235	
	g. Trip Tests	236	
	h. In-service Tests	236	
6.	PERIODIC TESTING	237	
7.	TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS	237	
	a. Non-Exporting Test Procedures	237	
	b. In-rush Current Test Procedures	248	(T)

(Continued)



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

Sheet 14

TABLE OF CONTENTS (Cont'd.)

M.	INADVERTENT EXPORT	249	(T)
Mm.	INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NONISLANDING) INVERTERS	251	
N.	EXPEDITED INTERCONNECTION PROCESS FOR NON-EXPORT ENERGY STORAGE GENERATING FACILITIES	255	
1.	ELIGIBILITY REQUIREMENTS	255	
2.	GENERATING FACILITY ELIGIBILITY CRITERIA	256	
O.	AC/DC CONVERTER ELIGIBILITY CRITERIA	257	
Appendix A	Forms Associated with Rule 2 Generating Facility Interconnections	258	
Appendix B	Unit Cost Guide	263	(T)

(Continued)



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

Sheet 55

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)
  - 2. INTERCONNECTION REQUEST PROCESS (Cont'd.)
    - c. Applicant Completes an Interconnection Request (Cont'd.)

**TABLE E.1**

**Summary of Interconnection Request Fees, Deposits and Exemptions**

<u>Generating Facility Type</u>	<u>Interconnection Request Fee</u>	<u>Supplemental Review Fee</u>	<u>Detailed Study Deposit</u>	<u>Additional Commissioning Test Verification</u>	<u>Cost Envelope Option Deposit****</u>
Non-Net Energy Metering and > 1 MW NEM-2	\$800	\$2,500*	For a Generating Facility with a Gross Nameplate Rating of 5 MW or less and applying to the Independent Study Process, \$10,000 for a System Impact Study or the DGS Phase I Interconnection Study in the case of the Distribution Group Study Process; and \$15,000 for an Interconnection Facilities Study or DGS Phase II Interconnection Study in the case of the Distribution Group Study Process.  For a Generating Facility with a Gross Nameplate Rating above 5 MW, \$50,000 plus \$1,000 per MW of electrical output of the Generating Facility, or the increase in electrical output of the existing Generation Facility, as applicable, rounded up to the nearest whole MW, up to a maximum of \$250,000.	\$150/Person Hour**	\$2,500
≤ 1 MW NEM-2***	\$145	\$0	\$0	N/A	\$2,500
NEM-1	\$0	\$0	\$0	N/A	\$2,500
Solar ≤ 1MW or less that does not sell power to Distribution Provider (per D.01-07-027) nor participate in NEM-1 or NEM-2	First \$5,000 of study fees waived			\$150/Person Hour**	\$2,500

\* Optional \$1,000 additional fault current study fee pursuant to Section F.2.c.ii. Pursuant to D. 20-09-035, Applicants have the option to pre-pay the non-refundable Supplemental Review Fee (such as concurrently with the Interconnection Request fee) or separately upon completion of the Initial Review.

\*\* Plus additional costs for travel, lodging and meals.

\*\*\* Applicants that participate in the Single-Family Affordable Solar Homes (SASH) program are exempt from the Interconnection Request fee.

\*\*\*\* Interconnection Requests that have selected the Cost Envelope Option and that subsequently qualify for and pass the Fast Track Process evaluation, as well as NEM Generating Facilities and Solar ≤ 1 MW Generating Facilities evaluated under the Independent Study Process, must provide the Cost Envelope Option deposit in accordance with Section F.7 to remain eligible for the Cost Envelope Option.

(T)  
|  
(T)

(Continued)



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

Sheet 56

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

**2. INTERCONNECTION REQUEST PROCESS (Cont'd.)**

**d. Site Exclusivity**

Documentation of Site Exclusivity must be submitted with the Interconnection Request. This requirement does not apply to Applicants with NEM-1 Generating Facilities, NEM-2 ≤ 1 MW Generating Facilities, or Non-Export Generating Facilities.

**3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT**

The Interconnection Request fee shall be waived for NEM-1 Interconnection Requests and for non-NEM solar-powered Generating Facilities that do not sell power per Commission Decision 01-07-027. NEM-1 Generating Facilities are also exempt from any costs associated with Interconnection Studies.

NEM-2 Applicants are required to pay any applicable Interconnection Request fees and costs associated with Interconnection Studies pursuant to Table E.1. As noted in the table, SASH participants are exempt from the NEM-2 Interconnection Request Fee and NEM-2 ≤ 1 MW Applicants are exempt from costs associated with Interconnection Studies.

Interconnection Study fees for non-NEM solar ≤ 1 MW Generating Facilities interconnecting to the Distribution System that do not sell power will be waived up to the amount of \$5,000.

The Applicant must pay the Interconnection Request Fee as outlined in Table E.1 with the Application. The Applicant may pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), or separately upon completion of the Initial Review.

For Applicants that pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be performed following the Initial Review. The Optional Initial Review Results Meeting will not be held, but the Optional Supplemental Review Results Meeting may be held following completion of the Supplemental Review.

(N)  
|  
(N)

(Continued)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 57

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT (Cont'd.)
  - a. Detailed Study Deposit
    - i) Detailed Study Deposit
 

To proceed with Detailed Study, Applicant must submit a Detailed Study deposit.

For a Generating Facility with a Gross Nameplate Rating of 5 MW or less, Applicant must submit a Detailed Study deposit of \$10,000 for the Interconnection System Impact Study or the DGS Phase I Interconnection Study, and where an Interconnection Facilities Study or DGS Phase II Interconnection Study in the case of the Distribution Group Study Process is required, an additional \$15,000 deposit must be submitted as required in Section F.3.b.vi or F.3.c.viii.

(Continued)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	<u>May 19, 2021</u>
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	<u>May 19, 2021</u>
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	<u></u>



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

Sheet 58

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)

3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT (Cont'd.)

a. Detailed Study Deposit (Cont'd.)

For a Generating Facility with a Gross Nameplate Rating above 5 MW, Applicant must submit a Detailed Study deposit equal to \$50,000 plus \$1,000 per MW of electrical output of the Generating Facility, or the increase in electrical output of the existing Generating Facility, as applicable, rounded up to the nearest whole MW, up to a maximum of \$250,000.

ii) Use of Detailed Study Deposit

The Detailed Study deposit shall be applied to pay for prudent costs incurred by Distribution Provider, the CAISO, or third parties at the direction of Distribution Provider or CAISO, as applicable, to perform and administer the Interconnection Studies. Deposit amounts that exceed the prudent costs incurred by Distribution Provider shall be refunded to Applicant within sixty (60) Calendar Days following either the execution of the Generator Interconnection Agreement or project withdrawal as described in more detail below.

The interconnection study costs for a Distribution Study Group shall be allocated equally among the Interconnection Requests within the Distribution Study Group, except as provided in (3) below.

The Detailed Study deposits shall be refundable as follows:

- (1) Should an Interconnection Request be withdrawn by Applicant or be deemed withdrawn by Distribution Provider by written notice under Section F.6 on or before thirty (30) Calendar Days following the scoping meeting, Distribution Provider shall refund to Applicant any portion of Applicant's Detailed Study deposit that exceeds the costs Distribution Provider, CAISO, and third parties have incurred on Applicant's behalf, including interest from the date of receipt by Distribution Provider to the date of payment to Applicant. The applicable interest shall be one-twelfth of the Federal Reserve three-month Commercial Paper Rate – Non-Financial, from the Federal Reserve Statistical Release H.15 (expressed as an annual rate).

(Continued)



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

Sheet 59

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT (Cont'd.)
- a. Detailed Study Deposit (Cont'd.)
- ii) Use of Detailed Study Deposit (Cont'd.)
  - (2) Should an Interconnection Request that has been moved into the Detailed Study Process be withdrawn by Applicant or be deemed withdrawn by Distribution Provider by written notice under Section F.6 more than thirty (30) Calendar Days after the scoping meeting, but on or before thirty (30) Calendar Days following the results meeting for the Interconnection System Impact Study, or DGS Phase I Interconnection Study, Distribution Provider shall refund to Applicant the difference between (i) Applicant's Detailed Study deposit and (ii) the greater of (a) the costs Distribution Provider, CAISO, and third parties have incurred on Applicant's behalf or (b) one-half of the original Detailed Study deposit up to a maximum of \$100,000, including interest from the date of receipt by Distribution Provider to the date of payment to Applicant. The applicable interest shall be one-twelfth of the Federal Reserve three-month Commercial Paper Rate – Non-Financial, from the Federal Reserve Statistical Release H.15 (expressed as an annual rate).
  - (3) Should an Interconnection Request be withdrawn by Applicant or be deemed withdrawn by Distribution Provider by written notice under Section F.6 at any time more than thirty (30) Calendar Days after the results meeting for the Interconnection System Impact Study, or DGS Phase I Interconnection Study, or thirty (30) Calendar Days after issuance of the final Interconnection System Impact Study report or DGS Phase I Interconnection Study report if a results meeting is not held, the Detailed Study deposit shall be non-refundable.
  - (4) Upon execution of a Generator Interconnection Agreement by an Applicant and Distribution Provider, Distribution Provider shall refund to Applicant any portion of Applicant's detailed study deposit that exceeds the costs Distribution

(Continued)



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

Sheet 60

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT (Cont'd.)
- a. Detailed Study Deposit (Cont'd.)
- ii) Use of Detailed Study Deposit (Cont'd.)
- (4) Provider, CAISO, and third parties have incurred on Applicant's behalf, including interest from the date of receipt by Distribution Provider to the date of payment to Applicant. The applicable interest shall be one-twelfth of the Federal Reserve three-month Commercial Paper Rate – Non-Financial, from the Federal Reserve Statistical Release H.15 (expressed as an annual rate).
- iii) Impact of Withdrawal
- (1) Notwithstanding the foregoing, an Applicant that withdraws or is deemed to have withdrawn its Interconnection Request shall be obligated to pay to Distribution Provider all costs in excess of the Detailed Study deposit that have been prudently incurred or irrevocably have been committed to be incurred with respect to that Interconnection Request prior to withdrawal. Distribution Provider will reimburse the CAISO or third parties, as applicable, for all work performed on behalf of the withdrawn Interconnection Request at Distribution Provider's direction. Applicant must pay all monies due before it is allowed to obtain any Interconnection Study data or results. Any proceeds of the Detailed Study deposit not otherwise reimbursed to Applicant or applied to costs incurred or irrevocably committed to be incurred for the interconnection studies shall be applied as directed by the Commission. Where an Applicant with remaining proceeds from a Detailed Study deposit 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 61

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT (Cont'd.)
  - a. Detailed Study Deposit (Cont'd.)
    - iii) Impact of Withdrawal (Cont'd.)
      - (2) Forfeited Study Deposit for Distribution Group Study Process
 

Non-refundable Detailed Study deposits, as pursuant to Section E.3.a.ii, for a Distribution Group Study Process Interconnection Request, shall be applied to the costs associated with any following Interconnection Study or restudy work performed by Distribution Provider, CAISO, or third party for the withdrawn Interconnection Request's

Distribution Study Group. Any remaining proceeds of the Detailed Study deposit, after the withdrawn Interconnection Request's Distribution Study Group has completed all relevant Interconnection Studies or restudies, or all Interconnection Requests associated with the specific Distribution Study Group have withdrawn, not otherwise applied to costs incurred, or irrevocably committed to be incurred for the Interconnection Studies or restudies, shall be allocated to individual Applicants on a kVA basis who have remained in the Distribution Study Group by executing a Generator Interconnection Agreement.

Such funds shall be allocated to Applicants sixty (60) Calendar Days following the conclusion of the Generator Interconnection Agreement negotiation pursuant to Section F.3.e.ii. If no Applicants remain in the Distribution Study Group, such funds shall escheat to the State pursuant to the Unclaimed Property Law commencing with the California Code of Civil Procedure § 1500.
    - iv) Special Circumstances
 

Applicant may propose, and Distribution Provider may agree to reduced costs for reviewing atypical Interconnection Requests, such as Interconnection Requests submitted for multiple Generating Facilities, multiple sites, or otherwise as conditions warrant.

(Continued)



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

Sheet 62

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)

4. INTERCONNECTION COST RESPONSIBILITY

An Applicant, or a Producer where those are different entities, is responsible for all fees and/or costs, including Commissioning Testing, required to complete the interconnection process. A Producer that interconnects to Distribution Provider's Distribution or Transmission System is responsible for all costs associated with Parallel Operation to support the safe and reliable operation of the Distribution and Transmission System. NEM-1 Generating Facilities and NEM-2 ≤1 MW Generating Facilities are exempt from any costs associated with Distribution or Network Upgrades.

a. Costs of Interconnection and Parallel Operation

The Interconnection and Parallel Operation of a Producer may trigger the need for Interconnection Facilities, Special Facilities or Added Facilities, Upgrades, Delivery Network Upgrades, and/or Reliability Network Upgrades. Interconnection Facilities installed on Producer's side of the PCC may be owned, operated and maintained by Producer or Distribution Provider. Interconnection Facilities installed on Distribution Provider's side of the PCC and Distribution System modifications shall be owned, operated, and maintained only by Distribution Provider.

b. Methodology and Timing of Cost Identification

Any costs triggered by a Producer are based on Producer's unique Interconnection requirements, Producer's impact on the Distribution System and/or Transmission System following allocation of capacity to earlier-queued interconnection requests, and Producer's electrical interdependence with any earlier-queued interconnection requests. Earlier-queued interconnection requests include interconnection requests under any applicable tariff.

(L)

(Continued)



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

Sheet 63

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 4. INTERCONNECTION COST RESPONSIBILITY (Cont'd.)
- c. Timing of Cost Identification
 

For Applicants to Fast Track, Independent Study Process, or Distribution Group Study Process, costs may be identified during the study process, or after the study process is complete and a Generator Interconnection Agreement is executed. The purpose of later identification of costs is to facilitate Applicant's Interconnection while accommodating incomplete interconnection studies for earlier-queued interconnection requests to the same Line Section, distribution circuit, and/or substation, incomplete interconnection studies for earlier-queued interconnection requests with which Applicant is electrically interdependent with respect to short circuit duty, withdrawal of earlier-queued interconnection requests for Interconnection to the Distribution or Transmission System, and delay or cancellation of planned Distribution System Upgrades.
- d. Producer Costs During Parallel Operation
 

All Producers are required to provide and maintain Interconnection Facilities, for the duration of the Generator Interconnection Agreement, that meet Distribution Provider's technical design and operating standards for Parallel Operation as set out in Section H or Hh, including any updates to those standards. This includes Producer responsibility for costs associated with changes to the operating characteristics at the Point of Interconnection necessitated by Distribution Provider's upgrades to the Transmission or Distribution System from time to time.
- e. Cost Allocation
 

For cost allocation under the Fast Track Process or the Independent Study Process: Except where exempt by law or Commission decision, costs triggered by an Interconnection Request are the responsibility of the triggering Interconnection Request.

(Continued)



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

Sheet 64

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
  - 4. INTERCONNECTION COST RESPONSIBILITY (Cont'd.)
  - e. Cost Allocation (Cont'd.)
- For cost allocation under the Distribution Group Study Process: The costs of Interconnection Facilities will be assigned to the triggering Interconnection Request. The costs of Distribution Upgrades or Network Upgrades identified through a Distribution Group Study shall be allocated among the Interconnection Requests in a Distribution Study Group based on nameplate kilovolt amperes (kVA) and, in some instances, as determined by Distribution Provider, also based on an Applicant's specific contributions to the upgrade costs. Costs for upgrades will be allocated based upon an Applicant's specific contributions to a particular upgrade only if the Distribution Provider determines that; based on overall fairness to the Distribution Study Group, the individual applicant, rather than the Distribution Study Group, should be responsible for the costs. Cost allocation within the Distribution Study Group will not always align with cost contribution under a per kVA plus specific contribution allocation method. The DGS Phase I and Phase II study reports will indicate how cost allocation is determined. Examples of the possible types of shared costs include but may not be limited to: upgraded transformers, reconductoring, circuit switchers, and breakers.
- Costs triggered by an Interconnection Request under this Rule that transitions to the Transmission Cluster Study Process are allocated pursuant to the terms of Distribution Provider's WDT or other applicable tariff. (L)

(Continued)



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

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

(L)

**4. INTERCONNECTION COST RESPONSIBILITY (Cont'd.)**

**f. Summary Tables**

Table E.2 summarizes cost responsibility for costs and fees that may arise in the course of the interconnection process for NEM and non-NEM Applicants. Table E.3 summarizes cost responsibility for costs and fees that may arise in the course of the interconnection process for NEM Applicants under various sequences of interconnecting NEM and non-NEM Generators on the same PCC interconnecting to the Distribution or Transmission System.

Table E.2 Summary of Producer Cost Responsibility

Generating Facility Type	Interconnection Request Fee		Supplemental Review Fee		Detailed Study Cost (ISP, DGSP, or TCSP)		Interconnection Facilities Cost		Distribution Upgrades Cost		Transmission Network Upgrade Cost (per Applicable CAISO Tariff at signing of IA)	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Non-NEM and NEM-2 (>1MW)	X		X		X		X		X		X	
NEM-1		X		X		X	X			X <sup>a</sup>		X <sup>a</sup>
NEM-2 (≤1MW)*	X			X		X <sup>**</sup>	X			X		X <sup>**</sup>

\* Applicants participating in the Single-Family Affordable Solar Homes program are exempt from the Interconnection Request Fee.

\*\* Except as provided in Section F.3.d.

(L)

(Continued)



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

Sheet 66

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)

(L)

4. INTERCONNECTION COST RESPONSIBILITY (Cont'd.)

f. Summary Tables (Cont'd.)

Table E.3 Summary of Producer Cost Responsibility for Multiple Tariff Interconnections

Existing Generating Facility	New Generating Facility	Interconnection Request Fee		Supplemental Review Fee		Detailed Study Cost		Interconnection Facilities Cost		Distribution Upgrades Cost	
		YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
NEM	Non-NEM, NEM-2 (>1 MW)	X		X		X		X		X <sup>b</sup>	
NEM-1	NEM-1		X		X		X	X			X
NEM-1	NEM-2 (≤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 (>1 MW)	X		X		X		X		X	
Non-NEM	NEM-2 (≤1MW)*	X			X <sup>c</sup>		X <sup>c</sup>	X			X <sup>b,c</sup>
Simultaneous NEM and 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.											

(L)

(Continued)



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

Sheet 67

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)

5. INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION

Any Applicant for Interconnection to Distribution Provider's Distribution or Transmission System must submit a complete and valid Interconnection Request. An Interconnection Request will be considered complete and valid when all items required for an Interconnection Request have been received by Distribution Provider and deemed valid by Distribution Provider.

a. Acknowledgement of Interconnection Request

For Interconnection Requests that have not elected the Cost Envelope Option, Distribution Provider shall provide a first written notification to the Interconnection Customer within ten (10) Business Days of receipt of the Interconnection Request, which notice shall state whether the Interconnection Request is deemed complete and valid.

For Interconnection Requests that have elected the Cost Envelope Option, Distribution Provider shall provide a first written notification to the Interconnection Customer within twenty (20) Business Days of receipt of the Interconnection Request, which notice shall state whether the Interconnection Request is deemed complete and valid.

b. Deficiencies in Interconnection Request

i) First Notification of Deficiency

If an Interconnection Request fails to meet the requirements, Distribution Provider shall state in its first written notification the reasons for such failure and that the Interconnection Request does not constitute a valid request.

Applicant shall provide Distribution Provider the additional requested information needed to constitute a complete and valid request within ten (10) Business Days from the date of the first written notification that the Interconnection Request is invalid. (L)

(Continued)



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

Sheet 68

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 5. INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION (Cont'd.)
  - b. Deficiencies in Interconnection Request (Cont'd.)
    - ii) Second Notification of Deficiency
 

Distribution Provider shall provide a second written notification to Applicant within ten (10) Business Days of receipt of the additional requested information, stating whether the Interconnection Request is valid or the reasons for any failure.

Applicant shall provide Distribution Provider the additional requested information needed to constitute a complete and valid request within five (5) Business Days from the date of the second written notification that the Interconnection Request is invalid.
    - iii) Extension Request
 

Upon request, Applicant can receive one extension of up to twenty (20) Business Days to resolve deficiencies in the Interconnection Request.
    - iv) Failure to Resolve Deficiencies
 

If Applicant does not resolve deficiencies in the Interconnection Request within the time frames set out above, Distribution Provider will deem the Interconnection Request withdrawn. Applicant may submit a new Interconnection Request.

Applicants with invalid Interconnection Requests under this Section may seek relief under the dispute resolution provisions in Section K by so notifying Distribution Provider within two (2) Business Days of receipt of the first or second written notification that the Interconnection Request is incomplete and/or invalid. (L)

(Continued)



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

Sheet 69

E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)

5. INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION (Cont'd.)

c. Assignment of Queue Position

Distribution Provider shall assign a queue position to all NEM-2 Applicants with Generating Facilities sized above 1 MW (except as provided in Section D.13.e) and all non-Net Energy Metering Applicants. Applicants applying for Momentary Parallel Operation of any size, or Non-Export Applicants with Gross Nameplate Capacity of 30 kW or less, will not be assigned a queue position by the Distribution Provider. If there were no deficiencies in the Interconnection Request, the queue position will be based on the date Distribution Provider received the Interconnection Request. If there were deficiencies in the Interconnection Request, the queue position will be based on the date Distribution Provider determines an Interconnection Request to be complete and valid. Should Distribution Provider not meet any deadline for providing the first (Section E.5.b.i) or second written notification (Section E.5.b.ii) to Applicant regarding the Interconnection Request, Applicant's queue position shall be set on the final day of the period in which Distribution Provider was obligated to provide such written notification, provided, however, that Applicant meets deadlines as set out above to submit any additional information required for a valid Interconnection Request following such written notification under Section E.5.b.i or E.5.b.ii, and that Distribution Provider determines that the Interconnection Request is valid.

Distribution Provider shall maintain a single queue for all Interconnection Requests requiring a Queue Position and governed by this Rule with a Point of Interconnection on Distribution Provider's Distribution System. For Interconnection Requests that are studied under the Distribution Group Study Process, the effective queue position for all Interconnection Requests in a Distribution Study Group will be derived on the last day of the Distribution Group Study window for that Distribution Study Group. For Interconnection Requests that are studied under the Transmission Cluster Study Process, the queue position will be the applicable cluster's queue position. (L)

(Continued)



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

Sheet 70

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
- 5. INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION (Cont'd.)
  - d. Publication of the Interconnection Queue
 

Distribution Provider shall publish and update monthly on its website the interconnection queue for all Interconnection Requests governed by this Rule with a Point of Interconnection on Distribution Provider's Distribution System that have been assigned a queue position. Nothing here prohibits Distribution Provider from publishing this queue combined with other interconnection requests to Distribution Provider's Distribution System. The published interconnection queue may include the following information for each Interconnection Request governed by this Rule, subject to Energy Division approval:

    - i) Interconnection Request and Queue Position Data
      - (1) The assigned number, if any;
      - (2) the queue position;
      - (3) the date the Interconnection Request was received by Distribution Provider;
      - (4) the date the Interconnection Request was determined to be complete and valid;
      - (5) the review process to which Applicant originally applied and is currently assigned;
      - (6) the original requested In-Service Date;
      - (7) the currently requested In-Service Date;
      - (8) the agreed-upon Commercial Operation Date or actual Commercial Operation Date.

(Continued)



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

Sheet 71

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.) (L)
  - 5. INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION (Cont'd.)
    - d. Publication of the Interconnection Queue (Cont'd.)
      - ii) Applicant Generating Facility/Storage System and Point of Interconnection Data
        - (1) the maximum summer and winter MW electrical output;
        - (2) the type of generating or storage facility to be constructed;
        - (3) the fuel source;
        - (4) the proposed Point of Interconnection location by county;
        - (5) the proposed Point of Interconnection location by substation/area and, if applicable, circuit.
- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS
  - 1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS
    - a. Valid Interconnection Request
 

After an Interconnection Request is deemed complete and valid, Distribution Provider will perform Fast Track evaluation unless an Applicant applies for Detailed Study or is not eligible for Fast Track evaluation. The eligibility requirements for Fast Track evaluation are set forth in Section E.2.b. See Section D.13 for special provisions related to the timeframe and costs applicable to certain NEM Applicants as provided therein. See Section D.14 and Section N for special provisions applicable to Non-Export Energy Storage Generating Facilities, as provided therein.

(Continued)



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

Sheet 72

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

1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS (Cont'd.)

b. Fast Track Review

Fast Track evaluation allows for rapid review of the Interconnection of those Generating Facilities that do not require Detailed Study. Regardless of study process, all Generating Facilities shall be designed to meet the applicable requirements of Section H which identifies Generating Facility Design and Operation Requirements.

Fast Track review consists of an Initial Review and, if required, a Supplemental Review. The need for Supplemental Review will be determined based on the results of Initial Review Screens A through M in Section G.1. Applicants that successfully pass Initial Review Screens A through M will be allowed to interconnect without Supplemental Review.

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 Supplemental Review is required, Distribution Provider will notify Applicant and Applicant must pay a nonrefundable Supplemental Review fee, per Table E-1 or withdraw its Interconnection Request. If the Applicant pre-paid the Supplemental Review fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be conducted upon completion of the Initial Review. Supplemental Review shall consist of the application of Screens N through P in Section G.2. Applicants that pass Screens N through P will be allowed to interconnect without additional review.

If Supplemental Review reveals that a proposed Generating Facility cannot be interconnected to Distribution Provider's Distribution System by means of Fast Track evaluation, Distribution Provider will notify Applicant that Detailed Study will be required.

Failure to pass Fast Track evaluation means only that further review and/or study are required before the Generating Facility can be interconnected with Distribution Provider's Distribution System. It does not mean that the Generating Facility cannot be interconnected.

(Continued)



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

Sheet 73

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

1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS (Cont'd.)

c. Detailed Studies

Detailed Study will be required for Interconnection Requests that apply directly for Detailed Study, are not eligible for Fast Track evaluation, or do not pass Fast Track evaluation. Detailed Study shall consist of one of three study processes: (i) Independent Study Process; (ii) Distribution Group Study Process; or (iii) Transmission Cluster Study Process. The specific study process that is applied will depend on the results of Screens Q and R in Section G.3. Interconnection Requests that are found to be electrically interdependent with earlier-queued interconnection requests with impacts on the Transmission System, and thereby fail screen Q, will proceed to the Transmission Cluster Study Process. Interconnection Requests that are not electrically interdependent with earlier-queued interconnection requests with impacts on the Transmission System, and thereby pass Screen Q, will be studied under either the Independent Study Process or the Distribution Group Study Process, depending on the results of Screen R.

d. Compliance with Timelines

Distribution Provider shall use Reasonable Efforts in meeting all the timelines set out in this Rule, or mutually modified by Distribution Provider and Applicant pursuant to Section D.16. Each Distribution Provider shall designate an ombudsman with authority to resolve disputes over missed timelines. The identity, role, and contact information of the ombudsman shall be available on Distribution Provider's website.

If at any time an Applicant is dissatisfied with the Reasonable Efforts of Distribution Provider to meet the timelines in this Section, Applicant may use the following procedures:

(L)

(Continued)



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

Sheet 74

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
  - 1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS (Cont'd.)
  - d. Compliance with Timelines (Cont'd.)
    - (i) Contact the ombudsman designated by Distribution Provider;
    - (ii) If the Distribution Provider ombudsman is unable to resolve the dispute within ten (10) Business Days, Applicant may either:
      - a) Contact the Consumer Affairs Branch (CAB) at the Commission.
      - b) Upon mutual agreement with Distribution Provider, make a written request for mediation to the Alternative Dispute Resolution (ADR) Coordinator in the Commission's Administrative Law Judge (ALJ) Division. The request may be made by electronic mail to [adr\\_program@cpuc.ca.gov](mailto:adr_program@cpuc.ca.gov), and shall state "Rule 21" in the subject line. The request shall contain the relevant facts of the timeline dispute. A copy of the request shall be sent to the Distribution Provider ombudsman. Provided that resources are available, the mediator assigned shall schedule a mediation with Applicant and Distribution Provider within ten (10) Business Days of receiving the request.
- At any time, Applicant 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. (L)

(Continued)



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

Sheet 75

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

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.

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.

(Continued)



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

Sheet 76

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 ≤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.

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

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, 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 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 ≤1 MW NEM-2 Generating Facilities and for solar-powered non-NEM ≤1 MW Generating Facilities that do not sell power to Distribution Provider, per Commission D.01-07-027.

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

(Continued)



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

Sheet 77

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. (L)

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. (N)

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. (L)

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 78

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. (L)

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. (N)  
(N)

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

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)

(L)

(Continued)





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

Sheet 80

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
- 2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.) (L)
- c. Supplemental Review (Cont'd.) (L)
- iii) Line Data: (T)/(L)
  - Impedance data for line from XFMR to POI (if applicable) (L)
  - Z1 (L)
  - Z0 (L)
- POI Location (T)
- 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. (T)/(L)
- 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 81

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.) (L)
- 2. FAST TRACK INTERCONNECTION REVIEW PROCESS (Cont'd.)
  - c. Supplemental Review (Cont'd.) (L)
    - 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. (T)/(L)
    - 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)



**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.)
- 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)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



**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.)
- 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**

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 85

- 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)

(Continued)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 86

- 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)



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

Sheet 87

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 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 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 88

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

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.

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.

(Continued)



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

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, 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)

(Continued)



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

Sheet 90

- 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)

(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 (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)

(Continued)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



**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.)

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 of modification. (L)

(Continued)



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

Sheet 93

- 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**

- 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)

(Continued)



**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.)

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)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



**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.)
  - 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.

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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.)
- 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 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.

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**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.)

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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<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 100

- 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.

(Continued)



**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.)
- 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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Advice	5988-E-A	Issued by	Submitted	May 19, 2021
Decision	D.20-09-035	<b>Robert S. Kenney</b>	Effective	May 19, 2021
		Vice President, Regulatory Affairs	Resolution	



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

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.

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

- 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.

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<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

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)



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

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.

(Continued)



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

- 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.

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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.)
- 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)



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

- 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)



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

- 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.

(Continued)



**ELECTRIC RULE NO. 21**  
**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.)
  - 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)

(Continued)



**ELECTRIC RULE NO. 21**  
**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.)
  - 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. Transmission Cluster Study Process
 

If Applicant's Interconnection Request fails Screen Q or elects to be studied under the Transmission Cluster Study Process, Applicant shall have the option of applying for Interconnection under the 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. (L)

(Continued)









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

Sheet 115

- 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.
  - 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 agreement terms.

(Continued)



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

Sheet 116

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)



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

Sheet 117

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.

(Continued)



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

Sheet 118

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.

(Continued)



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

- 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

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Advice	5988-E-A	Issued by	Submitted	May 19, 2021
Decision	D.20-09-035	<b>Robert S. Kenney</b>	Effective	May 19, 2021
		Vice President, Regulatory Affairs	Resolution	



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

Sheet 120

- 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)

(Continued)



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

Sheet 121

- 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 122

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)

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

Sheet 123

- 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.

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

Sheet 124

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 125

- 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 126

- 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)

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Advice	5988-E-A	Issued by	Submitted	May 19, 2021
Decision	D.20-09-035	<b>Robert S. Kenney</b>	Effective	May 19, 2021
		Vice President, Regulatory Affairs	Resolution	



**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.)
    - 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.

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

Sheet 128

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.

(Continued)



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

Sheet 129

- 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 130

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)

(Continued)



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

Sheet 131

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)

(Continued)



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

Sheet 132

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 133

- 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 ≤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 134

- 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**

- 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)

(Continued)



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

Sheet 136

- 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)

(Continued)

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<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 137

- 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)

(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.)

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)

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Decision D.20-09-035

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

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Resolution	



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

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)

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

Sheet 140

- 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.

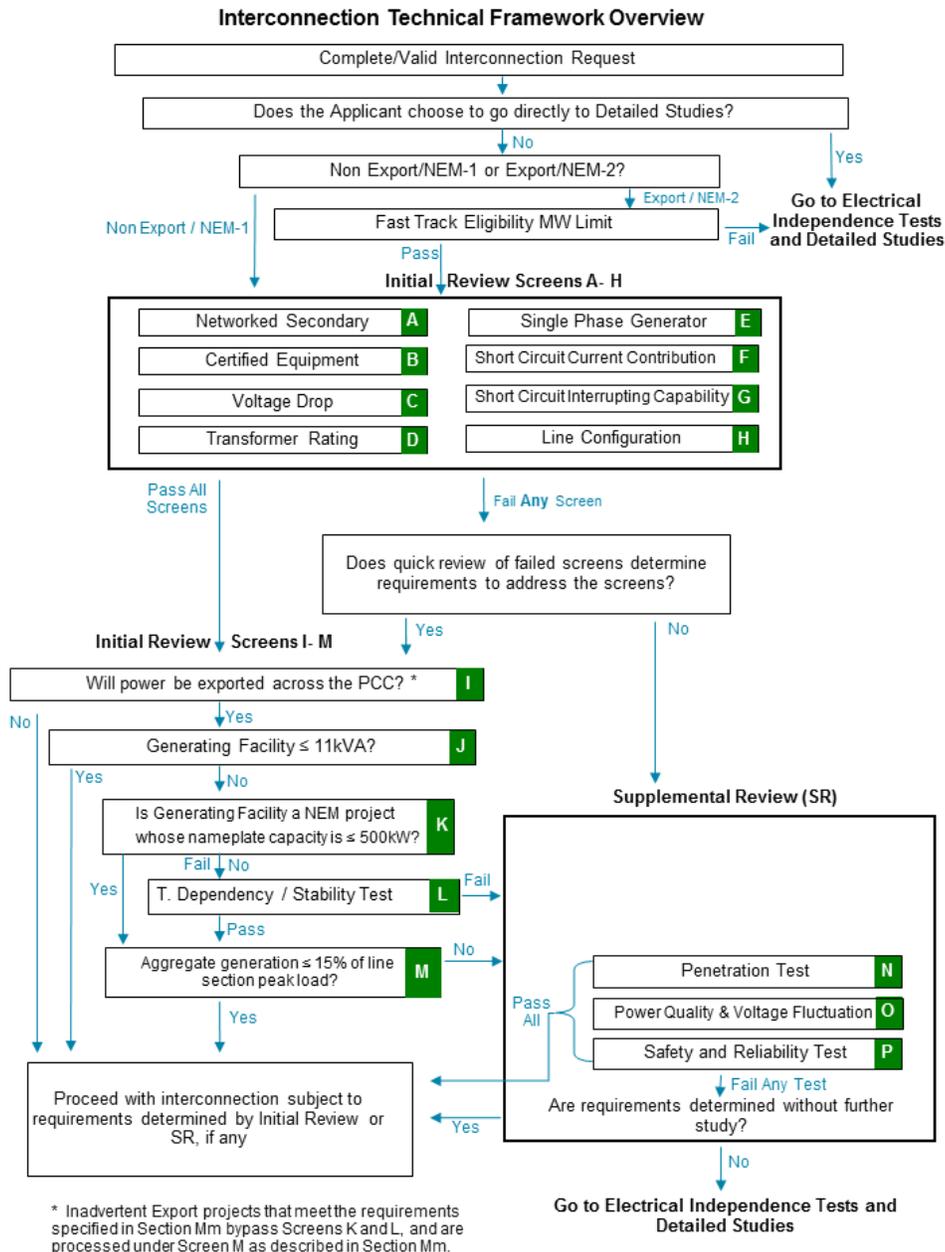
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**ELECTRIC RULE NO. 21  
GENERATING FACILITY INTERCONNECTIONS**

**G. ENGINEERING REVIEW DETAILS**

(L)



\* 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.

(L)

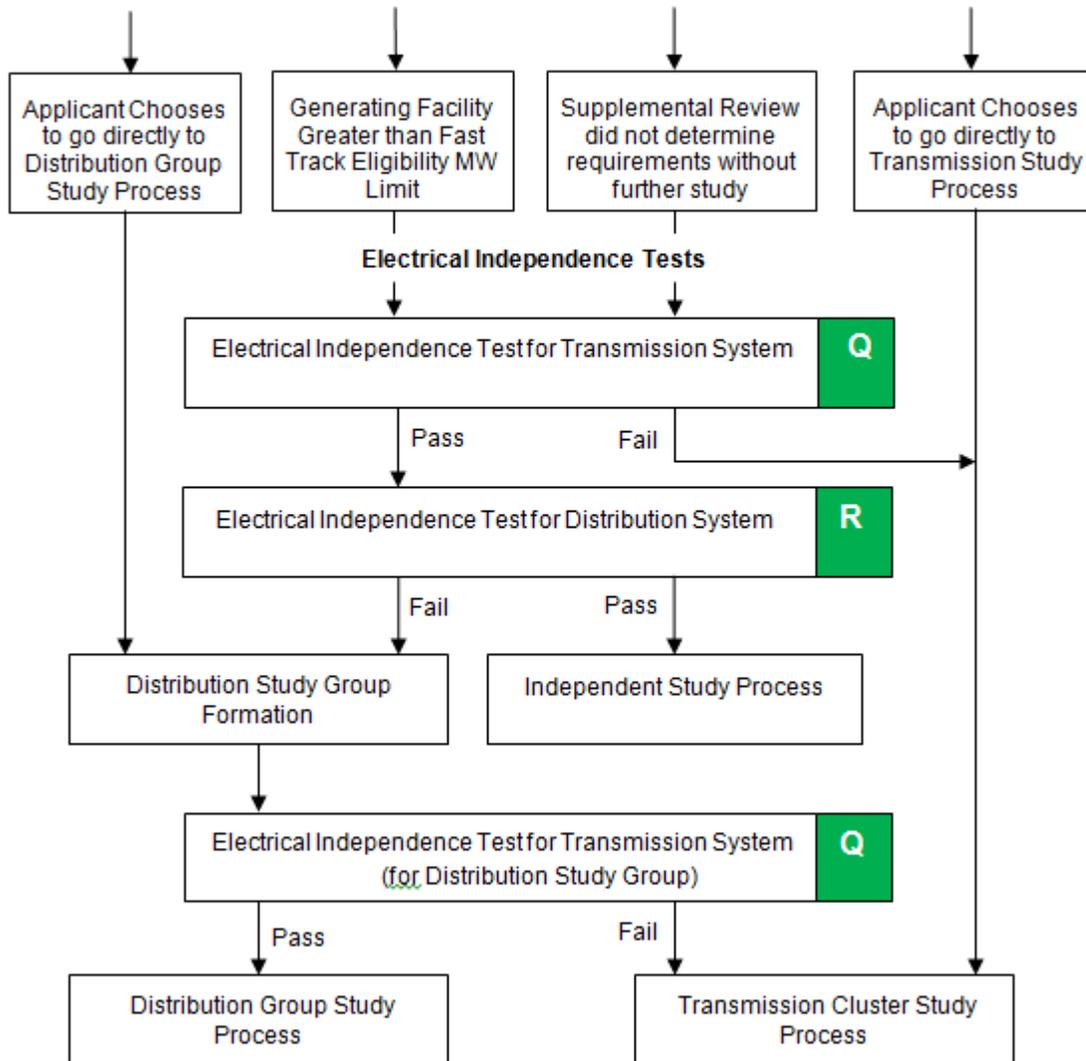
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**ELECTRIC RULE NO. 21  
GENERATING FACILITY INTERCONNECTIONS**

G. ENGINEERING REVIEW DETAILS (Cont'd.)

**Interconnection Technical Framework- Overview**



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(L)

(Continued)



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

Sheet 143

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 144

- 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 145

- 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)

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		Vice President, Regulatory Affairs	Resolution	



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

Sheet 146

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 147

- 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.)
- 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. Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits?
- If Yes (pass), continue to Screen G.
  - If No (fail), continue to Screen G pursuant to Section G.1.
- Note: This Screen does not apply to Generating Facilities with a Gross Rating of 11 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. (L)

(Continued)



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

Sheet 148

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
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 11 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)

(Continued)



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

Sheet 149

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?

- 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 11 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 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 (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

(L)

(Continued)



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

Sheet 150

- 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?
  - If Yes, Continue to Screen J. This includes Options 5 and 6 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 below. Following that selection, Initial Review is complete.

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

(Continued)



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

Sheet 151

- 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**

- 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 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 listed grid support (Non-Islanding) inverters as described in Section Mm.
    - 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).

(Continued)



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

Sheet 153

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(L)

1. INITIAL REVIEW SCREENS (Cont'd.)

j. Screen J: Is the Gross Rating of the Generating Facility 11 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.

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**

G. ENGINEERING REVIEW DETAILS (Cont'd.)

(L)

1. INITIAL REVIEW SCREENS (Cont'd.)

I. Screen L: Transmission Dependency and Transmission Stability Test

Is the Interconnection Request for an area where: (i) there are known, or posted, transient stability limitations, or (ii) the proposed Generating Facility has interdependencies, known to Distribution Provider, with earlier-queued Transmission System interconnection requests. Where (i) or (ii) above are met, the impacts of this Interconnection Request to the Transmission System may require Detailed Study.

- 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.

m. Screen M: 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.

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.

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

(L)

(Continued)



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

Sheet 155

- G. ENGINEERING REVIEW DETAILS (Cont'd.) (L)
- 1. INITIAL REVIEW SCREENS (Cont'd.)
  - m. Screen M: 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.)
  - 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)

(Continued)

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		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 156

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 157

- 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 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 158

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)? (L)

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? (N)

• If yes to all of the above (pass), continue to Screen P. (L)

• 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 159

- 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 160

- 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 Network Upgrades. If Distribution Provider determines that no interdependencies exist as described above, 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 as described above, then Applicant may be studied under the Transmission Cluster Study Process as set forth in Section F.3.d.

(Continued)



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

Sheet 161

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.

Note 1: NEM Generating Facilities with net export less than or equal to 500 kW that may flow across the Point of Common Coupling will not be studied in the Transmission Cluster Study Process, but may be studied under the Independent Study Process.

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.

(Continued)

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

Sheet 162

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**

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 164

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 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

(Continued)



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

Sheet 165

- 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

(Continued)



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

Sheet 166

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 H shall apply for interconnection of inverter based technologies. Until such date, Section H may be used in all or in part, for inverter based technologies by mutual agreement of the Distribution Provider and the Applicant.

(Continued)



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

Sheet 167

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)

(Continued)



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

Sheet 168

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**

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,

(Continued)



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

Sheet 170

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 171

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 173

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)



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

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.)

(L)  
-----  
(L)

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 (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 175

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.

(Continued)



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

Sheet 176

- 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.

(Continued)



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

Sheet 177

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

(L)

**2. PREVENTION OF INTERFERENCE (Cont'd.)**

**f. Frequency (Cont'd.)**

***Table H.2  
Frequency Trip Settings***

<u>Generating Facility Rating</u>	<u>Frequency Range (Assuming 60Hz Nominal)</u>	<u>Maximum Trip Time [1] (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 between 59.8 Hz and 57 Hz but greater than 57 Hz. [2]	Adjustable between 10 and 18,000 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.

(L)

(Continued)



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

Sheet 178

H. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (L)  
(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 harmonic order, h (odd harmonics) [3]	h<11	11≤h<17	17≤h<23	23≤h<35	35≤h	Total demand 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.

(L)

(Continued)



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

Sheet 179

- 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)



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

Sheet 180

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.

(Continued)



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

Sheet 181

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

**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.

**e. Non-Export AC/DC Converters**

A Non-Export AC/DC Converter must satisfy the definition in Section C.

(N)  
|  
|  
(N)

**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.

(Continued)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 182

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

4. SUPPLEMENTAL GENERATING FACILITY REQUIREMENTS (Cont'd.)

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".

(Continued)



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

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 and Distribution Provider. (N)  
(N)

1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (L)  
(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 184

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 185

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 186

- 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 187

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 188

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.

(Continued)



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

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**

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 (Cont'd.)

Table Hh.1: Voltage Ride-Through Table

Region	Voltage at Point of Common Coupling (% Nominal Voltage)	Ride-Through Until	Operating Mode	Maximum Trip Time
High Voltage 2 (HV2)	$V \geq 120$			0.16 seconds
High Voltage 1 (HV1)	$110 < V < 120$	12 seconds	Momentary Cessation	13 seconds
Near Nominal (NN)	$88 \leq V \leq 110$	Indefinite	Continuous Operation	Not Applicable
Low Voltage 1 (LV1)	$70 \leq V < 88$	20 seconds	Mandatory Operation	21 seconds
Low Voltage 2 (LV2)	$50 \leq V < 70$	10 seconds	Mandatory Operation	11 seconds
Low Voltage 3 (LV3)	$V < 50$	1 seconds	Momentary Cessation	1.5 seconds

(L)

(Continued)



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

Sheet 191

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**

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**

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

(L)

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.

(L)

(Continued)



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

Sheet 194

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 harmonic order, h (odd harmonics) [3]	h<11	11≤h<17	17≤h<23	23≤h<35	35≤h	Total demand 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 195

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**

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

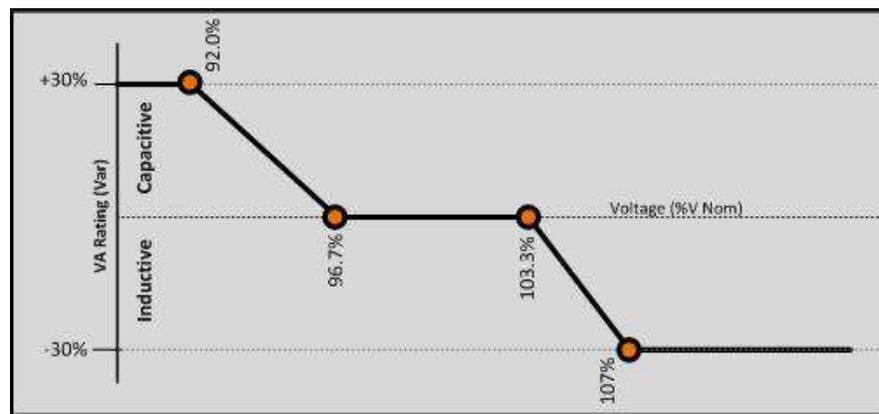
Table Hh-4 and Figure Hh-1 depict the default settings, which should be applied for all inverter sizes. Specific volt/var settings may be required for larger Generating Facilities (such as 100 kw or greater), or for specific areas with the Distribution Systems as determined by the Distribution Provider.

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 197

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**

Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

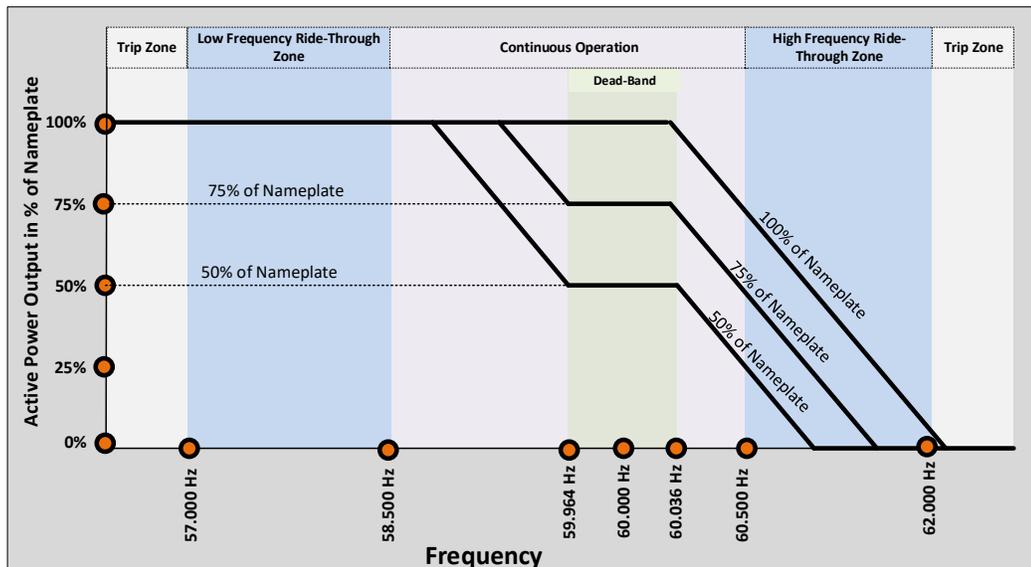
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2. PREVENTION OF INTERFERENCE (Cont'd.)

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 199

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)

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

Sheet 200

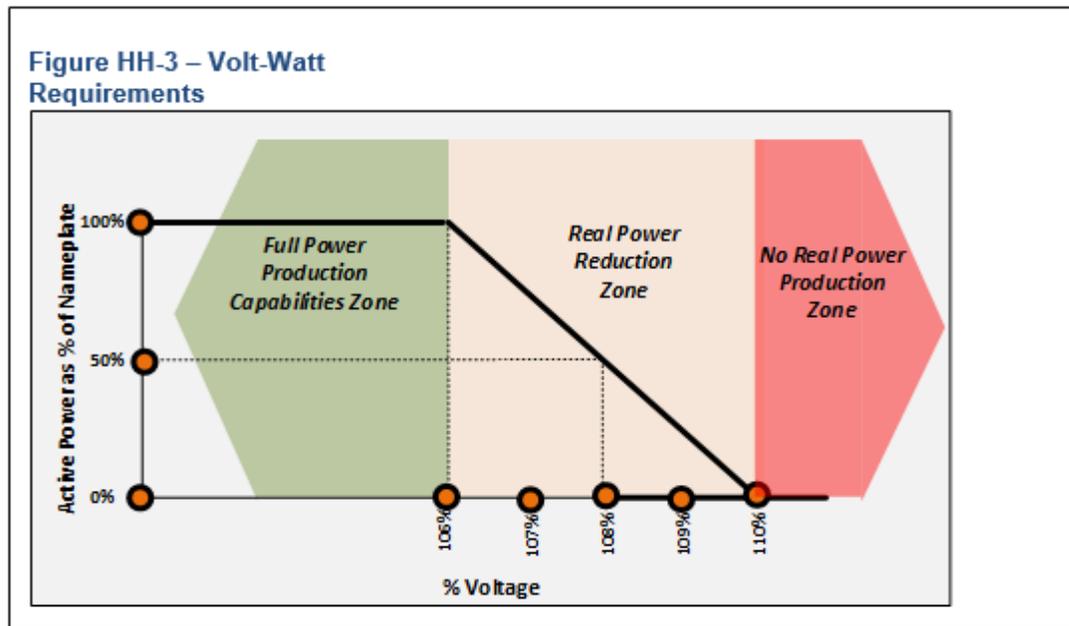
Hh. SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)

(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



Percent (%) of nominal voltage

(L)

(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.)

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, 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:

	<u>Function</u>	<u>State</u>
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 202

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 Reconnect Command (Cease to Energize and Return to Service)	<b>June 22, 2020</b>
3	Limit Maximum Active Power Mode	<b>June 22, 2020</b>
4	Set Active Power Mode	12 months after approval of a nationally recognized standard that includes the function.
5	Frequency Watt Mode	<b>February 22, 2019</b> , which is 9 months following SunSpec Alliance Communication Protocol Certification Test Standard.
6	Volt Watt Mode	<b>February 22, 2019</b> , which is 9 months following SunSpec Alliance Communication Protocol Certification Test Standard.
7	Dynamic Reactive Support	12 months after approval of a nationally recognized standard that includes the function.
8	Scheduling Power Values 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 204

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 205

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 206

- 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 207

- 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 208

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 209

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 210

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)

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

Sheet 211

- 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 212

- 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 213

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 214

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

Subject to the approval of Distribution Provider, a Producer may, at its option, employ a qualified contractor 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.

(L)

(Continued)



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

Sheet 215

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.

(Continued)



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

Sheet 216

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 217

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.

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,

(L)

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

Sheet 218

J. METERING, MONITORING AND TELEMETERING (Cont'd.) (L)

4. POINT OF COMMON COUPLING (PCC) METERING (Cont'd.)

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.

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.

(Continued)



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

Sheet 219

- J. METERING, MONITORING AND TELEMETERING (Cont'd.) (L)
- 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 220

**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 221

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 222

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 223

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)



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

Sheet 224

- 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 225

- 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.

(Continued)



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

Sheet 226

- 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.

(Continued)



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

Sheet 227

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 228

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, 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 and on follow in order convenient to the test agency.

b. Anti-Islanding Test

Devices that pass the Anti-Islanding test procedure described in UL 1741 Section 46.3 will be considered Non-Islanding for the purposes of these Interconnection requirements. The test is required only for devices for which a Certified Non-Islanding designation is desired.

c. Non-Export Test

Equipment that passes the Non-Export test procedure described in Section L.7.a will be considered Non-Exporting for the purposes of these Interconnection requirements. This test is required only for devices for which a Certified Non-Export designation is desired.

(Continued)



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

Sheet 229

- 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)



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

Sheet 230

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)

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Advice 5988-E-A  
Decision D.20-09-035

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

Submitted May 19, 2021  
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Resolution



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

Sheet 231

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 of Generator Units (kVA)	Frequency Difference ( $\Delta f$ , Hz)	Voltage Difference ( $\Delta V$ , %)	Phase Angle Difference ( $\Delta \Phi$ , °)
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 232

- 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)



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

Sheet 233

- 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.

(Continued)



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

Sheet 234

- 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)



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

Sheet 235

- 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)



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

Sheet 236

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)



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

Sheet 237

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.

(Continued)



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

Sheet 238

- 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)



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

Sheet 239

- 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.

(Continued)



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

Sheet 240

- 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.

(Continued)



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

Sheet 241

- 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.

(Continued)



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

Sheet 242

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)



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

Sheet 243

- 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)





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

Sheet 245

- 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.

(Continued)



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

Sheet 246

- 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.

(Continued)



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

Sheet 247

- 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.

(Continued)



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

Sheet 248

- 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)



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

Sheet 249

**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.

(L)

(Continued)







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

Sheet 252

Mm. INADVERTENT EXPORT FOR INTERCONNECTION REQUESTS UTILIZING UL-1741 CERTIFIED OR SA LISTED GRID SUPPORT (NON-ISLANDING) INVERTERS (Cont'd.) (L)

- 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)

<i>Advice</i>	5988-E-A	<i>Issued by</i>	<i>Submitted</i>	May 19, 2021
<i>Decision</i>	D.20-09-035	<b>Robert S. Kenney</b>	<i>Effective</i>	May 19, 2021
		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	



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

Sheet 253

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?\*,\*\*

- 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.

(Continued)

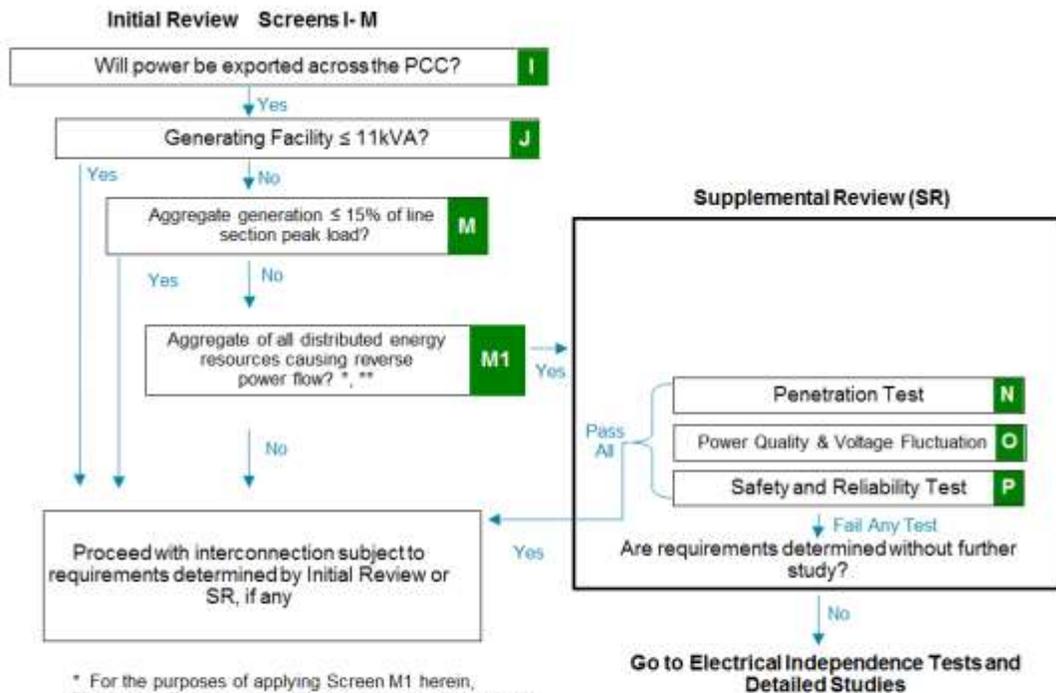


**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

**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 255

**N. EXPEDITED INTERCONNECTION PROCESS FOR NON-EXPORT ENERGY STORAGE GENERATING FACILITIES (L)**

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>1</sup> Applicants with Non-Export AC/DC Converters that meet the requirements outlined in O. below are also eligible.

**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>1</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

(Continued)







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

<b>Appendix A</b> Forms Associated with Rule 21 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 ***	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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**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

<b>Appendix A (Cont'd.)</b> Forms Associated with Rule 21 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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**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

<b>Appendix A (Cont'd.)</b>			
Forms Associated with Rule 21			
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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**ELECTRIC RULE NO. 21**  
**GENERATING FACILITY INTERCONNECTIONS**

Sheet 261

<b>Appendix A (Cont'd.)</b> Forms Associated with Rule 21 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 ****	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**

<b>Appendix A (Cont'd.)</b> Forms Associated with Rule 21 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: <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.

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**ELECTRIC TABLE OF CONTENTS**

Sheet 24

FORM	TITLE OF SHEET	CAL P.U.C. SHEET NO.
<b>Sample Forms</b>		
<b>Rule 20 Replacement of Overhead with Underground Electric Facilities</b>		
79-1113	Agreement to Perform Tariff Schedule Related Work, Rule 20A Electric Panel Service Conversions .....	48602-E
<b>Sample Forms</b>		
<b>Rule 21 Generating Facility Interconnections</b>		
79-280	Agreement for Installation or Allocation of Special Facilities for Parallel Operation of Nonutility Owned Generation and/or Electrical Standby Service (Electric Rule 2 and 21) .....	48684-E
79-702	Agreement for Installation or Allocation of Special Facilities for Parallel Operation of Nonutility-Owned Generation and/or Electrical Standby Service (Electric Rule 2 and 21) – Appendix A, Detail of Special Facilities Charges .....	48686-E
79-973	Generating Facility Interconnection Agreement .....	48703-E
79-988	Generating Facility Interconnection Agreement Third Party Non-Exporting .....	48706-E
79-992	Generating Facility Interconnection Agreement Third Party Generation or Premise Non-Exporting .....	49236-E
79-1070	Addendum to Form 79-973 – Export Addendum for Generators Sized 2 Megawatts or Less .....	48582-E
79-1100	Electric Rule 21 – Agreement to Install Applicant Requested NGOM Special Facilities for Solar Performance Metering .....	48592-E
79-1136	PG&E Interconnection Agreement For An Existing Small Generating Facility Interconnecting to the Distribution System Under Rule 21 .....	48619-E
79-1145	Rule 21 Exporting Generator Interconnection Request .....	<b>49768-E</b> (T)
79-1162	Rule 21 Detailed Study Agreement .....	48645-E
79-1174	Rule 21 Generator Interconnection Application .....	49265-E
79-1174-A	Rule 21 Generator Interconnection Application – Attachment A .....	<b>49770-E</b> (T)
79-1174-B	Rule 21 Generator Interconnection Application – Attachment B .....	49282-E
79-1174-C	Rule 21 Generator Interconnection Application – Attachment C .....	49283-E
79-1174-D	Rule 21 Generator Interconnection Application – Attachment D .....	49284-E
79-1174-E	Rule 21 Generator Interconnection Application – Attachment E .....	49285-E
79-1174-F	Rule 21 Generator Interconnection Application – Attachment F .....	49286-E
79-1174-G	Rule 21 Generator Interconnection Application – Attachment G .....	49287-E
79-1174-H	Rule 21 Generator Interconnection Application – Attachment H .....	49288-E
79-1174-I	Rule 21 Generator Interconnection Application – Attachment I .....	49289-E
79-1174-J	Rule 21 Generator Interconnection Application – Attachment J .....	49290-E
79-1174-K	Rule 21 Generator Interconnection Application – Attachment K .....	49291-E
79-1174-L	Rule 21 Generator Interconnection Application – Attachment L .....	49292-E
79-1174-M	Rule 21 Generator Interconnection Application – Attachment M .....	49293-E
79-1174-N	Rule 21 Generator Interconnection Application – Attachment N .....	49294-E

(Continued)



**ELECTRIC TABLE OF CONTENTS**

Sheet 25

FORM	TITLE OF SHEET	CAL P.U.C. SHEET NO.
<b>Sample Forms</b>		
<b>Rule 21 Generating Facility Interconnections (Cont'd)</b>		
79-1174-02	Rule 21 Generator Interconnection Application.....	49266-E
79-1174-02A	Rule 21 Generator Interconnection Application – Attachment A .....	<b>49769-E</b> (T)
79-1174-02B	Rule 21 Generator Interconnection Application – Attachment B .....	49268-E
79-1174-02C	Rule 21 Generator Interconnection Application – Attachment C .....	49269-E
79-1174-02D	Rule 21 Generator Interconnection Application – Attachment D .....	49270-E
79-1174-02E	Rule 21 Generator Interconnection Application – Attachment E .....	49271-E
79-1174-02F	Rule 21 Generator Interconnection Application – Attachment F .....	49272-E
79-1174-02G	Rule 21 Generator Interconnection Application – Attachment G.....	49273-E
79-1174-02H	Rule 21 Generator Interconnection Application – Attachment H .....	49274-E
79-1174-02I	Rule 21 Generator Interconnection Application – Attachment I.....	49275-E
79-1174-02J	Rule 21 Generator Interconnection Application – Attachment J.....	49276-E
79-1174-02K	Rule 21 Generator Interconnection Application – Attachment K .....	49277-E
79-1174-02L	Rule 21 Generator Interconnection Application – Attachment L.....	49278-E
79-1174-02M	Rule 21 Generator Interconnection Application – Attachment M.....	49279-E
79-1174-02N	Rule 21 Generator Interconnection Application – Attachment N .....	49280-E
79-1175	Rule 21 Consent to Assignment Form for Non-NEM Projects.....	48657-E
79-1181	Rule 21 Pre-Application Report Request .....	48663-E
79-1191	Generating Facility Interconnection Agreement For Local Government Renewable Energy Self- Generation Bill Credit Transfer (RES-BCT).....	49295-E
79-1197	Local Government Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) Re- Allocation Request .....	48676-E
79-1198-02	Interconnection Agreement for Net Energy Metering (NEM2) and Renewable Electrical Generating Facility Sized Greater than 1,000 kW .....	49298-E
79-1199	Agreement and Customer Authorization Non-Export Standalone Energy Storage of 30 Kilowatts or Less .....	48678-E
79-1200	Rule 21 Generator Interconnection Agreement for Exporting Generating Facilities .....	48679-E
79-1204	Pilot Pedestal Program Application .....	48680-E

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## **Attachment B**

### **Redline Tariff Revisions**

For convenience of the reader, PG&E has included redline revisions in Attachment 2. Where Sample Forms have been revised, the entire Sample Form is included in Attachment A (clean version), but the redline version in Attachment B only includes the pages where the modification has occurred, and excludes pages of the form where only the advice letter number and date has been updated within the footer of the page to reflect this advice letter.

Like the Sample Forms, where Electric Rule 21 has been revised, the affected sheets are included in Attachment A. However, the redline tariff revisions in Attachment B do not include pages that merely show location changes.



**Electric Sample Form 79-1145**  
Rule 21 Exporting Generator  
Interconnection Request

Sheet 1

**Please Refer to Attached  
Sample Form**

**PG&E'S RULE 21  
EXPORTING GENERATOR INTERCONNECTION REQUEST**

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g. Applicant Data (set forth in Attachment A)

*The Applicant shall provide to the Distribution Provider the technical data called for in Attachment A.*

h. AC Disconnect Switch. List the AC disconnect switch that will be used at this Generating Facility (enter "N/A" if not applicable)

Disconnect Switch Manufacturer: \_\_\_\_\_

Disconnect Switch Model Number: \_\_\_\_\_

Disconnect Switch Rating (amps): \_\_\_\_\_

4. Application Fee and Detailed Study Deposit as specified in Rule 21 is required to complete this application. Upon receipt of this Interconnection Request and Attachment A, PG&E will send a separate invoice for the applicable fee or deposit. **PLEASE DO NOT INCLUDE ANY CHECKS/MONIES WITH THIS INTERCONNECTION REQUEST.** (Any checks/monies submitted with this IR will be returned to the sender and may result in a delay in the application process.)

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

      Yes             No      

5. Attach evidence of Site Exclusivity as specified in Rule 21 Section E.2.d as applicable, and name(s), address(es) and contact information of site owner(s).

6. **Interconnection Request Instructions:** Complete this interconnection request and enter this information into PG&E's web-based form. (PG&E strongly recommends preparing all information and materials before starting the online interconnection request.) The online web-based form can be found at:

[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)

Questions concerning PG&E's online interconnection request process can be directed to the Electric Generation Interconnection Department at [rule21gen@pge.com](mailto:rule21gen@pge.com).

7 Representative of Applicant to contact:

[To be completed by Applicant]

Name:

Title:

Company Name:

Street Address:

City, State:

Zip Code:

Phone Number:

Fax Number:

Email Address:



**Electric Sample Form No. 79-1174\_A**  
Rule 21 Generator Interconnection Application - Attachment A

Sheet 1

**Please Refer to Attached  
Sample Form**

(Continued)

*Advice* 5988-E-A  
*Decision* D.20-09-035

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

*Submitted* May 19, 2021  
*Effective* May 19, 2021  
*Resolution* \_\_\_\_\_



# FORM 79-1174 - ATTACHMENT A - INTERCONNECTION APPLICATION - CUSTOMER AND PROJECT INFORMATION

## Part I - Selecting the Study Process<sup>1</sup>

This Application is not applicable for incentives and/or rebates offered by the Energy Resources Conservation and Development Commission (CEC), the CPUC or any other entity. Please contact those agencies directly or on their respective websites:

[www.energy.ca.gov](http://www.energy.ca.gov) and [www.cpuc.ca.gov](http://www.cpuc.ca.gov).

Please check one:

- Fast Track Process.
- Detailed Study (not typical)
  - Will be either an Independent Study Process, Distribution Group Study Process or Transmission Cluster Study Process, dependent upon the Electrical Independence Tests.

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

       Yes        No

## Part II – Identifying the Generating Facility Location and Responsible Parties

Project Name:

**A. Generating Facility Account Information** (What electric service will the Generating Facility be interconnected for parallel operation with PG&E? For aggregated electric accounts provide the primary account and meter information).

Name shown on PG&E service account	Electric Service Agreement ID number - 10-digits	Electric Badge (Meter) Number - 6-10 digits (alpha numeric)

**NOTE: Customer Electric account must match the customer's utility bill account information.**

		CA	
Meter Location Street Address	City	State	Zip - 5-digits

Please check all that apply:

- A New Generating Facility interconnection (at an existing service).
- Physical Changes to an interconnected Generating Facility with previous approval by PG&E (adding PV panels, adding energy storage as an addition or enhancement, changing inverters/turbines or changing load and/or operations).
- A New interconnection in conjunction with a new service.
  - An **Application for Service** must be completed. Additional fees may be required if a service or line extension is required (in accordance with PG&E Electric Rules 15 and 16). Please contact PG&E at 1-800-PGE-5000 or Rule21Gen@pge.com.

<sup>1</sup> For selection of Study Process for Exporting Generating Facilities, please complete the Rule 21 Exporting Generating Facility Interconnection Request Form 79-1145.



**Electric Sample Form No. 79-1174-02A**  
Rule 21 Generator Interconnection Application - Attachment A

Sheet 1

**Please Refer to Attached  
Sample Form**

(Continued)

*Advice* 5988-E-A  
*Decision* D.20-09-035

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

*Submitted* May 19, 2021  
*Effective* May 19, 2021  
*Resolution* \_\_\_\_\_



# INTERCONNECTION APPLICATION (Form 79-1174-02)

## ATTACHMENT A

### CUSTOMER AND PROJECT INFORMATION

#### Part I - Selecting the Study Process

Please check one:

- Fast Track Process<sup>1</sup>.
- Greater than 1 MW generation facility,
- Detailed Study (not typical)
  - Will be either an Independent Study Process, Distribution Group Study Process or Transmission Cluster Study Process, dependent upon the Electrical Independence Tests.

Please indicate below if Applicant elects to pre-pay the Supplemental Review Fee:

\_\_\_\_\_ Yes \_\_\_\_\_ No

#### Part II – Identifying the Generating Facility Location and Responsible Parties

<i>Project Name:</i>

**A. Generating Facility Account Information** (What electric service will the Generating Facility be interconnected for parallel operation with PG&E? For aggregated electric accounts provide the primary account and meter information).

Name shown on PG&E service account	Electric Service Agreement ID number - 10-digits	Electric Badge (Meter) Number - 6-10 digits (alpha numeric)

**NOTE: Customer Electric account must match the customer's utility bill account information.**

		CA	
Meter Location Street Address	City	State	Zip - 5-digits

**Please check all that apply:**

- A New Generating Facility interconnection (at an existing service).
- Physical Changes to an interconnected Generating Facility with previous approval by PG&E (adding PV panels, adding energy storage as an addition or enhancement, changing inverters/turbines or changing load and/or operations).
- A New interconnection in conjunction with a new service.
  - An **Application for Service** must be completed. Additional fees may be required if a service or line extension is required (in accordance with PG&E Electric Rules 15 and 16). Please contact PG&E at 1-800-PGE-5000 or Rule21Gen@pge.com.
- An Interconnection under Direct Access (DA).

<sup>1</sup> See Electric Rule 21 for FAST TRACK requirements.



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

Sheet 2

TABLE OF CONTENTS (Cont'd.)

D.	GENERAL, RULES, RIGHTS AND OBLIGATIONS (Cont'd.)	
8.	PRUDENT OPERATION AND MAINTENANCE REQUIRED	39
9.	CURTAILMENT AND DISCONNECTION	40
10.	LOCAL FURNISHING BONDS	40
11.	COORDINATION WITH AFFECTED SYSTEMS	41
12.	TRANSFERABILITY OF INTERCONNECTION REQUEST	41
13.	SPECIAL PROVISIONS APPLICABLE TO CERTAIN NET ENERGY METERED APPLICANTS	41
14.	SPECIAL PROVISIONS APPLICABLE TO NON-EXPORT ENERGY STORAGE GENERATING FACILITIES	45
15.	COMPLIANCE WITH ESTABLISHED TIMELINES	45
16.	MODIFICATION OF TIMELINES	45
E.	INTERCONNECTION REQUEST SUBMISSION PROCESS	46
1.	OPTIONAL STANDARD AND ENHANCED PRE-APPLICATION REPORTS	46
	a. Standard Pre-Application Report	46
	b. Enhanced Pre-Application Report	47
2.	INTERCONNECTION REQUEST PROCESS	51
	a. Applicant Initiates Contact with Distribution Provider	51
	b. Applicant Selects a Study Process	52
	c. Applicant Completes an Interconnection Request	53
	d. Site Exclusivity	56
3.	INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT	56
	a. Detailed Study Deposit	576

(Continued)



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

Sheet 3

TABLE OF CONTENTS (Cont'd.)

E.	INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)	
4.	INTERCONNECTION COST RESPONSIBILITY	6 <del>21</del>
a.	Costs of Interconnection and Parallel Operation	6 <del>21</del>
b.	Methodology and Timing of Cost Identification	6 <del>21</del>
c.	Timing of Cost Identification	6 <del>32</del>
d.	Producer Costs During Parallel Operation	6 <del>32</del>
e.	Cost Allocation	6 <del>32</del>
f.	Summary Tables	6 <del>54</del>
5.	INTERCONNECTION REQUEST VALIDATION AND ASSIGNMENT OF QUEUE POSITION	6 <del>76</del>
a.	Acknowledgement of Interconnection Request	6 <del>76</del>
b.	Deficiencies in Interconnection Request	6 <del>76</del>
c.	Assignment of Queue Position	6 <del>98</del>
d.	Publication of the Interconnection Queue	7 <del>06</del> 9
F.	REVIEW PROCESS FOR INTERCONNECTION REQUESTS	7 <del>10</del>
1.	OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS	7 <del>10</del>
a.	Valid Interconnection Request	7 <del>10</del>
b.	Fast Track Review	7 <del>21</del>
c.	Detailed Studies	7 <del>32</del>
d.	Compliance with Timelines	7 <del>32</del>

(Continued)



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

Sheet 4

TABLE OF CONTENTS (Cont'd.)

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

2. FAST TRACK INTERCONNECTION REVIEW PROCESS 754

    a. Initial Review 754

    b. Optional Initial Review Results Meeting 776

    c. Supplemental Review 787

    d. Optional Supplemental Review Results Meeting 824

    e. Execution of the Generator Interconnection Agreement 832

3. DETAILED STUDY INTERCONNECTION REVIEW PROCESS 865

    a. Detailed Study Track Selection Process 865

    b. Independent Study Process 887

    c. Distribution Group Study Process 976

    d. Transmission Cluster Study Process 111  
        0

    e. Generator Interconnection Agreement 113  
        2

    f. Engineering & Procurement (E&P) Agreement 116  
        5

4. INTERCONNECTION FINANCIAL SECURITY 116  
        5

    a. Types of Interconnection Financial Security 116  
        5

    b. Initial Posting of Interconnection Financial Security 117  
        6

    c. Second Posting of Interconnection Financial Security 119  
        8

    d. Third Posting of Interconnection Financial Security 120  
        19

    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 121  
        0

(Continued)



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

Sheet 5

TABLE OF CONTENTS (Cont'd.)

F.	REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)	
5.	COMMISSIONING TESTING AND PARALLEL OPERATION	129 <del>8</del>
a.	Commissioning Testing	129 <del>8</del>
b.	Parallel Operation or Momentary Parallel Operation	129 <del>8</del>
6.	WITHDRAWAL	130 <del>29</del>
7.	Cost Envelope Option	131 <del>0</del>
a.	Eligibility for Cost Envelope Option	131 <del>0</del>
b.	Cost Responsibility for Facilities Subject to Cost Envelope	133 <del>2</del>
c.	Timing of Applicant's Selection of Cost Envelope and Payment of Deposit	134 <del>3</del>
d.	Distribution Provider's Preparation of the Cost Envelope Estimate	136 <del>5</del>
e.	Cost Elements Not Subject to Cost Envelope	137 <del>6</del>
f.	Modifications	139 <del>8</del>
g.	Tender of the Generator Interconnection Agreement Under the Cost Envelope Option	140 <del>39</del>
G.	ENGINEERING REVIEW DETAILS	141 <del>0</del>
1.	INITIAL REVIEW SCREENS	143 <del>2</del>
a.	Screen A: Is the PCC on a Networked Secondary System?	143 <del>2</del>
b.	Screen B: Is Certified Equipment used?	144 <del>3</del>
c.	Screen C: Is the Starting Voltage Drop within acceptable limits?	145 <del>4</del>

(Continued)



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

Sheet 6

TABLE OF CONTENTS (Cont'd.)

G.	ENGINEERING REVIEW DETAILS (Cont'd.)	
1.	INITIAL REVIEW SCREENS (Cont'd.)	
	d. Screen D: Is the transformer or secondary conductor rating exceeded?	146 <del>5</del>
	e. Screen E: Does the Single-Phase Generator cause unacceptable imbalance?	146 <del>5</del>
	f. Screen F: Is the Short Circuit Current Contribution Ratio within acceptable limits?	147 <del>6</del>
	g. Screen G: Is the Short Circuit Interrupting Capability Exceeded?	148 <del>7</del>
	h. Screen H: Is the line configuration compatible with the Interconnection type?	149 <del>8</del>
	i. Screen I: Will power be exported across the PCC?	150 <del>49</del>
	j. Screen J: Is the Gross Rating of the Generating Facility 11 kVA or less?	153 <del>2</del>
	k. Screen K: Is the Generating Facility a Net Energy Metering (NEM) Generating Facility with nameplate capacity less than or equal to 500kW?	153 <del>2</del>
	l. Screen L: Transmission Dependency and Transmission Stability Test	154 <del>3</del>
	m. Screen M: 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?	154 <del>3</del>

(Continued)



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

Sheet 7

TABLE OF CONTENTS (Cont'd.)

G.	ENGINEERING REVIEW DETAILS (Cont'd.)	
2.	SUPPLEMENTAL REVIEW SCREENS	155
		<del>4</del>
a.	Screen N: Penetration Test	156
		<del>5</del>
b.	Screen O: Power Quality and Voltage Tests	157
		<del>6</del>
c.	Screen P: Safety and Reliability Tests	158
		<del>7</del>
3.	DETAILED STUDY SCREENS	160
		<del>59</del>
a.	Screen Q: Is the Interconnection Request electrically Independent of the Transmission System?	160
		<del>59</del>
b.	Screen R: Is the Interconnection Request independent of other earlier-queued and yet to be studied interconnection requests interconnecting to the Distribution System?	162
		<del>4</del>
c.	Independent Study Process and Distribution Group Study Process Interconnection Studies	163
		<del>2</del>
H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS	166
		<del>5</del>
1.	GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS	167
		<del>6</del>
a.	Protective Functions Required	167
		<del>6</del>
b.	Momentary Paralleling Generating Facilities	168
		<del>7</del>
c.	Suitable Equipment Required	168
		<del>7</del>
d.	Visible Disconnect Required	169
		<del>8</del>
e.	Drawings Required	170
		<del>69</del>
f.	Generating Facility Conditions Not Identified	171
		<del>0</del>

(Continued)



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

Sheet 8

TABLE OF CONTENTS (Cont'd.)

H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)	
2.	PREVENTION OF INTERFERENCE	171 <del>0</del>
a.	Voltage Regulation	171 <del>0</del>
b.	Voltage Trip Setting	172 <del>4</del>
c.	Paralleling	175 <del>4</del>
d.	Flicker	175 <del>4</del>
e.	Integration with Distribution Provider's Distribution System Grounding	176 <del>5</del>
f.	Frequency	176 <del>5</del>
g.	Harmonics	178 <del>7</del>
h.	Direct Current Injection	179 <del>8</del>
i.	Power Factor	179 <del>8</del>
3.	TECHNOLOGY SPECIFIC REQUIREMENTS	180 <del>79</del>
a.	Technology Specific Requirements	180 <del>79</del>
b.	Induction Generators	180 <del>79</del>
c.	Inverters	181 <del>0</del>
d.	Limitations on Inverters Not Classified as Smart Inverters	181 <del>0</del>
e.	Non-Export AC/DC Converters	181 <del>0</del>

(Continued)



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

Sheet 9

TABLE OF CONTENTS (Cont'd.)

H.	GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)	
4.	SUPPLEMENTAL GENERATING FACILITY REQUIREMENTS	181 0
a.	Fault Detection	181 0
b.	Transfer Trip	182 4
c.	Reclose Blocking	182 4
Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS	182 4
1.	GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS	183 2
a.	Protective Functions Required	183 2
b.	Momentary Paralleling Generating Facilities	184 3
c.	Suitable Equipment Required	185 4
d.	Visible Disconnect Required	185 4
e.	Drawings Required	187 6
f.	Generating Facility Conditions Not Identified	187 6
2.	PREVENTION OF INTERFERENCE	187 6
a.	Voltage Regulation	188 7
b.	Voltage Trip and Ride-Through Settings	188 7
c.	Paralleling	191 0
d.	Flicker	191 0

(Continued)





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

Sheet 10

TABLE OF CONTENTS (Cont'd.)

Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)	
2.	PREVENTION OF INTERFERENCE (Cont'd.)	
f.	Frequency	192 <del>4</del>
g.	Harmonics	193 <del>2</del>
h.	Direct Current Injection	194 <del>3</del>
i.	Fixed Power Factor	194 <del>3</del>
j.	Dynamic Volt/VAR Operations	195 <del>4</del>
k.	Ramp Rate Requirements	197 <del>6</del>
l.	Recommended Frequency-Watt Settings	196 <del>7</del>
m.	Smart Inverters	199 <del>8</del>
n.	Default Activation States for Phase 1 Functions	200 <del>199</del>
o.	Load Shedding or Transfer	201 <del>0</del>
p.	Default Activation States for Phase 1 Functions	201 <del>0</del>
q.	Phase 3 Function	202 <del>1</del>
r.	Load Shedding or Transfer	203 <del>2</del>
3.	TECHNOLOGY SPECIFIC REQUIREMENTS	203 <del>2</del>
4.	SUPPLEMENTAL SMART INVERTER REQUIREMENTS	204 <del>3</del>
a.	Fault Detection	204 <del>3</del>

(Continued)



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

Sheet 10

b. Transfer Trip	204
	<u>3</u>
c. Reclose Blocking	204
	<u>3</u>
5. COMMUNICATION REQUIREMENTS	205
	<u>4</u>
a. Generating Facilities utilizing inverter-based technologies must adhere to all of the following communication protocol requirements:	205
	<u>4</u>

(Continued)



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

Sheet 11

TABLE OF CONTENTS (Cont'd.)

Hh.	SMART INVERTER GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont'd.)	
5.	COMMUNICATION REQUIREMENTS (Cont'd.)	
	b. Additional communication protocol requirements shall also apply to Generating Facilities utilizing inverter-based technologies as provided in the following documents	206 5
	c. Additional communication protocol requirements shall also apply to Generating Facilities utilizing inverter-based technologies as provided in the following documents:	207 6
6.	SCHEDULING CAPABILITY REQUIREMENTS	208 7
7.	MONITORING AND TELEMETRY REQUIREMENTS	210 09
8.	CONTROL THROUGH COMMUNICATION CAPABILITIES	213 2
I.	THIRD-PARTY INSTALLATIONS, RESERVATION OF UNUSED FACILITIES, AND REFUND OF SALVAGE VALUE	214 3
1.	INTERCONNECTION FACILITIES AND DISTRIBUTION UPGRADES	214 3
2.	THIRD-PARTY INSTALLATIONS	214 3
3.	RESERVATION OF UNUSED FACILITIES	215 4
4.	REFUND OF SALVAGE VALUE	215 4
J.	METERING, MONITORING AND TELEMETERING	215 4
1.	GENERAL REQUIREMENTS	215 4
2.	METERING BY NON-DISTRIBUTION PROVIDER PARTIES	215 4
3.	NET GENERATION OUTPUT METERING	216 5
4.	POINT OF COMMON COUPLING (PCC) METERING	217 6

(Continued)



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

Sheet 11

5.	TELEMETERING	218 <del>7</del>
6.	LOCATION	218 <del>7</del>
7.	COSTS OF METERING	219 <del>8</del>
8.	MULTIPLE TARIFF METERING	219 <del>8</del>

(Continued)

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

Sheet 12

TABLE OF CONTENTS (Cont'd.)

K.	DISPUTE RESOLUTION PROCESS	220 <del>19</del>
1.	SCOPE	220 <del>19</del>
2.	PROCEDURES	220 <del>19</del>
3.	PERFORMANCE DURING DISPUTE	222 <del>4</del>
L.	CERTIFICATION AND TESTING CRITERIA	222 <del>4</del>
1.	INTRODUCTION	222 <del>4</del>
2.	CERTIFIED AND NON-CERTIFIED INTERCONNECTION EQUIPMENT	224 <del>3</del>
a.	Certified Equipment	224 <del>3</del>
b.	Non-Certified Equipment	225 <del>4</del>
3.	TYPE TESTING	226 <del>5</del>
a.	Type Tests and Criteria for Interconnection Equipment Certification	226 <del>5</del>
b.	Anti-Islanding Test	228 <del>7</del>
c.	Non-Export Test	228 <del>7</del>
d.	In-rush Current Test	229 <del>8</del>
e.	Surge Withstand Capability Test	229 <del>8</del>
f.	Synchronization Test	230 <del>29</del>
g.	Paralleling Device Withstand Test	231 <del>0</del>
h.	Backfeed Test	231 <del>0</del>

(Continued)



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

Sheet 13

TABLE OF CONTENTS (Cont'd.)

L.	CERTIFICATION AND TESTING CRITERIA (Cont'd.)	
4.	PRODUCTION TESTING	231 <del>0</del>
5.	COMMISSIONING TESTING	232 <del>4</del>
a.	Commissioning Testing	232 <del>4</del>
b.	Review, Study, and Additional Commissioning Test Verification Costs	233 <del>2</del>
c.	Other Checks and Tests	234 <del>3</del>
d.	Certified Equipment	234 <del>3</del>
e.	Non-Certified Equipment	235 <del>4</del>
f.	Verification of Settings	235 <del>4</del>
g.	Trip Tests	236 <del>5</del>
h.	In-service Tests	236 <del>5</del>
6.	PERIODIC TESTING	237 <del>6</del>
7.	TYPE TESTING PROCEDURES NOT DEFINED IN OTHER STANDARDS	237 <del>6</del>
a.	Non-Exporting Test Procedures	237 <del>6</del>
b.	In-rush Current Test Procedures	248 <del>7</del>

(Continued)





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

Sheet 55

- E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)
  - 2. INTERCONNECTION REQUEST PROCESS (Cont'd.)
    - c. Applicant Completes an Interconnection Request (Cont'd.)

**TABLE E.1**

**Summary of Interconnection Request Fees, Deposits and Exemptions**

<u>Generating Facility Type</u>	<u>Interconnection Request Fee</u>	<u>Supplemental Review Fee</u>	<u>Detailed Study Deposit</u>	<u>Additional Commissioning Test Verification</u>	<u>Cost Envelope Option Deposit****</u>
Non-Net Energy Metering and > 1 MW NEM-2	\$800	\$2,500*	For a Generating Facility with a Gross Nameplate Rating of 5 MW or less and applying to the Independent Study Process, \$10,000 for a System Impact Study or the DGS Phase I Interconnection Study in the case of the Distribution Group Study Process; and \$15,000 for an Interconnection Facilities Study or DGS Phase II Interconnection Study in the case of the Distribution Group Study Process.  For a Generating Facility with a Gross Nameplate Rating above 5 MW, \$50,000 plus \$1,000 per MW of electrical output of the Generating Facility, or the increase in electrical output of the existing Generation Facility, as applicable, rounded up to the nearest whole MW, up to a maximum of \$250,000.	\$150/Person Hour**	\$2,500
≤ 1 MW NEM-2***	\$145	\$0	\$0	N/A	\$2,500
NEM-1	\$0	\$0	\$0	N/A	\$2,500
Solar ≤ 1MW or less that does not sell power to Distribution Provider (per D.01-07-027) nor participate in NEM-1 or NEM-2	First \$5,000 of study fees waived			\$150/Person Hour**	\$2,500

\* Optional \$1,000 additional fault current study fee pursuant to Section F.2.c.ii. [Pursuant to D. 20-09-035, Applicants have the option to pre-pay the non-refundable Supplemental Review Fee \(such as concurrently with the Interconnection Request fee\) or separately upon completion of the Initial Review.](#)

\*\* Plus additional costs for travel, lodging and meals.

\*\*\* Applicants that participate in the Single-Family Affordable Solar Homes (SASH) program are exempt from the Interconnection Request fee.

\*\*\*\* Interconnection Requests that have selected the Cost Envelope Option and that subsequently qualify for and pass the Fast Track Process evaluation, as well as NEM Generating Facilities and Solar ≤ 1 MW Generating Facilities evaluated under the Independent Study Process, must provide the Cost Envelope Option deposit in accordance with Section F.7 to remain eligible for the Cost Envelope Option.

(Continued)



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

Sheet 56

**E. INTERCONNECTION REQUEST SUBMISSION PROCESS (Cont'd.)**

**2. INTERCONNECTION REQUEST PROCESS (Cont'd.)**

**d. Site Exclusivity**

Documentation of Site Exclusivity must be submitted with the Interconnection Request. This requirement does not apply to Applicants with NEM-1 Generating Facilities, NEM-2 ≤ 1 MW Generating Facilities, or Non-Export Generating Facilities.

**3. INTERCONNECTION REQUEST FEE AND STUDY DEPOSIT**

The Interconnection Request fee shall be waived for NEM-1 Interconnection Requests and for non-NEM solar-powered Generating Facilities that do not sell power per Commission Decision 01-07-027. NEM-1 Generating Facilities are also exempt from any costs associated with Interconnection Studies.

NEM-2 Applicants are required to pay any applicable Interconnection Request fees and costs associated with Interconnection Studies pursuant to Table E.1. As noted in the table, SASH participants are exempt from the NEM-2 Interconnection Request Fee and NEM-2 ≤1 MW Applicants are exempt from costs associated with Interconnection Studies.

Interconnection Study fees for non-NEM solar ≤1 MW Generating Facilities interconnecting to the Distribution System that do not sell power will be waived up to the amount of \$5,000.

The Applicant must pay the Interconnection Request Fee as outlined in Table E.1 with the Application. The Applicant may pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), or separately upon completion of the Initial Review.

For Applicants that pre-pay the Supplemental Review Fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be performed following the Initial Review. The Optional Initial Review Results Meeting will not be held, but the Optional Supplemental Review Results Meeting may be held following completion of the Supplemental Review.

(Continued)

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		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	





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

Sheet 71

- F. REVIEW PROCESS FOR INTERCONNECTION REQUESTS (Cont'd.)
  - 1. OVERVIEW OF THE INTERCONNECTION REVIEW PROCESS (Cont'd.)
    - b. Fast Track Review

Fast Track evaluation allows for rapid review of the Interconnection of those Generating Facilities that do not require Detailed Study. Regardless of study process, all Generating Facilities shall be designed to meet the applicable requirements of Section H which identifies Generating Facility Design and Operation Requirements.

Fast Track review consists of an Initial Review and, if required, a Supplemental Review. The need for Supplemental Review will be determined based on the results of Initial Review Screens A through M in Section G.1. Applicants that successfully pass Initial Review Screens A through M will be allowed to interconnect without Supplemental Review.

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 Supplemental Review is required, Distribution Provider will notify Applicant and Applicant must pay a nonrefundable Supplemental Review fee, per Table E-1 or withdraw its Interconnection Request. If the Applicant pre-paid the Supplemental Review fee (such as concurrently with the Interconnection Request Fee), the Supplemental Review, if required, will be conducted upon completion of the Initial Review. Supplemental Review shall consist of the application of Screens N through P in Section G.2. Applicants that pass Screens N through P will be allowed to interconnect without additional review.

If Supplemental Review reveals that a proposed Generating Facility cannot be interconnected to Distribution Provider's Distribution System by means of Fast Track evaluation, Distribution Provider will notify Applicant that Detailed Study will be required.

Failure to pass Fast Track evaluation means only that further review and/or study are required before the Generating Facility can be interconnected with Distribution Provider's Distribution System. It does not mean that the Generating Facility cannot be interconnected.

(Continued)

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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 (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 ≤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, 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 must reapply and submit a new Interconnection Request.

Applicants that elect to proceed, unless the Applicant has pre-paid, to Supplemental Review 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 ≤1 MW NEM-2 Generating Facilities and for solar-powered non-NEM ≤1 MW Generating Facilities that do not sell power to Distribution Provider, per Commission D.01-07-027.

(Continued)

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

Sheet 76

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

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.

(Continued)

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

Sheet 77

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

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. 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 (Continued)



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

Sheet 78

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

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

c. Supplemental Review (Cont'd.)

- iii) 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 (Cont'd.).

~~If the Applicant chooses to move to Supplemental Review, 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. (Cont'd.)~~

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

(Continued)



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

Sheet 79

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

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

c. Supplemental Review (Cont'd.)

~~iii) If the Applicant chooses to move to Supplemental Review, 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. (Cont'd.)~~

Line Data:

Impedance data for line from XFMR to POI (if applicable)

Z1

Z0

POI Location:

~~ivii) 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.

(Continued)

Advice	5187-E-A	Issued by	Date Filed	May 31, 2018
Decision	16-06-052	<b>Robert S. Kenney</b>	Effective	June 30, 2018
		Vice President, Regulatory Affairs	Resolution	



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

Sheet 80

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

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

c. Supplemental Review (Cont'd.)

- iv) 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.

(Continued)

<i>Advice</i>	5187-E-A	<i>Issued by</i>	<i>Date Filed</i>	<u>May 31, 2018</u>
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		<i>Vice President, Regulatory Affairs</i>	<i>Resolution</i>	<u></u>



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

Sheet 157

G. ENGINEERING REVIEW DETAILS (Cont'd.)

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.

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

Sheet 182

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 and Distribution Provider.

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;

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

AT&T  
Albion Power Company

Alta Power Group, LLC  
Anderson & Poole

Atlas ReFuel  
BART

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

California Hub for Energy Efficiency  
Financing

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

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

Chevron Pipeline and Power  
City of Palo Alto

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

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

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

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

Green Power Institute  
Hanna & Morton  
ICF

IGS Energy  
International Power Technology  
Intestate Gas Services, Inc.  
Kelly Group  
Ken Bohn Consulting  
Keyes & Fox LLP  
Leviton Manufacturing Co., Inc.

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

Modesto Irrigation District  
NLine Energy, Inc.  
NRG Solar

Office of Ratepayer Advocates  
OnGrid Solar  
Pacific Gas and Electric Company  
Peninsula Clean Energy

Pioneer Community Energy

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

SPURR  
San Francisco Water Power and Sewer  
Sempra Utilities

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

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