

PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298



Pacific Gas & Electric Company
ELC (Corp ID 39)
Status of Advice Letter 5879E
As of August 18, 2020

Subject: Modifications to PG&E Net Energy Metering Tariffs to Allow Energy Storage Systems to Grid Charge in

Division Assigned: Energy

Date Filed: 07-17-2020

Date to Calendar: 07-22-2020

Authorizing Documents: D2006017

Disposition:	Accepted
Effective Date:	08-16-2020

Resolution Required: No

Resolution Number: None

Commission Meeting Date: None

CPUC Contact Information:

edtariffunit@cpuc.ca.gov

AL Certificate Contact Information:

Kimberly Loo

(415)973-4587

PGETariffs@pge.com

PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298



To: Energy Company Filing Advice Letter

From: Energy Division PAL Coordinator

Subject: Your Advice Letter Filing

The Energy Division of the California Public Utilities Commission has processed your recent Advice Letter (AL) filing and is returning an AL status certificate for your records.

The AL status certificate indicates:

- Advice Letter Number
- Name of Filer
- CPUC Corporate ID number of Filer
- Subject of Filing
- Date Filed
- Disposition of Filing (Accepted, Rejected, Withdrawn, etc.)
- Effective Date of Filing
- Other Miscellaneous Information (e.g., Resolution, if applicable, etc.)

The Energy Division has made no changes to your copy of the Advice Letter Filing; please review your Advice Letter Filing with the information contained in the AL status certificate, and update your Advice Letter and tariff records accordingly.

All inquiries to the California Public Utilities Commission on the status of your Advice Letter Filing will be answered by Energy Division staff based on the information contained in the Energy Division's PAL database from which the AL status certificate is generated. If you have any questions on this matter please contact the:

Energy Division's Tariff Unit by e-mail to
edtariffunit@cpuc.ca.gov

July 17, 2020

Advice 5879-E

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: Modifications to PG&E Net Energy Metering Tariffs to Allow Energy Storage Systems to Grid Charge in Advance of a Public Safety Power Shutoff Upon Receiving PG&E Notification, Pursuant to Decision 20-06-017

Purpose

Pacific Gas and Electric Company (PG&E) hereby submits this Tier 2 Advice Letter ("AL") in compliance with the California Public Utilities Commission ("CPUC" or "Commission") Decision ("D.") 20-06-017 ("Decision") Ordering Paragraph ("OP") 5. The AL demonstrates PG&E's compliance with Section 4.2.3 to allow energy storage systems that were interconnected under the condition that they only charge from solar to temporarily charge from the grid in advance of a Public Safety Power Shutoff ("PSPS") upon receiving PG&E notification.

Background

The Commission initiated Rulemaking ("R.") 19-09-009 to develop a policy framework surrounding the commercialization of microgrids and related resiliency strategies and to implement Senate Bill (SB) 1339 (Stern, 2018).

On December 20, 2019 the assigned Commissioner's Scoping Memo and Ruling was issued, adopting a scope and schedule for Track 1 of the proceeding. Track 1 addressed deploying resiliency planning in areas that are prone to outage events and wildfires, with the goal of establishing key microgrid and resiliency strategies as soon as possible. Subsequently, on January 21, 2020, Administrative Law Judge Rizzo issued a Ruling with Energy Division staff's ("Staff's") proposal on short-term actions related to microgrids and other resiliency strategies that could be initiated in early 2020 to reduce the impact of PSPS outages or other catastrophic events.

On June 11, 2020, the Commission adopted D.20-06-017, which approves certain Staff proposals for modernizing NEM tariffs to maximize resiliency benefits. This Advice Letter addresses the requirements included in OP 5 of D.20-06-017, which requires:

Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) shall each submit a Tier 2 Advice Letter within 30 days of the date of issuance of this decision that:

(1) proposes the necessary modifications to their Net Energy Metering tariffs to allow energy storage systems that are interconnected under the condition that they charge from solar to temporarily import from (but not export to) the grid upon receiving advanced notification from the utility of an upcoming Public Safety Power Shutoff (PSPS) event consistent with Section 4.2.3 of this decision;

(2) discuss how the utility coordinated with developers and aggregators to create a process that allows energy storage systems that are interconnected under the condition that they charge from solar to temporarily import from (but not export to) the grid upon receiving advanced notification from the utility of an upcoming PSPS event; and

(3) summarize how the utility consulted on this process with the Smart Inverter Working Group. In this Advice Letter submittal, PG&E, SCE, and SDG&E shall reference compliance with this decision pursuant to Ordering Paragraph 5.

PG&E submits this Tier 2 Advice Letter in compliance with OP 5 of D.20-06-017.

Discussion

I. Existing NEM Tariff Requirements for NEM Paired Storage

The NEM tariff prohibits NEM paired storage systems from charging from the grid in only one use-case. That use case is when a system has a storage device with a power rating that is both higher than 10kW and less than 150% of the power rating of the REGF inverter. A customer with a system that meets these size thresholds has three options for ensuring NEM credits are provided only for energy originating from the renewable generator, maintaining NEM integrity:¹

- Net Generation Output Meter (NGOM) on the solar device
- Relay protection equipment on the storage device (either non-export or non-import protection depending on definition)
- Power Control System (PCS)

¹ PG&E Electric Schedule NEM, Special Condition 11.a. Definitions (Cont'd). No Grid Charging and PG&E Electric Schedule NEM2, Special Condition 9.a. Definitions (Cont'd). No Grid Charging.

The first option, an NGOM, will monitor the production of the solar array exclusively. This provides a reliable measurement of NEM eligible credits and therefore ensures NEM integrity. The storage device for this customer type is not limited in its source of charge and can charge from the grid without restriction by the tariff.² However, the interconnection agreement may indicate that the customer cannot increase their peak demand, which may limit the rate of charge and the timing of the charge depending on the host load demand at that time.³

The second option, relay protection equipment, will physically disconnect the storage device from the grid if power flow is sensed in whichever direction is not permitted. For example, if it is defined as “No Grid Charging” then it would be a non-import relay configuration. If it was defined as “No Grid Export” then it would be a non-export relay configuration. This ensures NEM integrity due to the inability of the storage device to perform the unpermitted activity, whichever energy flow direction that may be. Storage devices defined as “No Grid Charging” and using a non-import relay to ensure NEM integrity are unable to charge from the grid according to the tariff and will be addressed in the tariff modification to allow for grid charging prior to a PSPS event.

The third option is the use of a PCS. In order to qualify, the PCS must be certified to a national standard, which is currently UL 1741 PCS. There are four distinct operating modes within this standard: Unrestricted Mode, Export Only Mode, Import Only Mode, and No Exchange Mode.⁴ The NEM tariff requires that either Export Only mode (defined in tariff as No Grid Charging) or Import Only mode (defined in tariff as No Grid Export) be selected and maintained in order to preserve NEM integrity. Systems that are set to Export Only mode are, according to the tariff, unable to charge from the grid. The proposed tariff modification will address this restriction.

Currently, there are only a small number of products available to consumers that have achieved PCS Certification.⁵ These products are certified only to a single operating mode. However, one of the most popular products is certified to and automatically set to Import Only mode and is therefore unrestricted from charging from the grid by PG&E’s tariff. It is expected that the product list that has achieved PCS certification will increase over time; it is also expected that products currently certified to a single operating mode be certified to multiple operating modes.

Due to customers with PCS certified equipment for Import Only mode (defined as No Grid Export) being already permitted by the NEM tariff to charge from the grid, the modification to the NEM tariff will be directed specifically at the customers using a certified PCS

² PG&E Electric Schedule NEM and NEM2, Table 11.2

³ PG&E Electric Form 79-1069 Appendix I, checkbox 2

⁴ UL 1741 CRD, subject: Power Control Systems (PCS), section 204.2.3

⁵ CalSSA NEM Paired Storage List of Certified Power Control Systems.

<https://calssa.org/powercontrolsyste.ms>

product that is certified to and set to Export Only mode as well as non-import relay customers. Those are the only systems restricted by the tariff from grid charging.

System Reliability and Safety Concerns:

Charging from the grid in reaction to a PSPS notification creates a significant concern around grid safety and reliability if not properly mitigated. Specifically, it creates the potential to overload distribution infrastructure. Almost all storage devices are studied as if they do not increase the peak demand at the host facility. This, if applicable, is stated on the single line drawings and the interconnection agreement for the system. Although a system may not be restricted from grid charging by its position under the NEM Tariff, increasing the peak demand of the host load through charging is in almost all cases prohibited by the interconnection agreement.

PG&E stated this concern in its opening comments filed May 19, 2020, on the Track 1 proposed decision in R.19-09-009, and is included below:

*"PG&E supports allowing pre-PSPS importing for customer resiliency, so long as the charging does not jeopardize system reliability and safety. Conditions in Rule 21 interconnection agreements normally require that customers not increase their peak demand through charging. Additionally, the current expedited interconnection process for storage projects under Rule 21 does not study a scenario in which storage projects charge concurrently, as may happen just prior to a PSPS event. Any adopted changes to allow for pre-PSPS charging will need to consider the potential for overloads on the grid from concurrent charging, which can lead to safety and reliability issues, especially as the amount of NEM-paired storage increases on the grid over time."*⁶

In its proposed tariff modification, PG&E will be emphasizing this point by specifically referencing that the Interconnection Agreement must always be adhered to and specifically that the host customer is not allowed to increase their historical peak demand. Although there is not a physical mechanism stopping a customer from doing this, PG&E is using the tools it has available at this time, the tariff modification, to emphasize the existing restriction.

Proposed NEM Tariff Modification

Due to the restriction for grid charging only being applicable to systems using either a non-import relay configuration, or a PCS configuration and set to Export Only, PG&E recommends making the necessary modification as a footnote with reference to the sentence that contains this restriction. This footnote will be placed in section 11.a. Definitions (Cont'd.) for NEM and in section 9.a. Definitions (Cont'd.) for NEM2, within the

⁶ PG&E's Opening Comments on Proposed Decision Adopting Short-Term Actions to Accelerate Microgrid Deployment and Related Resiliency Solutions. p 11-12.

definition for “No Grid Export.” A small modification to the wording of the paragraph is needed to combine the sentences referencing both the non-import relay and the PCS options and is included in the modification.

Below is an excerpt of the proposed footnote which will be referenced in the NEM Tariffs.

In the event of an expected PSPS (Public Safety Power Shutoff) outage, as evidenced by a 48-hour notice from PG&E to the expected outage start, a storage system defined as “No Grid Charging” and designed for resiliency, meaning it is capable of providing back-up power safely and in compliance with all relevant tariffs, electric rules, other requirements, and is qualified by PG&E to participate, will be temporarily permitted to charge from the grid in order to prepare for the PSPS outage. The notification must specify an impact to the customer generator location. This temporary permission will begin at the publication of the 48-hour notification and will end 24 hours after the end of the PSPS event, as marked by the restoration of power at the site. If power is not shutoff, the temporary permission will end 72 hours after the original 48-hour notice. At the end of the temporary permission period as described above, the storage system will need to revert to “No Grid Charging” operation mode in order to maintain compliance with the NEM tariff, notwithstanding additional PSPS Alerts. At no point during the temporary permission period will the system be permitted to violate the interconnection agreement. Specifically, the storage system must not increase the host facility’s historical peak demand.

PG&E took careful consideration in structuring the language of this footnote to ensure that it provides adequate information in terms of what must occur to qualify for this temporary permission period, when it starts and when it ends for the scenarios of an outage occurring and an outage not occurring, as well as emphasizing that the interconnection agreement prevails at all times.

Attached to this Advice Letter is a redlined copy of both the NEM and NEM2 tariffs that include these changes. The redlines also include changes made to remove the storage sizing limit for large NEM-paired storage for a period of three years, while maintaining existing metering requirements, as required by OP 6 of D.20-06-017. PG&E is concurrently submitting a separate advice letter seeking approval of those tariff changes.

II. Coordination with Developers and Aggregators

In compliance with OP5, section 2, PG&E engaged with the following developers/aggregators on the following dates: Tesla (May 20, 2020), SolarEdge (June 8, 2020), and Sunrun (June 10, 2020) to coordinate on a process for grid charging prior to PSPS outages. To summarize these discussions, each company will likely take differing approaches with customer management and overall execution when reacting to a PSPS notification based on their differing approaches and abilities in centralized control of battery operation modes, customer to business relationship structure, and tax concerns. All three companies confirmed that they are aware of the PG&E PSPS notification process.

Notification Process:

PG&E has two notification pathways for expected PSPS outages that a vendor or aggregator can utilize to provide the pre-PSPS grid charging service to customers.

The first is the notification that goes directly from PG&E to the customer. In order to receive these notifications, the entity must be a PG&E account holder. The customer would then notify their battery storage provider that they have received the notification and authorize the provider to charge the battery.

The second notification pathway is zip-code based notifications that are available to non-account holders. A vendor, or anyone, is able to sign up for these notifications for the zip codes they would like to track, and by knowing what zip code their systems are located in, the vendors can know whether or not the system and therefore customer will be effected by the outage.

III. Consultation with the Smart Inverter Working Group

In compliance with OP 5, section 3, as quoted in the background section of this advice letter, PG&E participated in a joint consultation of this process during the June 25, 2020, Smart Inverter Working Group (SIWG) meeting.

Updates to the UL PCS Standard May Be Needed.

Currently, the Underwriters Laboratory (UL) PCS standard includes strict limits on the ability to change the PCS operation mode in the field and prohibits it to be changed by the end user (customer) except when it becomes necessary.⁷

These restrictions are in place to ensure the highest level of NEM integrity possible, so that once a system is operating, an end-user is not able to easily change the battery controls and conduct rate arbitrage under NEM using grid power. During the SIWG meeting this topic was discussed, and it was requested for a proposed process and timeline for the UL PCS Working Group⁸ to create a proposal for updates to the UL 1741 CRD code to address these concerns.

Summary of the SIWG Meeting:

Attendance of the meeting included SCE, SDG&E, PG&E, and CPUC representatives, as well as a wide ranging and well represented group of solar providers, equipment manufacturers, industry advocate groups, and others. During the meeting, existing tariff

⁷ UL 1741 CRD, subject: Power Control Systems (PCS), section 204.3 ESS Operating Mode Selection

⁸ The UL PCS Working Group meets on a weekly basis and includes the UL, SCE, PG&E, SolarEdge, Enphase, and others.

allowances, PCS certification challenges, notification processes, and a proposed process for potentially updating the UL PCS standard was discussed. Stakeholders recognized the difficulties with PCS certification and recertification but did not request or provide any additional coordination beyond what the utilities presented. PG&E is open to continued coordination with the SIWG on this topic but believes it has fulfilled its obligation of consultation directed by D-20-06-017.

Protests

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

Any party wishing to protest this submittal may do so by letter sent via U.S. mail, facsimile or E-mail, no later than August 6, 2020, which is 20 days after the date of this submittal. Protests must be submitted to:

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

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

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

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

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

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

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

Effective Date

Pursuant to General Order (GO) 96-B, Rule 5.2, this advice letter is submitted with a Tier 2 designation. PG&E requests that this Tier 2 advice submittal become effective August 16, 2020, thirty days from the date of submittal.

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, R. 14-07-002 and R.19-09-009. 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/

Erik Jacobson
Director, Regulatory Relations

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

Attachments:

Attachment 1 – Tariffs
Attachment 2 – Redline Tariff Revisions



ADVICE LETTER SUMMARY

ENERGY UTILITY



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

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

Utility type:

☒ ELC ☐ GAS ☐ WATER
☐ PLC ☐ HEAT

Contact Person: Kimberly Loo

Phone #: (415)973-4587

E-mail: PGETariffs@pge.com

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

EXPLANATION OF UTILITY TYPE

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

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 5879-E

Tier Designation: 2

Subject of AL: Modifications to PG&E Net Energy Metering Tariffs to Allow Energy Storage Systems to Grid Charge in Advance of a Public Safety Power Shutoff Upon Receiving PG&E Notification, Pursuant to Decision 20-06-017

Keywords (choose from CPUC listing): Compliance, Metering, Storage

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

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D.20-06-017

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: 8/16/20

No. of tariff sheets: 4

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 proposed¹: N/A

Pending advice letters that revise the same tariff sheets: N/A

¹Discuss 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

Name: Erik Jacobson, 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

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

Clear Form

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
46840-E	ELECTRIC SCHEDULE NEM NET ENERGY METERING SERVICE Sheet 27	45717-E
46841-E	ELECTRIC SCHEDULE NEM2 NET ENERGY METERING SERVICE Sheet 29	45729-E
46842-E	ELECTRIC TABLE OF CONTENTS Sheet 1	46826-E
46843-E	ELECTRIC TABLE OF CONTENTS Sheet 6	46659-E



ELECTRIC SCHEDULE NEM
NET ENERGY METERING SERVICE

Sheet 27

SPECIAL
CONDITIONS:
(Cont'd.)

11. NEM Paired Storage

a. Definitions (Cont'd.)

No Grid Charging:

A storage system that uses a control configuration that is either certified to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot be charged from the PG&E grid⁵. A PG&E approved physical non-import relay or a functionally equivalent non-import configuration to prevent grid power from flowing to the storage device is also permitted. Customers may not have access to software settings, only the installer and the storage provider would be able to access and select settings profiles. Inadvertent but minor instances of grid import are permitted. Such inadvertent grid imports must not exceed durations of ten seconds.

(T)

No Storage Export:

A storage system that uses a power-control configuration that is certified either to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot export to PG&E's grid. A PG&E approved physical non-export relay or a functionally equivalent non-export configuration to prevent grid power from flowing to the storage device is also permitted. Inadvertent but minor instances of storage export are permitted. Such inadvertent grid exports must not exceed durations of ten seconds.

b. Interconnection

NEM Paired Storage will have the same interconnection cost responsibility as the NEM generator that it is paired with, including charges or fees related to the interconnection application, Rule 21 engineering study/review, and/or any associated distribution upgrade.

See Section c.5 below for additional information

c. Types of NEM Paired Storage

The Renewables Portfolio Standard (RPS) Guidebook establishes two categories of energy storage that may be considered an addition or enhancement to a renewable electrical generation facility: "integrated" and "directly connected" storage.

1) Integrated Storage:

Integrated Energy Storage is defined in the RPS guidelines as methods of storing energy from a renewable energy resource that are integrated into the REGF as part of the generation process.

⁵ In the event of an expected PSPS (Public Safety Power Shutoff) outage, as evidenced by a 48-hour notice from PG&E to the expected outage start, a storage system defined as "No Grid Charging" and designed for resiliency, meaning it is capable of providing back-up power safely and in compliance with all relevant tariffs, electric rules, other requirements, and is qualified by PG&E to participate, will be temporarily permitted to charge from the grid in order to prepare for the PSPS outage. The notification must specify an impact to the customer generator location. This temporary permission will begin at the publication of the 48-hour notification and will end 24 hours after the end of the PSPS event, as marked by the restoration of power at the site. If power is not shutoff, the temporary permission will end 72 hours after the original 48-hour notice. At the end of the temporary permission period as described above, the storage system will need to revert to "No Grid Charging" operation mode in order to maintain compliance with the NEM tariff, notwithstanding additional PSPS Alerts. At no point during the temporary permission period will the system be permitted to violate the interconnection agreement. Specifically, the storage system must not increase the host facility's historical peak demand.

(N)

(N)

(Continued)



**ELECTRIC SCHEDULE NEM2
NET ENERGY METERING SERVICE**

Sheet 29

SPECIAL
CONDITIONS:
(Cont'd.)

9. NEM Paired Storage

a. Definitions: (Cont'd.)

No Grid Charging:

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(N)

(N)

(Continued)



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Sheet 1

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Advice 5879-E
Decision D.20-06-017

Issued by
Robert S. Kenney
Vice President, Regulatory Affairs

Submitted Effective Resolution
July 17, 2020



ELECTRIC TABLE OF CONTENTS

Sheet 6

SCHEDULE	TITLE OF SHEET	CAL P.U.C. SHEET NO.
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E-DEPART	Departing Customers	28859-E
E-DRP	Demand Response Provider Services.....	35430,43626-E
E-ECR	Enhanced Community Renewables (ECR) Program.....	45680,35739,46519, 46520,46521,46522,46523,46524-E
E-GT	Green Tariff (GT) Program.....	45682,46529,46530,46531,46532,46533-E
E-NMDL	New Municipal Departing Load	27453,32097,32098,32099, 29557,29558-,29559, 29560,29561,29562,29563,29564-E
E-NWDL	New WAPA Departing Load.....	28581,28582,28862,28863, 27448,27449,27450,27451, 27452-E
E-LORMS	Limited Optional Remote Metering Services	20194-E
E-SDL	Split-Wheeling Departing Load.....	28588,28589,28867,28868,27459, 27460,27461,27462,27463, 27464-E
E-STORE	Station Service For Storage Devices.....	40238,40239,40240,40241,40242-E
E-TMDL	Transferred Municipal Departing Load	27465,28869,28870, 35227,28961,30659,28608,25887,25888,25889,25890,25891-E
NEM	Net Energy Metering Service	37636,36352,43185*,35636, 44459,37638,37639,37640,36562,36563,36564,35753,33909*,33910*, 37641,33912*,33913*,35643,33915*,35276,35644,36599,35489,35645,35646, 43186*,45716,46840,45718,45719,45720,45721,45722,45723-E (T)
NEM2	Net Energy Metering Service	42929,45724,42930,37798,46378,42931,42932,42933, 42934,42935,42936,42937,45725,42938,43187*,37810,42939,38161, 38162,42940,45726,37816,42941,38165,37819,42942,45727,45728,46841, (T) 45730,45731,45732,45733,45734,45735,45736,45737,45738,45739,45740-E
NEMFC	Net Energy Metering Service For Fuel Cell Customer-Generators	37770,38187,37772,37773, 37774,37775,32446,32447,37824,38231-E
NEMBIO	Net Energy Metering Service for Biogas Customer-Generators.....	30791,27254,27255, 26140,27256,26142,27257,26144,37823-E
NEMCCSF	Net Energy Metering Service for City and County of San Francisco	28176,28177, 28178,28179-E
NEMV	Virtual Net Metering for a Multi-Tenant or Multi-Meter Property Served at the Same Service Delivery Point.....	42055,42056,42057,31549,32806, 31551,33921,31553,42058,42059,31556,31557,31558,36565,31560, 42060,36566,32807,42061,31565,42062,33216,42063,44523-E

(Continued)

Attachment 2

Redline Tariff Revisions



**ELECTRIC SCHEDULE NEM
NET ENERGY METERING SERVICE**

Sheet 27

SPECIAL
CONDITIONS:
(Cont'd.)

11. NEM Paired Storage

a. Definitions (Cont'd.)

No Grid Charging:

A storage system that uses a control configuration that is either certified to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot be charged from the PG&E grid⁵. A PG&E approved physical non-import relay or a functionally equivalent non-import configuration to prevent grid power from flowing to the storage device is also permitted. Customers may not have access to software settings, only the installer and the storage provider would be able to access and select settings profiles. Inadvertent but minor instances of grid import are permitted. Such inadvertent grid imports must not exceed durations of ten seconds.

No Storage Export:

A storage system that uses a power-control configuration that is certified either to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot export to PG&E's grid. A PG&E approved physical non-export relay or a functionally equivalent non-export configuration to prevent grid power from flowing to the storage device is also permitted. Inadvertent but minor instances of storage export are permitted. Such inadvertent grid exports must not exceed durations of ten seconds.

b. Interconnection

NEM Paired Storage will have the same interconnection cost responsibility as the NEM generator that it is paired with, including charges or fees related to the interconnection application, Rule 21 engineering study/review, and/or any associated distribution upgrade.

See Section c.5 below for additional information

c. Types of NEM Paired Storage

The Renewables Portfolio Standard (RPS) Guidebook establishes two categories of energy storage that may be considered an addition or enhancement to a renewable electrical generation facility: "integrated" and "directly connected" storage.

1) Integrated Storage:

Integrated Energy Storage is defined in the RPS guidelines as methods of storing energy from a renewable energy resource that are integrated into the REGF as part of the generation process.

⁵In the event of an expected PSPS (Public Safety Power Shutoff) outage, as evidenced by a 48-hour notice from PG&E to the expected outage start, a storage system defined as "No Grid Charging" and designed for resiliency, meaning it is capable of providing back-up power safely and in compliance with all relevant tariffs, electric rules, other requirements, and is qualified by PG&E to participate, will be temporarily permitted to charge from the grid in order to prepare for the PSPS outage. The notification must specify an impact to the customer generator location. This temporary permission will begin at the publication of the 48-hour notification and will end 24 hours after the end of the PSPS event, as marked by the restoration of power at the site. If power is not shutoff, the temporary permission will end 72 hours after the original 48-hour notice. At the end of the temporary permission period as described above, the storage system will need to revert to "No Grid Charging" operation mode in order to maintain compliance with the NEM tariff, notwithstanding additional PSPS Alerts. At no point during the temporary permission period will the system be permitted to violate the interconnection agreement. Specifically, the storage system must not increase the host facility's historical peak demand.

(Continued)

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Decision 19-01-030

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Vice President, Regulatory Affairs

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**ELECTRIC SCHEDULE NEM
NET ENERGY METERING SERVICE**

Sheet 29

SPECIAL
CONDITIONS:
(Cont'd.)

11. NEM Paired Storage

c. Types of NEM Paired Storage

2) Directly Connected: (Cont'd.)

Directly Connected Cases:

(i) DC-Coupled storage system sized 10kW or smaller

DC-Coupled storage systems sized 10kW or smaller are not required to meet either the "No Grid Charging" or "No Storage Export" requirements, must complete interconnection agreement Form 79-1193 (solar and/or wind electric facilities of 30kW or less) and will be billed using the estimation methodology as described in Section g.1) of this special condition when no additional metering is installed as described in "Large NEM-Eligible GFs" below.

(ii) DC-Coupled storage system sized greater than 10kW

The DC-Coupled storage systems sized greater than 10kW must satisfy the definition of "No Storage Export", apply with 79-1174, complete Form 79-1069, and will be billed as described for Large NEM paired Storage in Section 3)(ii) of this special condition.

For this case, there are no restrictions on the storage system size (kW).

(iii) Large AC Coupled storage system ("Large NEM-eligible GFs")

Large NEM-eligible Generating Facilities (GFs) are NEM-eligible GFs paired with storage sized larger than 10 kW. For Large NEM-eligible GFs, the storage system shall have a maximum output power no larger than 150% of the NEM-eligible generator's maximum output capacity. Pursuant to Decision 20-06-017 the maximum output capacity limit shall not apply for a period of 3 years starting on August 16, 2020.

Large NEM-eligible GFs are required to select one of the following:

- a) install a non-export relay on the storage device(s);
- b) install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling;
- c) install an interval meter directly to the NEM-eligible generator(s); or
- d) meet the requirements of No Grid Export

(Continued)

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**ELECTRIC SCHEDULE NEM
NET ENERGY METERING SERVICE**

Sheet 31

SPECIAL
CONDITIONS:
(Cont'd.)

11. NEM Paired Storage

c. Types of NEM Paired Storage

2) Directly Connected: (Cont'd.)

DIRECTLY CONNECTED - Table 11.2 (This table covers storage that is NOT 100% REGF charged) For Both AC and DC Coupled Storage					
May Include ▶ No-Grid Charged storage (if other nonrenewable generation present) ▶ Non Storage Export (if other nonrenewable generation present) Includes All ▶ Grid Charged Storage And Storage Exports All apply with Application 79-1174-02					
Includes ▶ Non-Storage Export with either NGOM or non-export relay equivalent (if no other nonrenewable generation present) All apply with Application 79-1174-02					
	PV/Wind < 30 kw	Non-PV/Wind REGF ≤1MW >30kW PV/Wind ≤1MW	Bill as	IC costs	Notes
Storage ≤ 10kw	79-1093- 02	79-1069-02	§3i	Per 5.i	Estimation Methodology
Storage > 10kw And < 150% ⁶	79-1069- 02	79-1069-02	§3ii	Per 5.ii or iii	NGOM, No Grid Charging, No Storage Export ⁷
Storage > 10kw And > 150%	Set up and bill as NEMMT (not under NEM-Paired Storage section)				

⁶ the storage system shall have a maximum output power no larger than 150% of the NEM-eligible generator's maximum output capacity. Pursuant to Decision 20-06-017 the maximum output capacity limit shall not apply for a period of 3 years starting on August 16, 2020.

⁷ see definition of "No Grid Charging" storage and "No Storage Export" above in 9.a above.

(Continued)



**ELECTRIC SCHEDULE NEM2
NET ENERGY METERING SERVICE**

Sheet 29

SPECIAL
CONDITIONS:
(Cont'd.)

9. NEM Paired Storage

a. Definitions: (Cont'd.)

No Grid Charging:

A storage system that uses a power control configuration that is either certified to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot be charged from the PG&E grid⁹. A PG&E approved physical non-import relay or a functionally equivalent non-import configuration to prevent grid power from flowing to the storage device is also permitted. Customers may not have access to software settings, only the installer and the storage provider would be able to access and select settings profiles. Inadvertent but minor instances of grid import are permitted. Such inadvertent grid imports must not exceed durations of ten seconds.

No Storage Export:

A storage system that uses a power-control configuration that is certified either to a national standard or to a utility-approved interim testing procedure, either of which ensures that the storage system cannot export to PG&E's grid. A PG&E approved physical non-export relay or a functionally equivalent non-export configuration to prevent grid power from flowing to the storage device is also permitted. Inadvertent but minor instances of storage export are permitted. Such inadvertent grid exports must not exceed durations of ten seconds.

b. Interconnection

NEM Paired Storage will have the same interconnection cost responsibility as the NEM generator that it is paired with, including charges or fees related to the interconnection application, Rule 21 engineering study/review, and/or any associated distribution upgrades.

See Section c.5. below for additional information

c. Types of NEM Paired Storage

The Renewables Portfolio Standard (RPS) Guidebook⁸ establishes two categories of energy storage that may be considered an addition or enhancement to a renewable electrical generation facility: "integrated" and "directly connected" storage.

1) Integrated Storage:

Integrated Energy Storage is defined in the RPS guidelines as methods of storing energy from a renewable energy resource that are integrated into the REGF as part of the generation process.

⁹ In the event of an expected PSPS (Public Safety Power Shutoff) outage, as evidenced by a 48-hour notice from PG&E to the expected outage start, a storage system defined as "No Grid Charging" and designed for resiliency, meaning it is capable of providing back-up power safely and in compliance with all relevant tariffs, electric rules, other requirements, and is qualified by PG&E to participate, will be temporarily permitted to charge from the grid in order to prepare for the PSPS outage. The notification must specify an impact to the customer generator location. This temporary permission will begin at the publication of the 48-hour notification and will end 24 hours after the end of the PSPS event, as marked by the restoration of power at the site. If power is not shutoff, the temporary permission will end 72 hours after the original 48-hour notice. At the end of the temporary permission period as described above, the storage system will need to revert to "No Grid Charging" operation mode in order to maintain compliance with the NEM tariff, notwithstanding additional PSPS Alerts. At no point during the temporary permission period will the system be permitted to violate the interconnection agreement. Specifically, the storage system must not increase the host facility's historical peak demand.

(Continued)



ELECTRIC SCHEDULE NEM2
NET ENERGY METERING SERVICE

Sheet 31

SPECIAL
CONDITIONS:
(Cont'd.)

9. NEM Paired Storage

c. Types of NEM Paired Storage

2) Directly Connected: (Cont'd.)

Directly Connected Cases:

- (i) DC-Coupled storage system sized 10kW or smaller. DC-Coupled storage systems sized 10kW or smaller are not required to meet either the "No Grid Charging" or "No Storage Export" requirements, must apply with 79-1174-02, and either complete interconnection agreement Form 79-1193-02 (solar and/or wind electric facilities of 30kW or less) or Form 79-1069-02 (all other REGF with a storage system configurations fulling the requirements of "No Grid Charging"). All configurations will be billed using the estimation methodology as described in Section g.1) of this special condition when no additional metering is installed as described in "Large NEM-Eligible GFs" below.

- (ii) DC-Coupled storage system sized greater than 10kW

The DC-Coupled storage systems sized greater than 10kW must satisfy the definition of "No Storage Export", apply with 79-1174-02, complete Form 79-1069-02 and will be billed as described for Large NEM paired Storage in Section 3)(ii) of this special condition.

For this case, there are no restrictions on the storage system size (kW).

- (iii) Large AC Coupled storage system ("Large NEM-eligible GFs")

Large NEM-eligible Generating Facilities (GFs) are NEM-eligible GFs paired with storage sized larger than 10 kW. For Large NEM-eligible GFs, the storage system shall have a maximum output power no larger than 150% of the NEM-eligible generator's maximum output capacity. Pursuant to Decision 20-06-017 the maximum output capacity limit shall not apply for a period of 3 years starting on August 16, 2020.

Large NEM-eligible GFs are required to select one of the following:

- a) install a non-export relay on the storage device(s);
- b) install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling;
- c) install an interval meter directly to the NEM-eligible generator(s); or
- d) or meet the requirements of No Grid Export

(Continued)

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**ELECTRIC SCHEDULE NEM2
NET ENERGY METERING SERVICE**

Sheet 33

SPECIAL
CONDITIONS:
(Cont'd.)

9. NEM Paired Storage

c. Types of NEM Paired Storage

DIRECTLY CONNECTED - Table 11.2 (This table covers storage that is NOT 100% REGF charged) For Both AC and DC Coupled Storage May Include ► No-Grid Charged storage (if other nonrenewable generation present) ► Non Storage Export (if other nonrenewable generation present) Includes All ► Grid Charged Storage And Storage Exports All apply with Application 79-1174-02 Includes ► Non-Storage Export with either NGOM or non-export relay equivalent (if no other nonrenewable generation present) All apply with Application 79-1174-02						
	PV/Wind < 30 kw	Non- PV/Wind REGF ≤1MW >30kW PV/Wind ≤1MW	REGF >1Mw	Bill as	IC costs	Notes
Storage ≤ 10kw	79-1093-02	79-1069-02	79-1078-02	§3i	Per 5.i	Estimation Methodology
Storage > 10kw And < 150% ⁶	79-1069-02	79-1069-02	79-1078-02	§3ii	Per 5.ii or iii	NGOM, No Grid Charging, No Storage Export⁷
Storage > 10kw And > 150%	Set up and bill as NEMMT (not under NEM-Paired Storage section)					

⁶ the storage system shall have a maximum output power no larger than 150% of the NEM-eligible generator's maximum output capacity. Pursuant to Decision 20-06-017 the maximum output capacity limit shall not apply for a period of 3 years starting on August 16, 2020.

⁷ see definition of "No Grid Charging" storage and "No Storage Export" above in 9.a above.

(Continued)



ELECTRIC SCHEDULE NEM2
NET ENERGY METERING SERVICE

Sheet 36

**SPECIAL
CONDITIONS:
(Cont'd.)**

9. NEM Paired Storage (Cont'd.)

d. Storage Size Dependent Requirements

Requirements differ depending on the size of the NEM Paired Storage and whether it is paired with a solar generator or not. The storage device size is determined by the inverter alternating current nameplate rating.

e. Requirements for Large NEM Paired Storage (i.e., All NEM Paired Storage Devices except Solar NEM paired with Storage Sized 10 KW and Smaller)

For NEM-paired storage systems with storage devices larger than 10 kW, the NEM Paired Storage shall have a maximum output power no larger than 150% of the NEM-eligible generator's maximum output capacity. Pursuant to Decision 20-06-017 the maximum output capacity limit shall not apply for a period of 3 years starting on August 16, 2020.

Large NEM Paired Storage systems are required to either:

- 1) install a non-export relay on the storage device(s);
- 2) install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling; or
- 3) install an interval meter directly to the NEM-eligible generator(s).

f. Requirements for Small NEM Paired Storage (i.e., Solar NEM Paired with Storage Devices Sized 10 KW or Smaller)

Small NEM Paired Storage is not required to be sized to the customer demand or the NEM generator. Small NEM Paired Storage has the option to install metering as required for Large NEM Paired Storage or may chose the estimation methodology describe in Section g.

(Continued)

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

AT&T	Downey & Brand	Pioneer Community Energy
Albion Power Company	East Bay Community Energy	Redwood Coast Energy Authority
Alcantar & Kahl LLP	Ellison Schneider & Harris LLP	Regulatory & Cogeneration Service, Inc.
	Energy Management Service	SCD Energy Solutions
Alta Power Group, LLC	Engineers and Scientists of California	
Anderson & Poole		
Atlas ReFuel	GenOn Energy, Inc.	SCE
BART	Goodin, MacBride, Squeri, Schlotz & Ritchie	SDG&E and SoCalGas
Barkovich & Yap, Inc.	Green Power Institute	SPURR
California Cotton Ginners & Growers Assn	Hanna & Morton	San Francisco Water Power and Sewer
California Energy Commission	ICF	Seattle City Light
California Public Utilities Commission	IGS Energy	Sempra Utilities
California State Association of Counties	International Power Technology	Southern California Edison Company
Calpine	Intestate Gas Services, Inc.	Southern California Gas Company
	Kelly Group	Spark Energy
Cameron-Daniel, P.C.	Ken Bohn Consulting	Sun Light & Power
Casner, Steve	Keyes & Fox LLP	Sunshine Design
Cenergy Power	Leviton Manufacturing Co., Inc.	Tecogen, Inc.
Center for Biological Diversity		TerraVerde Renewable Partners
		Tiger Natural Gas, Inc.
Chevron Pipeline and Power	Los Angeles County Integrated	TransCanada
City of Palo Alto	Waste Management Task Force	Troutman Sanders LLP
	MRW & Associates	Utility Cost Management
City of San Jose	Manatt Phelps Phillips	Utility Power Solutions
Clean Power Research	Marin Energy Authority	Water and Energy Consulting Wellhead
Coast Economic Consulting	McKenzie & Associates	Electric Company
Commercial Energy		Western Manufactured Housing
Crossborder Energy	Modesto Irrigation District	Communities Association (WMA)
Crown Road Energy, LLC	NLine Energy, Inc.	Yep Energy
Davis Wright Tremaine LLP	NRG Solar	
Day Carter Murphy		
Dept of General Services	Office of Ratepayer Advocates	
Don Pickett & Associates, Inc.	OnGrid Solar	
Douglass & Liddell	Pacific Gas and Electric Company	
	Peninsula Clean Energy	