Virtual Net Metering Policy Background and Tariff Summary Report

Solar Market Pathways

June 30, 2015

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Center for Sustainable Energy, California Solar Energy Industries Association, Interstate Renewable Energy Council (2015), Virtual Net Metering Policy Background and Tariff Summary Report, Center for Sustainable Energy.

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Ackowledgements

Special thanks go to the following individuals
for their insight and support on this report:

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List of Acronyms	
AHJ	Authority Having Jurisdiction
ARRA	American Recovery and Reinvestment Act
CHP	Combined Heat and Power
CL&P	Connecticut Light and Power
CPUC	California Public Utilities Commission
CREA	Community Renewable Energy Act
CREF	Community Renewable Energy Facility
CRO	Customer Requested Outage
CSG	Community Solar Garden
CSI	California Solar Initiative
CT	Current Transformer
DEEP	Department of Energy and Environmental Protection
DIIS	Distribution Interconnection Information System
ECR	Enhanced Community Renewables
FIM	Facility Inventory Mapping
GTSR	Green Tariff Shared Renewables
IDR	Interval Data Recorder
IOU	Investor Owned Utility
ISO-NE	Independent System Operator - North East
kWh	Kilowatt hour
MASH	Multifamily Affordable Solar Housing
MW	Megawatt

NEM	Net Energy Metering
NEM-A	Net Energy Metering Aggregation
NEM-V	Net Energy Metering - Virtual (General Market tariff)
NGOM	Net Generation Output Meter
NMHC	National Multifamily Housing Council
NYISO	New York Independent System Operator
OAS/T	Otherwise Applicable Rate Schedule / Tariff
PG&E	Pacific Gas and Electric
PSB	Public Service Board
PSC	Public Service Commission
PTO	Permission to Operate
PV	Photovoltaic
PVPC	Photovoltaic Purchase and Credit Tariff
RECs	Renewable Energy Credits
RES-BCT	Renewable Energy Self Generation Bill Credit Transfer
RFP	Request for Proposal
RTEM	Real Time Energy Meter
SB 1	Senate Bill 1
SCE	Southern California Edison
SDG&E	San Diego Gas and Electric
SDP	Service Delivery Point
SLD	Single Line Drawing
SREC	Solar Renewable Energy Credit

T&D	Transmission and Distribution
TARR	Total Aggregate Retail Rate
VNEM	Virtual Net Energy Metering
VNM	Virtual Net Metering (MASH Low Income Housing tariff)

About this Report

The *Virtual Net Metering Market Development Plan* is one of 15 projects that make up the United States Department of Energy's SunShot Solar Market Pathways Program, which aims to bolster solar adoption throughout the United States.

The California Legislature established the Net Energy Metering (NEM) tariff in 1996 with the enactment of Senate Bill 656, which was signed into law by Governor Pete Wilson. With the growth of solar through the successful implementation of NEM, California has created different subtariffs that extend and build off the successes NEM created. Virtual Net Energy Metering (VNEM) has become one of those important derivatives of traditional net energy metering, which allows customers to produce electricity on site with distributed generation, such as with a solar photovoltaic (PV) or small wind energy system, and offset their own energy needs.

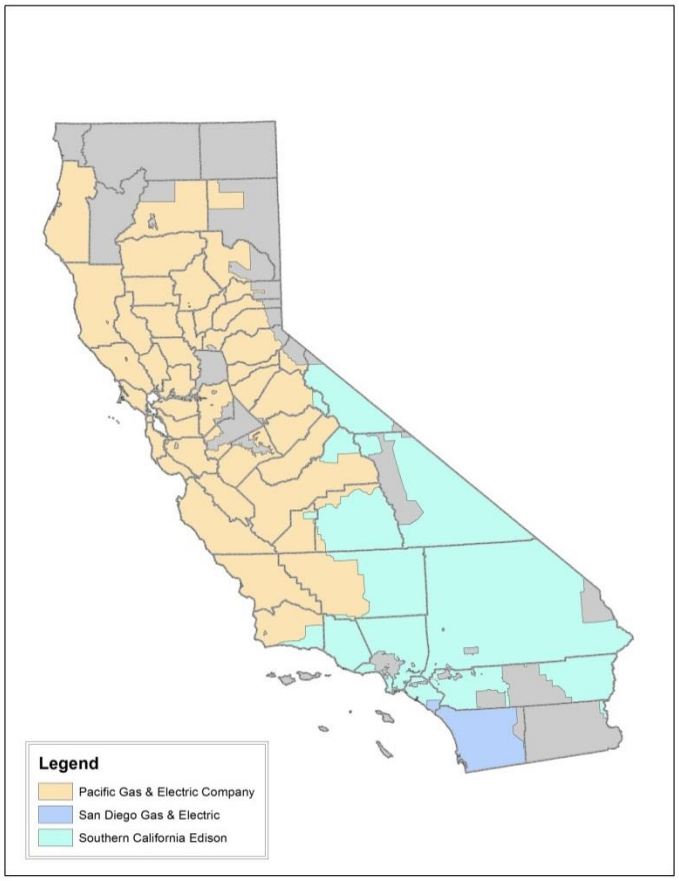
VNEM expands consumer options for renewable energy by removing significant hurdles commonly associated with traditional NEM. For instance, VNEM can allow residents in a multitenant building to participate in a common system on the roof of their building, sharing the electricity that is produced by the single solar electric system. Utility customers who can participate in a VNEM project include renter-tenants, owner-tenants and common load areas owned by the property owner. By allowing a multitenant building to install a single solar electric system for the benefit of multiple tenants, it enables more cost-effective design, as compared to the traditional NEM solar arrangement of one solar electric system physically installed and connected to each utility account.

Many of the tariffs that fall within the VNEM offering are similar, yet they each have defining eligibility characteristics and audiences to which they apply. While this report will touch on California VNEM tariffs as well as other related tariffs in California and elsewhere, the focus will be on the California NEM-V tariff. The NEM-V tariff is specific to market rate,[1] multitenant, multimetered buildings for which the participating utility accounts[2] all stem from a single Service Delivery Point (SDP).[3]

[1] Also referred to as *General market*, *Nonaffordable housing*, *Non-low-income.*
[2] Also referred to as *Benefitting Accounts.*
[3] SDP is commonly defined as "the demarcation between the customer-owned electrical system and the utility distribution system." CPUC Decision 11-07-031, p. 6.

Despite having been operational since 2012, the use of the NEM-V tariff has been extremely limited. Since its inception, only 150 systems have been connected under the NEM-V tariff within the service territories of California's three main investor-owned utilities (IOUs), Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E). Table 1 provides a breakdown of projects by utility.

Table 1: Quantity of Installed NEM-V Projects



Utility	Number of Installed NEM-V Projects[4]
Pacific Gas and Electric (PG&E)	114
Southern California Edison (SCE)	12
San Diego Gas & Electric (SDG&E)	24

VNEM market potential research (building stock analysis) has exposed the largely untapped multitenant, multimetered building sector audience for which solar access historically has not been feasible.

[4] Data supplied by Investor Owned Utilities (IOUs), which reflects the number of installed NEM-V projects from tariff inception to May 2015.

According to the National Multifamily Housing Council (NMHC),[5] the housing stock in the three IOU service territories is made up largely of apartment buildings.

Table 2: State Distribution of Apartment Residents, 2013

State	Population in Occupied Housing Units	Number of Apartment Residents	Apartment Resident Share of State Population
California	37,526,347	6,316,413	16.8%

Table 3: Large Cities: Population, Housing, and Renters

City	Population	Total Occupied Housing Units	Total Apartments	Apartments Percent of All Housing
San Francisco	837,442	354,651	142,598	40%
Los Angeles	3,884,340	1,320,167	563,413	43%
San Diego	1,355,885	480,730	139,116	29%

This NMHC data does not differentiate between affordable housing and market rate housing; however, the overall VNEM market potential is exposed, as well as the need for NEM-V tariff assessment to explore ways to tap this market.

Given that the significant potential for NEM-V projects in all three IOU service territories and the nominal adoption rates, these statistics give reason for further investigation into the NEM-V tariff. Indeed, a complete understanding of the NEM-V policy background and tariff structure is an important component to understanding the barriers to wider NEM-V adoption.

[5] https://nmhc.org/Content.aspx?id=4708#Large_Cities

In this report, we evaluate the regulations governing virtual net metering in California, examine how those rules have been implemented in the tariffs by the state's three large IOUs, summarize the current uptake and application process of the NEM-V tariff and summarize similar VNEM-type programs and regulations in other states. By assessing the past, present and future landscape of the NEM-V tariff, as well as identifying similar tariffs and programs in California and beyond, a more robust understanding of the NEM-V tariff may result.

Building on this understanding, future project efforts will focus on defining the market barriers, identifying solutions to address those hurdles and presenting proposals to contractors, building owners, regulators and utilities in an effort to increase the uptake of the NEM-V tariff and enable solar access to the previously untapped multitenant building market.

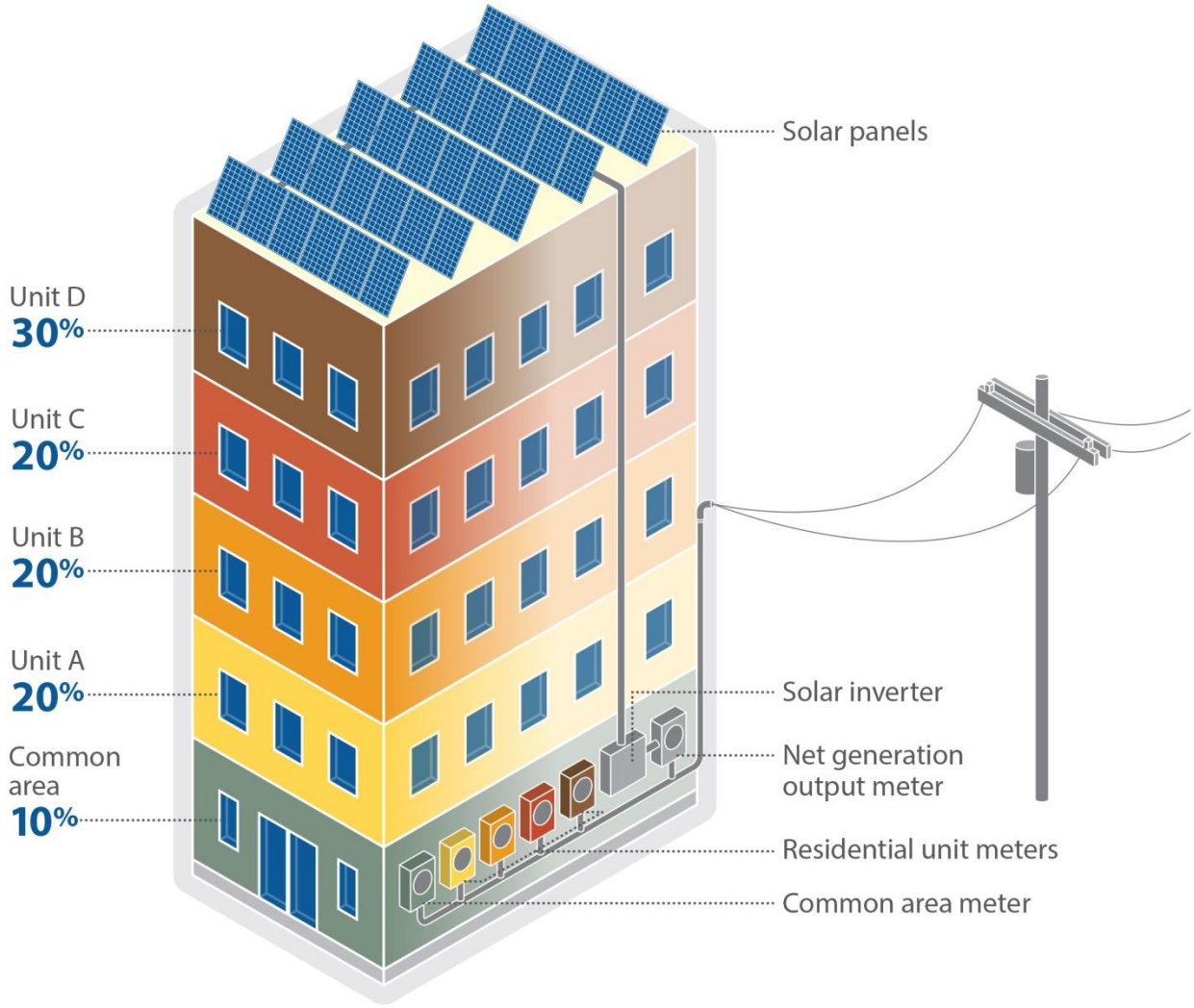


Figure 1: Virtual Net Metering

I. VNEM Policy Background

Events Leading to the NEM-V Tariff

In January 2006, the California Public Utilities Commission (CPUC) committed to providing $2.8 billion for solar incentives over 11 years through the California Solar Initiative (CSI) and set aside 10% of the money for low-income residential customers and affordable housing projects.[6] Later that year, the California Legislature and governor codified that commitment with Senate Bill (SB) 1.[7]

To address low-income residential customers and affordable housing projects, the CPUC created the Multifamily Affordable Solar Housing Program (MASH) in October 2008.[8] Recognizing that VNEM was essential for multifamily properties to be able to take advantage of these rebates, the need for a new utility tariff was apparent. Prior to the MASH Program kick-off, San Diego Gas & Electric (SDG&E) had proposed Schedule PVPC, the Photovoltaic Purchase and Credit tariff, in May 2007,[9] to serve as the rate schedule (tariff) for MASH participants. This PVPC tariff was a form of VNEM, although credits were not carried forward from one month to the next, as in the typical NEM arrangement. In addition, the credit rate was proposed to be equal to the class average rate for low-income customers at the time rather than their full retail rate.

The CPUC ultimately approved a somewhat different tariff, known as VNM. The approved VNM tariff included the accumulation of NEM credits until an annual true-up, the same as in the standard net metering tariff, and credits were granted at the full retail rate, which were two distinguishing differences from the Schedule PVPC proposal. VNM was adopted on a pilot basis and was only available for MASH program participants, but the CPUC Order on the tariff stated that the CPUC would issue a ruling at a later date to consider expanding the tariff to all multitenant properties (not solely low-income), later to be known as the NEM-V tariff.

Differing from the typical NEM arrangement in which a single utility account (tenant or common area load) can be served by a single solar electric system, the VNM tariff (as well as the subsequent NEM-V tariff), per CPUC direction, allows for energy credits to be allocated among individual units as well as to common area load. The VNM tariff requirements state that the predetermined energy allocations must

[6] CPUC Decision 06-01-024.
[7] Stats. 2006, ch. 132.
[8] CPUC Decision 08-10-036.
[9] SDG&E Advice Letter 1895-E, filed May 7, 2007.

remain fixed for participants for five years. For tenant load, SDG&E's original PVPC proposal determined bill credits for individual tenant units based on square footage. The CPUC, instead, used unit size, as it relates to the number of bedrooms, as the determining allocation factor for the approved VNM tariff.

Utilities argued that in order to implement and administer the VNM tariff there would be significant costs associated with the administrative transition and ongoing administration of the tariff and billing mechanism. The utilities and other parties also argued that the VNM tariff would be costly to implement both for utilities and landlords as additional fees on customer electric bills would be needed to recoup costs associated with a process change. These costs could ultimately flow through to increase tenant costs. The CPUC found that "the utilities' cost claims are vague and unsupported and their claims of increased costs to tenants are speculative."[10] Nevertheless, the CPUC ordered that the administrative costs associated with updating the utility billing software should be paid for by the existing administrative budget of the CSI General Market program, as opposed to imposing additional utility fees to the low-income customers participating in the VNM tariff.[11]

At the time when VNM was implemented, the utilities were required to, "allow for the allocation of net energy metering benefits from a single solar energy system to all meters on an individually metered multifamily affordable housing property."[12] Rather than define what constitutes a "property," the CPUC decision included a restriction that the accounts receiving virtual net metering credits be behind the same SDP as the solar system. Affordable housing projects, however, often consist of multiple buildings that span across multiple SDPs. Property owners and project developers found and objected to the fact that solar installations were not cost-effective at many affordable housing properties because of this tariff SDP limitation.

CPUC staff issued a report in July 2010 recommending various changes based on lessons learned after three years of operation of the CSI program. The proposed changes specifically related to VNM included:

1. Making VNM a standard tariff for customers in the MASH program rather than a pilot program.
2. Lifting the SDP restriction for VNM projects only, allowing all tenants on the affordable housing property to have access to the solar benefits.
3. Expanding VNM to general market multifamily housing, outside of the low-income sector and MASH program, but only within a single SDP.

[10] CPUC Decision 08-10-036, pp. 34-35.
[11] CPUC Decision 08-10-036, p 35.
[12] *Ibid.,* p. 38.

With respect to the second recommendation, PG&E filed a proposal in August 2010 to temporarily address the SDP issue.[13] The changes were urgent because the SDP limitation prevented low-income multifamily property owners from taking advantage of American Recovery and Reinvestment Act (ARRA) funding. PG&E proposed for their service territory to allow netting among a group of customers beyond a single SDP, but limited to customers within one low-income housing development. A single development was defined as "all of the real property and apparatus employed in a single low-income housing enterprise on contiguous parcels of land."[14] It also specified, "parcels may be divided by a dedicated street, highway, or public thoroughfare or railway, so long as they are otherwise contiguous and part of the same single low-income housing enterprise, and all under the same ownership."[15] The Commission approved this proposal as an interim measure with an effective date of September 2010 and a sunset date of December 2011.

The CPUC subsequently turned to the question of whether to make the proposed changes to virtual net metering for all three IOU service territories and whether to remove the sunset date for lifting the SDP restriction only for VNM projects in PG&E's service territory. Affordable housing entities, solar developers and clean energy advocates supported the three recommendations in the Energy Division staff proposal. SDG&E and SCE supported removing the SDP limit for low-income customers but opposed allowing properties to include buildings on both sides of a street. SCE further proposed reducing the value of net metering credits for VNM systems by subtracting the distribution rate from the full retail rate. PG&E opposed the staff recommendations, saying its interim program was intended to allow a few projects to proceed that had been started under a misinterpretation of the rules. PG&E argued that a permanent program that allowed the transfer of credits between buildings constitutes use of distribution system infrastructure without paying for it.

In a July 2011 decision, the CPUC dismissed PG&E's argument on the basis that containing a project within one housing development is sufficiently restrictive and the MASH budget is so limited that any wheeling of power across the distribution system is negligible. The CPUC pointed out that the SDP limitation hindered the CPUC's ability to meet its goal "to allocate the benefits of solar energy systems to all tenants on the affordable housing property."[16]

[13] PG&E, Advice Letter 3718-E.
[14] CPUC Decision 11-07-031, p. 7.
[15] *Ibid.,* p. 8
[16] CPUC Decision 11-07-031, p. 13.

With respect to the third recommendation, property owners, project developers and clean energy advocates all supported allowing market rate apartment buildings to take advantage of VNM behind a single SDP. In addition, some solar parties argued for expanding the VNM boundary beyond the SDP for non-MASH properties or for having no boundary at all. On the other hand, the utilities all opposed expanding VNM beyond the MASH program, citing as reasons that it would constitute "wheeling" and that increased billing costs would constitute a cross subsidy.

In July 2011, the CPUC approved[17] all three recommendations from the Staff Report by:

1. Removing the sunset date on the VNM tariff.
2. Ordering SCE and SDG&E to match PG&E's VNM tariff by removing the SDP limitation from affordable housing projects.
3. Ordering the IOUs to create a tariff for non-low-income multitenant housing properties similar to VNM, but with participation limited to a single SDP, to be known as the NEM-V tariff.
    a. The Commission sympathized with the utilities' concerns about the shifting of cost recovery but decided that the SDP limitation made those concerns minimal.

This CPUC approval marked the inception of the NEM-V tariff.

[17] CPUC Decision 11-07-031, p. 65, Ordering Paragraphs 1 and 2.

II. Implementation and Structure of NEM-V Tariff

The three IOUs filed proposed tariffs in September 2011 to fulfill the CPUC's order to create a virtual net metering tariff for general market multifamily housing and multimetered properties. There were a variety of topics that needed to be addressed in such a tariff, all of which were subject to protests, disputes and competing opinions as to how the tariff should be structured. Each utility proposal had elements controversial to the various solar parties, and the CPUC issued a decision in April 2012 ordering changes to the proposed tariffs.[18] This Resolution led to the current NEM-V tariff structure, as we know it today.

The NEM-V tariff, by definition, allows for *Qualified Customers*[19] to benefit from a single *Eligible Generating Facility*[20] (typically, but not exclusively, a solar electric system) installed on a site, in which energy credits produced (kWh) are allocated, by a predetermined percentage, to the participating tenants and/or accounts, herein referred to as the *Benefitting Accounts*. These Benefitting Accounts must be fed from a single SDP in order to participate in the NEM-V arrangement. The NEM-V tariff is in addition to a customer's otherwise applicable rate schedule/tariff. The process to apply for the NEM-V tariff depends on the utility service territory and is outlined in more detail in the following sections.

In the original IOU proposals, SDG&E proposed that the customer applying for NEM-V be limited to the property owner, SCE proposed to allow system operators in addition to property owners and PG&E did not address the issue. In response, the solar parties asked for flexibility given the uncertainty of how system ownership and management would be structured. Ultimately, the CPUC allowed the customer of

[18] CPUC, Resolution E-4481, April 29, 2012.

[19] The NEM-V tariff is applicable to *Qualified Customers* whose Service account(s) are located within a multitenant or multimeter property, which include all residential (whether rental properties or condominiums), commercial and industrial properties on which an *Eligible Generator(s)* has been installed at the same *Service Delivery Point (SDP)* and for which the Owner or Operator of the Property contracts with the Utility to have all eligible energy produced by the Eligible Generator and exported to the grid supplied by the Utility for the sole purpose of providing Allocated Credits to [Benefitting] accounts served by the same SDP as the generator within the Property.

[20] Eligible Generating Facility is defined as a renewable electrical generating facility, with a capacity of not more than one megawatt, which generates electricity from a renewable source listed in paragraph (1) of subdivision (a) of Section 25741 of the Public Resources Code.

record to be the property owner, system operator or a tenant.[21] This entity is referred to as the *Generator Account.*

Table 4: Key VNM & NEM-V Tariff Definitions

Qualified Customer	A *Qualified Customer* can be: A) the Owner or Operator of the multi-tenant, multi-meter Property with one or more separately metered accounts; B) an entity authorized by the owner to install and/or operate the Renewable Generating Facility (PV system) and who will be the IOU's customer of record for the PV system; or C) a tenant/occupant of the Property with a separately metered account, which is physically connected to the same SDP to which the PV system is connected.
Service Delivery Point	A *Service Delivery Point (SDP)* is where the utility's Service Facilities are connected to either Applicant's conductors or other service termination facility designated and approved by the utility.[22]
Generator Account	*Generator Account* is an Eligible Generator interconnected with the utility, for which the Owner or Operator is a utility customer, through a single meter located at the same SDP as all Benefitting Accounts.
Benefitting Account(s)	*Benefitting Account* is each Qualified Customer Service Account, which is individually metered, serves a tenant or common area with no other generating facility interconnected with the utility, is served from the same SDP as the Generator Account, does not participate in another virtual net energy metering program or the RES-BCT program, and for which the Owner has designated on the Allocation Request Form to receive an Allocated Credit.

[21] CPUC, Resolution E-4481, pages 25-26.

[22] Service Facilities may consist of (a) primary or secondary underground or overhead service conductors, (b) poles to support overhead service conductors, (c) service transformers, (d) Utility owned metering equipment and (e) other utility-owned service related equipment.

Service Delivery Point

The defining eligibility requirement for the NEM-V tariff is the restriction of all benefitting meters being tied to a single SDP. In the IOUs' initial tariff proposals, PG&E and SCE proposed site assessment fees of $550-$600, claiming that a site visit was necessary prior to construction to verify the SDP, condition of the service panel and compliance with system sizing rules. In response, the solar parties questioned whether a site visit was needed. The CPUC ultimately determined it was not and disallowed the fees.[23]

Currently, across the California IOU service territories, there is no standardized mechanism used by the utilities to confirm the quantity of SDPs on a site, but rather a process of leveraging a variety of resources, including utility circuit maps, city planner maps, customer-provided photographs and physical site visits.

The utility service territory within which the project is located will dictate the resources available to a contractor to investigate the quantity of SDPs on a site prior to submitting a NEM-V application for final utility eligibility determination and project approval. Ultimately, the utility will determine the SDP quantity and location for the project site. Interviews with key utility staff have uncovered measures a contractor can take during the project development stage, prior to submitting an interconnection application, in order to determine the quantity of SDPs on a site. These measures are outlined below:

Figure 2: Photo of Service Delivery Point for Multitenant Residential Facility[24]

[23] CPUC, Resolution E-4481, page 21.

[24] http://www.cpuc.ca.gov/PUC/energy/DistGen/vnm.htm; "CPUC_ServiceDeliveryPoint12_2011.ppt." Appendix C includes additional SDP schematic examples from the CPUC presentation.

SDG&E – The SDG&E NEM-V application process begins with an initial site visit in order to confirm that the project is eligible for the NEM-V tariff, in terms of the quantity of SDPs on site for the participating meters. This initial, in-person interaction ensures from the very beginning that the project will be eligible for the NEM-V tariff and avoids wasted time spent on applications that end up being ineligible due to the SDP restriction. The contractor should come to the site visit with an understanding of which meters will participate in the NEM-V arrangement and a Single Line Drawing (SLD) of the proposed system and tie-in location.

SCE – SCE does not confirm the eligibility of the project until a completed NEM-V application has been submitted for technical review. For those contractors and/or developers who wish to inquire or confirm the SDP landscape of their project site, SCE states, "the quantity of service panel(s) often corresponds to the number of SDP(s) on site. However, because this is not always the case, SCE refers developers to the Service Planning Department."[25] The Service Planning Department, which is a utility department, can potentially provide a "Facility Inventory Mapping (FIM)" for existing facilities for a fee. "Due to post 9/11 concerns, FIMs will only be given to cover specific projects, and not blanket coverage of cities, etc. SCE cannot guarantee the accuracy of the maps as field conditions can change at any time." The final eligibility determination will be made by SCE once the completed NEM-V application has been submitted for technical review.

PG&E – Similar to SCE, PG&E does not confirm the eligibility of a project until a completed NEM-V application has been submitted for technical review. For pre-application SDP inquiries, PG&E states, "physical indicators such as service panel or overhead weather head can be used by the contractor to determine SDP."[26] PG&E also mentions, "customers sometimes assume that transformers indicate the quantity of SDPs."[27] However, they go on to explain, "customers should reference the arrangement of their electric service panels for clearer indication."[28] The final eligibility determination will be made by PG&E once the completed NEM-V application has been submitted for technical review.

[25] Interview with SCE interconnection staff, conducted by CSE on 5/8/2015.
[26] Interview with PG&E interconnection staff, conducted by CSE on 5/7/2015.
[27] Ibid.
[28] Ibid.

NEM-V Metering Requirements

NEM-V requires a Net Generation Output Meter (NGOM) capable of recording generator output (in kWh) in fifteen-minute intervals. The Owner or Operator (Generator Account) is responsible for all costs associated with the installation of the NGOM by the utility.[29] The proposed location of the customer's Generator Output Metering equipment is defined in the NEM-V application and approved by the utility. This NGOM meter will record the generation of the solar electric system, and this total generation will be read monthly by the respective utility and the appropriate energy credit allocations will be reflected on each Benefitting Account's electric bill.[30]

NEM-V meter types include single-phase, three-phase and current transformer (CT) rated meters. The meter installed is based upon utility standards and is sized to the customer load.

> *SDG&E* – In SDG&E service territory, the utility provides the contractor with a form during the initial site visit that indicates which meter type will be needed for the specific project, based on voltage. This form indicates the utility metering standards to the customer and contractor. The contractor is also provided with a checkoff list of all the requirements to meet the utility standards.
>
> SCE – SCE applicants wishing to determine the appropriate meter type for a NEM-V project have access to public *Electric Service Requirements*, which include information about what meter type will be needed for a certain site. SCE's NEM-V tariff offers meter descriptions as well.
>
> PG&E – PG&E customers can reference the *PG&E Green Book* to understand which meter type will be required for the site, which is ultimately dependent on the building load. The *PG&*E

[29] The Owner or Operator using a Performance Based Incentive (PBI) meter for California Solar Initiative (CSI) incentives will not be required to install an additional NGOM for purposes of NEM-V metering requirements. However, the PBI meter will need to be (1) a utility-owned meter, (2) a utility-read meter where the utility will read the PBI meter data for purposes of providing CSI incentive payments and (3) installed in a location approved by the utility.

[30] In a typical NEM arrangement, the on-site generation (kWh) flows first to on site load needs, and any excess energy flows to the Utility grid and will be placed as a credit on the participating utility account. In a NEM-V arrangement, the total generation (kWh) of the system is recorded by the NGOM and read monthly by the Utility. The Utility divides this total generation (kWh) among the participating utility accounts based on the predetermined percent allocations, as defined in the NEM-V agreement with the Utility. Both scenarios would have the same result, regarding the amount owed the utility. The method in which the energy/cost savings are displayed on the customer's electric bill is what differs between these two arrangements.

Green Book is at www.pgegreenbookdata.com. The contractor is responsible for installing the meter socket prior to PG&E installing the NGOM meter.

In all three IOU service territories, the initial electrical requirement is given to the utility by the developer or contractor, and the meter type is verified by the utility during application review. The Building Owner or Operator (Generator Account) is invoiced for the new meter.

Tables 5-7 illustrate the estimated costs of utility NGOMs.

Table 5: SDG&E Sample Metering Costs[31]

Meter Type	Estimated Cost
Self-contained Meter Installation (≤ 200a)	$998
Single-phase CT Installation	$2,306
Three-phase CT Installation (<800a)	$2,306
Three-phase CT Installation (≥800a)	$2,943

[31] http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_NEM-V.pdf; Special Conditions, Generation Interconnection Responsibility, Page 3.

Table 6: SCE Sample Metering Costs[32]

Meter Type	Estimated Cost
Self-Contained Meter Installation (Interconnection Voltage: 600 V) (Generator Capacity: < 200 kW)	$861.68
Self-Contained Three Phase IDR Meter Installation (Interconnection Voltage: 600 V) (Generator Capacity: < 200 kW)	$950.44
Instrument-Rated Meter Installation with RTEM* (Interconnection Voltage: 600 V) (Generator Capacity: 730-860 kW)	$5,322.97
Primary Instrument rated Meter Installation with RTEM (Interconnection Voltage: 4 kV) (Generator Capacity: 360-540 kW)	$10,232.72
Primary Instrument rated Meter Installation with RTEM (Interconnection Voltage: 12 kV) (Generator Capacity: <1000 kW)	$13,535.34

[32] https://www.sce.com/NR/sc3/tm2/pdf/CE344.pdf; Special Conditions, Metering Requirement, Page 7.

Table 7: PG&E Sample Metering Costs

Meter Type	Estimated Cost
Self-contained Meter Installation (600V)	$788.33
Transformer-rated Meter Installation (600V)	$1,712.89
Primary Transformer-rated Meter Installation (5 kV)	$6,800.25
Primary Transformer-rated Meter Installation (15 kV)	$7,410.16
Primary Transformer-rated Meter Installation (25 kV)	$12,779.41

NEM-V Associated Fees

Initial Setup Fees

According to the current NEM-V tariff structure, projects incur a setup fee of $25 per Benefitting Account, not to exceed $500 per arrangement.[33] The CPUC rejected the utilities' requests for higher setup fees and monthly billing fees in response to protests.

Allocation modifications

All three IOUs proposed fees for modifying the allocation of credits among units; however, the CPUC ordered one free reallocation per year, with fees for additional changes set at $7.50 per account modified.[34]

Modifications to the allocation percentages can be made as frequently as needed to any Benefitting Account. There is no charge for up to one allocation modification per benefiting account per Relevant Period (12 monthly billing cycles). Subsequent allocation modifications within a Relevant Period are

[33] CPUC, Resolution E-4481, page 23.
[34] CPUC, Resolution E-4481, page 23.

billed to the Generator Account and charged according to the following table. Charges are on a per Benefitting Account basis. Please reference Appendix B for a "reallocation example" project.

Table 8 outlines the current fees enforced by each utility for initial setup and modifications per benefitting account.

Table 8: NEM-V Setup and Modification Charges per Benefitting Account

	One Time Origination Fee[35]	Charge for Additional Modifications
SDG&E	$25	$7.50
SCE	$25	$7.50
PG&E	$12	$3

Vacancies

The CPUC ultimately ordered that the system operator in the initial application be allowed to designate one account to receive unused credits in the event of vacant tenant units, which could be the Common Area Account or one of the tenant Benefitting Accounts.[36]

The Owner has the option to designate a specific Benefitting Account (which could be a Common Area Account) to receive the disposition of unallocated credits when any other Benefitting Account in the NEM-V Arrangement is closed.

NEM-V Billing Information

The recorded output for the specific billing period is read by the utility each month. The individual allocation of kWhs to each Benefitting Account is calculated by multiplying the recorded output by the designated percentage allocation for each individual Benefitting Account. This is defined on the Generation Credit Allocation Form, which is supplied with the NEM-V application. The allocations are

[35] Capped at $500 per NEM-V arrangement.
[36] CPUC, Resolution E-4481, page 35.

determined for the Relevant Period,[37] and additional fees may be enforced if modifications are made outside of the Relevant Period, as described in the following Allocation Modification section. Qualified Customers are responsible for all charges from their underlying tariff, such as monthly billed minimum charges, customer charges, meter charges, facilities charges and energy and demand charges.

At the end of each billing cycle, Allocated Credits, in kWhs, are subtracted from metered usage. Charges or credits are applied to the resulting kWh according to the provisions of the Benefitting Account's tariff. The bill may therefore reflect either a charge or a credit. Excess credits, in dollars, are carried over to the following billing period, until the end of the Relevant Period. If the Qualified Customer is a net consumer for the billing period or any discrete Time of Use (TOU) period, the net kWh consumed is billed in accordance with the Qualified Customer's tariff. If the Qualified Customer is a net generator, the net kWh generated is valued at the applicable baseline rates up to the billing period's baseline allowance, with any excess kWh valued at the applicable non-baseline rates or according to the discrete TOU rates of the tariff.

Optional Demand Credit

Qualified Customers on a tariff with demand charges may opt to receive a demand credit. Demand readings from the Generator Account interval meter are measured in each metered interval, allocated using the same allocation percentage for the Benefiting Account, and then netted with the Benefiting Account's metered demand for the same interval. The netted demand is then used for the calculation of the Benefitting Account's demand charges for the purposes of the tariff. Exercising this option, however, has associated charges, as identified in Table 9.

[37] A Relevant Period consists of any 12 monthly billing cycles commencing on the date the utility provides the Owner with written approval to begin parallel operation of the Renewable Electrical Generation Facility and on every subsequent anniversary thereof.

Table 9: Charges related to receiving a NEM-V demand credit per benefiting account

SDG&E	Variable[38]
SCE	$400 per month
PG&E	$500 upfront payment

Net Surplus Electricity Compensation[39]

Pursuant to Assembly Bill (AB) 920 (2009), a NEM customer with "net surplus electricity" over the course of a year is eligible to receive net surplus compensation (NSC). Net Surplus Electricity is all the electricity allocated to a Benefitting Account/Qualified Customer (in kWh) that exceeds the amount of electricity consumed by that Benefitting Account/Qualified Customer over a Relevant Period (12 billing periods). Compensation is at a wholesale rate, which currently equals approximately four cents/kWh.[40]

NEM-V Application Process

The process to apply for the NEM-V tariff differs slightly across the three IOU service territories. Differences between IOU processes include timing of site visits, level of contractor-utility interaction prior to application submission and methods of confirming SDP information. However, the documentation and information that is collected by the utility in the NEM-V application is generally standard for all three IOU service territories. Each IOU has supporting tariff documentation and supporting information online, for which links are provided in Appendix A.

SDG&E Application Process

The SDG&E NEM-V application process begins when the contractor contacts the utility to initiate the NEM-V project discussion and schedule the initial field meeting. This site visit includes the contractor and utility representatives, which may include the NEM Inspector, SDG&E Planner and/or the SDG&E Standards Representative. The contractor should come to the site visit prepared with a single-line

[38] "For purposes of calculating customer charges, standby charges, and demand charges, a Qualified Customer shall be treated identically as a NEM customer, consistent with PU Code § 2827(g). The Utility may charge incremental billing costs to Qualified Customers requesting to receive a demand credit subject to a review for reasonableness. The customer must agree to such incremental charges prior to utility providing this service." SDG&E SCHEDULE NEM-V, Page 1, paragraph 4.

[39] More info can be found at http://www.cpuc.ca.gov/PUC/energy/DistGen/netsurplus.htm.

[40] Value methodology pursuant to D.11-06-016.

drawing (SLD) showing the proposed interconnection schematic, along with knowledge of the building load and desired system size. This site visit allows the utility to confirm if the project qualifies for the NEM-V tariff, mainly with respect to the quantity of SDPs on site that are tied to the meters seeking to participate in the NEM-V arrangement. The utility also reviews the proposed location for the NGOM to ensure compliance with SDG&E's service standards.[41]

The field group also discusses project timelines and next steps. If a Customer Requested Outage (CRO) is required during the installation of the NGOM, a second meeting will be scheduled with a SDG&E Customer Project Planner. The Planner is responsible for scheduling the outage request; however, a four-week minimum lead time to schedule a CRO is required. The contractor works with the Planner to submit the necessary documentation, and the Authority Having Jurisdiction (AHJ) needs to perform an inspection prior to reenergizing the site. SDG&E creates a new account linked to the NGOM meter, which is considered the Generator Account. The contractor and customer are notified upon account creation, at which time the contractor should submit the NEM application with SLD through the online Distribution Interconnection Information System (DIIS) portal. If corrections need to be made, the Customer/Contractor is notified via email and can resubmit the SLD through the online portal. After the application has been reviewed and accepted, SGD&E sends an email to the Customer/Contractor with the following information:

- Cost Letter
- Customer Payment Remittance Form
- Rule 2 Contract(s)
- Allocation Form
- Continuity of Service Form

The contractor submits the above forms and payments once the installation and the AHJ inspection are complete. The following inspection releases must be received by the AHJ:

- PV Inspection Release(s) for each NGOM
- Meter Inspection Release(s) for each NGOM

Following AHJ Inspection approval, SDG&E completes their final inspection according to the NGOM Inspection Checklist. SDG&E notifies the contractor once again if any corrections need to be made. Once SDG&E verifies that the meter(s) have been set and that payment and all forms have been received, the

[41] SDG&E *Generation Interconnection Handbook*, http://www.sdge.com/generation-interconnection-handbook.

Permission to Operate (PTO) email is sent the next business day to the customer/contractor. The SDG&E *NEM-V Checklist* can be found at www.sdge.com/documents/nem-vnm-nem-v-progression-process-checklist and is referenced in Figure 2 of Appendix A.

SCE Application Process

SCE does not require an initial site visit prior to submitting the NEM-V application, but the SCE process does require that the NEM-V application be submitted to the utility as early as possible and a minimum of 30 days before scheduling the final inspection by the local AHJ. Applications may be submitted through the NEM Online Interconnection Application System, or by email, fax or U.S. mail. The SCE application packet includes:

- Generating Facility Interconnection Application (Form 14-732)
- SLD
- Plot plan (required for commercial, residential with non-self-contained meter, point of connection on the utility side of the main breaker, battery backup)
- Virtual Net Energy Metering for Multi-Tenant and Multi-Meter Properties Interconnection Agreement (Form 14-910)
- Building Permit

Once this application packet is approved, the AHJ completes its inspection and submits the Final Electrical Inspection Job Card to the utility. This prompts the final utility inspection. Upon inspection approval, the utility issues the PTO to the customer/contractor. SCE is required to issue the PTO within 30 days of approved application (post AHJ inspection), per Rule 21 standards. SCE's *Application Checklist for Virtual Net Metering-General Market* is at www.sce.com/wps/wcm/connect/ffa7628f-d34a-49ba-8863-5be6a28fd7a5/nemchecklist-nem-v.pdf?MOD=AJPERES and referenced in Figure 3 in Appendix A.

PG&E Application Process

PG&E also does not require an initial site visit prior to application submittal. The contractor submits a NEM-V application packet to PG&E for technical review, and PG&E will begin to process the application upon receipt of the following required documentation:

- Copy of the NEM-V Interconnection Application, including completed Appendices A, B, and C
- SLD, including description of AC disconnect switch, specific inverter(s), generating equipment, how the power output from the inverter is connected to the main service panel via a branch breaker, and an *installed* NGOM
- Site diagram
- Information regarding any existing insurance coverage
- Building permit
- Payment of any applicable fees (including but not limited to that in Special Conditions 1 [metering], 2 [one-time setup or modification charges] and/or 3 [Demand credit/set-up charges]

- Site Assessment Documentation, Appendix C

PG&E Application packets can be submitted to PG&E via email or U.S. mail. PG&E plans to have an online application portal operational in summer 2015. Once the completed application has been received, the contractor can request a site visit with the utility to ensure eligibility. Otherwise, PG&E notifies the contractor about issues regarding the application and/or site eligibility. Upon application approval, the AHJ should complete its final inspection, followed by the utility final inspection. Upon inspection approvals, PG&E is required to issue the PTO within 30 days of submission of complete application materials, per Rule 21 standards.

Additional resources, including links to each Utility Electric Schedule NEM-V and tariff homepage, are in Appendix A.

III. Current Virtual Net Metering and Shared Solar Policies across the United States

It is important to remember that *virtual net energy metering* (VNEM), and other related terms, are not standardized or used consistently in the United States. For example, "virtual net metering" in one state could mean the same program structure as "shared solar" in another state. Therefore, to understand a particular program, it is essential to review the details of that program, beyond simply its name. The following provides a snapshot of the states that offer VNEM and shared solar programs and the general components and interesting facets of each program. Statewide shared solar programs are included, as they generally accomplish the same policy goals as VNEM, in particular allowing multiple customers to participate in a common distributed generation system. Aggregate Net Metering or Meter Aggregation programs, however, are not included because these programs allow only one customer to offset loads from multiple meters via distributed generation system.

This report only includes states with mandatory programs that typically apply to just the states' investor-owned utilities (IOUs), though it should be noted that many utilities across the country, including IOUs, municipal utilities (MUNIs) and cooperative utilities (coops), also voluntarily offer shared solar or VNEM programs. For a list that includes additional voluntary shared solar programs, refer to the Interstate Renewable Energy Council, Inc.'s Shared Solar Program Catalog. Each of the following statewide programs is also summarized in the policy comparison table included as an appendix to this document.

Applicable Terminology

- **Net Energy Metering (NEM)** – A billing arrangement that allows a customer to offset on-site electricity use with a distributed generation system located on the property and receive credit for any excess electricity supplied to the grid (i.e., one customer, one meter).

Example: A small business owner that owns a single building installs rooftop solar PV, sized according to the electricity used on site. The electricity generated by the solar system first reduces on-site consumption, and the business owner receives NEM credits for any excess electricity supplied to the grid, which rolls over from month to month to reduce electricity bills.

- **Aggregate Net Metering or Meter Aggregation** – An extension of NEM rules that permits a single NEM participant to offset their load from multiple meters through NEM credits generated from a single renewable energy system connected to one of the participant's meters (i.e., one customer, multiple meters). Meter aggregation can be accomplished on a participant's contiguous properties or virtually on separate properties, if rules allow.

  Example: A community college campus installs a large rooftop solar PV system, sized to offset electricity used across several of its buildings and facilities on campus. The electricity generated by this PV system first offsets the electricity used by the building hosting the system, and the community college receives NEM bill credits for any excess electricity not directly consumed on site. These credits are allocated among the participating meters, thereby reducing the individual bills for those meters.

- **Virtual Net Energy Metering (VNEM)** – An extension of NEM that allows multiple customers to offset their combined energy use from a common distributed generation system. Like traditional NEM credits, VNEM credits are typically valued at, or at least based on, participants' retail rate (or rates) (i.e., multiple customers, multiple meters). In California, the NEM-V tariff is limited to customers of multitenant buildings that share a common service delivery point (SDP), whereas in most other states, a VNEM system may include participants from additional properties. In some states, this arrangement is called "group net metering," "neighborhood net metering" or "community net metering."

  Example: The commercial landlord of a multi-unit property installs a large covered-parking solar PV system in the parking lot of the property, sized to offset the electricity needs of multiple commercial tenants renting space in the building. The electricity generated by the system is allocated among the participating businesses, reducing their individual electricity bills.

- **Shared Solar or Community Solar**– Similar to VNEM, these policies allow multiple customers to participate in a common distributed generation system (i.e., multiple customers, multiple meters). Though states use different names for these types of programs, we refer to all of them here as "shared solar" programs. The bill credit mechanism in a shared solar program resembles VNEM except that it need not have a direct tie to the NEM program (e.g., the bill credit may be based on a customer's retail rate or may be determined via another method such as a value-based approach).

  Example: A local government and its municipal utility partner working with a third-party developer to build a large ground-mount solar PV project on a capped landfill, in order to create a new shared solar project. Local residents and businesses sign up to participate in the program and receive benefits from the solar project, as if it were located on their own homes or office

buildings. Participants may buy allocated "shares" of electricity generated from the project, which are reflected as bill credits on their respective electricity bills.

State VNEM and Shared Solar Profiles

California

California has three shared solar-type programs: general market multitenant VNEM (referred to as NEM-V and discussed in detail above); low-income VNM, developed as part of the Multifamily Affordable Solar Housing (MASH) program (referred to as VNM and discussed above); and a Green Tariff Shared Renewables (GTSR) program.

The GTSR program is a shared renewable energy option that was mandated by legislation (SB 43) in 2013 and approved by the CPUC in early 2015. This program comprises two different options for customers: a Green Tariff and an Enhanced Community Renewables (ECR) option. Under the Green Tariff option, participants can voluntarily agree to pay their utility a renewable energy rate for half or their entire monthly bill, in order to purchase energy derived from utility-owned solar facilities ranging from 500 kilowatts (kW) to 20 MW. The ECR option is similar to the Green Tariff option but uses energy derived from third-party facilities ranging from 500 kW to 3 MW. The ECR component allows customers to choose from an array of developer-led options, in order to find a program that suits their locational and budgetary preferences and other factors. Unlike California's other two programs, the GTSR does not fall under the net metering rules and has a separate statewide participation cap of 600 MW, divided up among the state's IOUs. In addition, the statute requires that, of the 600 MW cap, 100 MW should be reserved for facilities up to 1 MW, which are located in areas identified by the California Environmental Protection Agency to be the most disadvantaged communities. The IOUs submitted Advice Letters to the CPUC with implementation details for the programs in May 2015, and these programs will likely be in place by the end of 2015, once they receive final CPUC approval.

Related Tariffs and Issues

RES-BCT and NEM-A

Two policies related to virtual net metering that are available in California are Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) and net energy metering aggregation (NEM-A).

RES-BCT was approved by the CPUC in April 2010 but has only been available to local government entities. It allows participants to generate electricity at one account and transfer credits to other accounts of the same government entity. Because it is limited to one customer offsetting load at multiple accounts, RES-BCT is distinct from VNEM, which allows multiple customers to offset their load via shared generation. It has not been widely used because the credits are not at the full retail rate but rather at a much lower wholesale rate. The July 2010 staff report recommended making this tariff available to multitenant housing properties as another option for transcending the SDP limitation, but the CPUC did not follow this recommendation.

NEM-A was instituted as a result of SB 594 in 2012. It was mainly designed for agricultural entities that have multiple utility accounts on a single farm made up of separate parcels but is available to nonagricultural entities as well. It allows customers to install a single solar system that offsets the consumption on multiple accounts. NEM credits are allocated to the different participating accounts based on the proportion of consumption of each account. The NEM-A tariffs of the California IOUs became effective in 2014. Because it is limited to accounts of a single customer, similar to RES-BCT, it is not applicable for multifamily housing.

The California NEM Successor Tariff

Net metering began with a cap of 0.1% of load and increased several times. In 2013, when a 5% cap was looming, the Legislature passed AB 327, which directed the CPUC to end the current iteration of the net metering tariff when utilities meet program limits defined as 5% of aggregated customer peak demand, or July 1, 2017, at the latest. The CPUC must decide on a successor standard contract or tariff by December 2015 that will go into effect when each utility reaches its program limit, or by July 1, 2017, whichever is first.[42]

Presently, some parties are advocating for the successor to be the same as the current tariff, while other parties want to eliminate NEM and replace it with a feed-in tariff. Uncertainty surrounding the net metering tariff impacts the VNM and NEM-V tariffs as well. If the CPUC does not act to extend these tariffs, they will not be available to new customers. SCE and SDG&E have suggested in filings with the CPUC that NEM-V should continue even if the standard NEM tariff does not. Conversely, PG&E has recommended that NEM-V be terminated. Even if the CPUC decides to continue NEM-V, it may still consider modifications. Moreover, changes to NEM as part of this process may carry over to NEM-V.

Any changes made as part of this process would only apply to new NEM-V customers. In a March 2014 decision, the CPUC ruled that existing customers could continue on the current NEM tariffs until the solar system has completed 20 years of operation.[43] Hence, the potential termination of NEM does not have a short-term impact on customers that install a solar system before the utility meets its program limit, but customers installing after that time could face an altered tariff or not have the option to take service under NEM-V.

Links to applicable rules and other information

[42] This decision will be made in CPUC Rulemaking 14-07-002.
[43] CPUC decision number D.14-03-041.

California GTSR Enabling Statute, SB 43 (2013):
http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB43

Green Tariff Shared Renewables CPUC decision:
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M145/K819/145819809.PDF

CPUC Decision 11-07-031 to expand NEM-V:
http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/FINAL_DECISION/139683-03.htm#P144_30608

CPUC Decision 08-10-036 to adopt VNM for the MASH program:
http://docs.cpuc.ca.gov/published/FINAL_DECISION/92455-07.htm#P237_52694

Pacific Gas & Electric NEM-V and VNM Tariffs:
http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_NEMV.pdf

http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_NEMVMASH.pdf

Southern California Edison NEM-V and VNM Tariffs:
https://www.sce.com/wps/portal/home/residential/generating-your-own-power/virtual-net-metering/

San Diego Gas and Electric NEM-V and VNM Tariffs:
https://www.sdge.com/sites/default/files/documents/674682198/VirtualNetMetering.pdf

http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_NEM-V.pdf

http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_VNM-A.pdf

Colorado

Following a law passed in 2010, Colorado allows its residents to participate in Community Solar Gardens (CSGs), which may be owned by a utility or any third-party organization. The program originally started with an IOU cap of 6 MW per year, but starting in 2014, the Colorado Public Utilities Commission will set minimum and maximum purchase targets for IOUs each year. For 2015-2016, IOUs (Xcel Energy and Black Hills Power) must purchase between 6.5 and 30 MW of energy and associated renewable energy credits (RECs) from new CSGs. Each CSG must have at least 10 subscribers. Individual subscriptions must be greater than or equal to 1 kW but may not exceed 40% of the CSGs total capacity.

Residential bill credits for IOU customers are calculated by multiplying the subscriber's share (percentage of total generation in the facility) times the utility's Total Aggregate Retail Rate (TARR)[44] as charged to the Subscriber. For commercial and industrial customers on a demand tariff, the total aggregate retail rate (including all billed components) is determined by dividing the customer's total electric charges (including demand charges) by the customers' total electricity consumption for that year. Any excess credits roll over indefinitely.

Subscribers must be located in the same utility service territory and the same or adjacent county as the CSG. At least 5% of an IOU's purchases from CSGs must be reserved for low-income CSG subscribers.

In addition to the IOUs, a number of municipalities and cooperative utilities in Colorado have also developed CSGs for their customers or members.

Links to applicable rules and other information

Colorado CSG Enabling Statute, HB 1342 (2010):
https://legiscan.com/CO/text/HB1342/id/381889/Colorado-2010-HB1342-Enrolled.pdf

Colorado PUC rules governing CSGs (4 CCR 723-3, Rule 3665):
http://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=5738&fileName=4%20CCR%20723-3

Xcel Energy Tariff:
http://www.xcelenergy.com/Energy_Solutions/Residential_Solutions/Renewable_Energy_Solutions/Solar*Rewards%C2%AE_Community%C2%AE_-_CO

http://www.xcelenergy.com/staticfiles/xe/Marketing/Files/CO-Res-Solar-Rewards-2014-Community-Tariff.pdf

Black Hills Power Tariff: http://www.blackhillspower.com/node/111139

[44] The TARR is a dollar amount calculated, in aggregate, for each customer class and subclass of electric service, as follows: Total Retail Revenues – Monthly Customer Charge Revenues = TARR ($).

Connecticut

Connecticut provides a VNEM policy for state or municipal government and agricultural utility customers who wish to participate. These customers may virtually net meter Class I (including most forms of renewable energy) and Class III (combined heat and power [CHP]) systems up to 3 MW in capacity. Connecticut's rules are somewhat unique in that the state's Public Utility Regulatory Agency limits total participation not by a percentage of utility load or number of megawatts, as is the case in most states, but rather by the total monetary value of credits. As such, participation is limited to customers whose combined monetary credits do not exceed a statewide cap of $10,000,000. This effectively translates into a participation cap of $8,000,000 of credits for Connecticut Light and Power (CL&P) and $2,000,000 for United Illuminating. For both of these utilities, no individual sector (agricultural, state or municipal) may consume more than 40% of the cap.

Interestingly, a state or municipal government VNEM participant may include up to 10 additional beneficial accounts to receive excess credits from its generation facility. Up to five of these may be non-state or non-municipal customers, as long as they are connected to "critical facilities" on a microgrid. A "critical facility" is defined as any hospital, police station, fire station, water treatment plant, sewage treatment plant, public shelter or correctional facility, any commercial area of a municipality, a municipal center, as identified by the chief elected official of any municipality, or any other facility or area identified by the Department of Energy and Environmental Protection as critical. Agricultural VNEM participants may include up to 10 additional beneficial accounts including other agricultural customers, municipal customers or critical facilities.

Connecticut also uses an atypical method to calculate VNEM credits. The VNEM facility generation is first used to reduce the electric consumption of the host VNEM customer. Any surplus credits will be calculated at the retail rate against the generation service component of a beneficial account's bill and a declining percentage of the transmission and distribution (T&D) charges. In the first year of the VNEM facility's operation, 80% of the T&D charges will be credited, in the second year, 60% of T&D charges will be credited and in the third and subsequent years, 40% of the T&D charges will be credited. Excess credits rollover for one year and are subsequently credited to the host customer's account at the end of the year.

In 2015, the Connecticut Legislature also enacted SB 928, which requires the Department of Energy and Environmental Protection (DEEP), in consultation with the state's electric distribution utilities, to establish a two-year pilot program to support the development of "shared clean energy facilities." Although similar to the VNEM program described above, this pilot program would be distinct from the state's net metering program. The law defines "shared clean energy facilities" as a renewable energy source that is served by an electric distribution company, is located within the same utility service territory as the individual billing meters for subscriptions, has a nameplate capacity rating of 4 MW or less and has at least two subscribers. The legislation requires DEEP to develop and issue an RFP seeking subscriber organizations interested in developing shared clean energy facilities by January 2016.

The law also instructs DEEP to select a project (or projects) up to 2 MW in United Illuminating's service territory and up to 4 MW in the territory of Eversource. According to the law, a shared clean energy

facility may be built, owned or operated by a third party under contract with a subscriber organization. DEEP must establish a billing credit for any subscriber of a shared clean energy facility as well as consumer protections for subscribers including disclosures to be made when selling or reselling a subscription.

Links to applicable rules and other information

Final Connecticut Department of Public Utilities decision adopting VNEM: http://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/ea129242cd47fb2085257db1005ea06e?OpenDocument

Connecticut Light and Power VNEM Tariff: https://www.cl-p.com/downloads/VirtualNetMeteringRider.pdf?id=4294989083&dl=t

United Illuminating VNEM Tariff: http://www.uinet.com/wps/wcm/connect/9eedab00474ab89eb9fbf9269125d1f0/735_Rate+VNM_Rider.pdf?MOD=AJPERES&CACHEID=9eedab00474ab89eb9fbf9269125d1f0

SB 928: http://www.cga.ct.gov/2015/ACT/PA/2015PA-00113-R00SB-00928-PA.htm

Delaware

In 2010, Delaware passed legislation that allows community net metering for subscribers that have "a unique set of interests" to share in the generation of a common facility, located either behind a "host customer" meter or as a stand-alone facility. For a stand-alone facility, a host customer is the customer account designated by the facility's subscribers. The facility must be sized to meet no more than 110% of the expected electricity needs of the subscribers' aggregated meters. Systems must also remain within individual subscriber limits: 25 kW for each individual residential subscriber, 2 MW for nonresidential subscribers of Delmarva Power, 500 kW for all other nonresidential subscribers and 100 kW for agricultural subscribers. Community net metering participation is included within the state's NEM cap of 5% of a utility's aggregated customer monthly peak demand.

Generation credits are calculated based on a subscriber's proximity to the system. Subscribers not located on the same distribution feeder as the community generation facility are credited in kWh valued at an amount per kWh equal to supply service charges according to each account's rate schedule for any of the energy production in excess of the consumption of the host customer. Both the host customer and subscribers located on the same distribution feeder as the generation facility are credited in kWhs at the customer's applicable retail rate. Delmarva may elect to pay the host customer instead of issuing credits. A host customer may also request payment for any excess credits remaining at the end of the annual period, calculated based on the number of kWhs multiplied by the host customer's supply service charges. If this amount is less than $25, the utility may credit the host customer's account

through monthly billing. Community net metering facilities may be owned and operated by utility customers or third parties.

Links to applicable rules and other information

Delaware Community Net Metering Enabling Statute, SB 267 (2010):
http://legis.delaware.gov/LIS/lis145.nsf/vwLegislation/SB+267/$file/legis.html?open

Community Net Metering Rules:
http://regulations.delaware.gov/AdminCode/title26/3000/3001.shtml#TopOfPage

Delmarva Tariff (beginning on page 120):
http://www.delmarva.com/uploadedFiles/www.delmarva.com/Pages/my-home/choices-and-rates/Delaware/Master%20tariff%20eff%2007-01-2014%20filed%2011-13-14.pdf

Hawaii

In 2015, Hawaii enacted SB 1050, establishing a community-based renewable energy program for all Hawaii residents. In passing the law, the legislature expressed that "a community-based renewable energy tariff should, to the extent possible, be designed in an open and accessible process and should accommodate a variety of community-based renewable energy projects, models and sizes." The law also allows any person or entity to own or operate an eligible community-based renewable energy project or projects, provided they comply with all applicable regulations governing the ownership and interconnection of such projects.

Utilities must submit proposed tariffs to the Hawaii Public Utilities Commission (PUC) that allow all customers to obtain an interest in a portion of an eligible project that provides electricity to the utility and to receive compensation for the energy generated. The tariffs must be filed by October 1, 2015.

Links to applicable rules and other information

SB 1050 of 2015:
http://www.capitol.hawaii.gov/session2015/bills/SB1050_CD1_.htm

Maine

In 2009, the Maine Public Utilities Commission issued an order allowing up to 10 utility customers the ability to participate in the shared ownership of a renewable energy or high-efficiency CHP net metering facility. In order to participate in a community net billing arrangement, participants must maintain an "ownership interest" in the facility (i.e., they must have legal rights to the energy generated from a shared facility). Systems located in an IOU territory must not exceed 660 kW; whereas, systems located in the service territory of a cooperative or municipal utility must not exceed 100 kW, unless the utility

elects to allow facilities of up to 660 kW. Maine's community net metering policy is nested within the state's traditional net metering policy and imposes no aggregate participation limit.

Retail rate kWh credits are allocated to participants based on the ownership interest of the participants in the facility. A utility may place customers on the same billing cycle to facilitate billing. Participants may roll excess credits forward for up to 12 months, after which unused credits will expire with no compensation.

Links to applicable rules and other information

Maine's net metering rules (CMR 65-407-313):
http://www.maine.gov/sos/cec/rules/65/407/407c313.doc

Central Maine Power sample net billing contract:
http://www.cmpco.com/MediaLibrary/3/6/Content%20Management/Suppliers%20And%20Partners/PDFs%20and%20Doc/Sample_Rolling%2012%20month_Residential_CNEBA.PDF

Maryland

With the passage of House Bill (HB) 1087, the Maryland legislature enacted a three-year community solar pilot program in 2015 within its net metering program, which relies on VNEM as its bill credit mechanism. Qualifying community solar facilities must have a minimum of two subscribers, be located in the same service territory as its subscribers and be no greater than 2 MW in size. A community facility must not have subscriptions larger than 200 kW constituting more than 60% of its subscriptions. HB 1087 also prohibits community solar systems from being constructed on contiguous parcels of land, unless the system is installed solely on building rooftops.

Subscribers will receive bill credits based on their participation in a community solar facility. The law establishes a VNEM cap of 200% of the subscriber's baseline annual usage (i.e., a subscriber's total kilowatt-hour consumption for the previous 12-months). Capacity under the pilot will count towards the overall net metering nameplate capacity cap of 1,500 MW.

The law specifically noted that it is in the public interest to facilitate market entry for all potential subscribers while giving priority to those who are most sensitive to market barriers, including renters and low- and moderate-income electric customers.

The Maryland Public Service Commission (PSC) is required to develop rules to implement this pilot program. The legislation also requires the PSC, along with the Maryland Energy Administration and a stakeholder workgroup, to complete a study the value and costs of the pilot community solar program and virtual net metering by July 2019.

Links to applicable rules and other information

SB 398 of 2015:

http://mgaleg.maryland.gov/2015RS/bills/sb/sb0398e.pdf

Massachusetts

Massachusetts has two separate bill-credit-allocation programs: Neighborhood Net Metering and VNEM. Both programs fall within the State's broader net metering paradigm and program caps and are largely subject to the same rules. Massachusetts has three classes of net metering facilities (Classes I, II and III), with Class III including the largest facilities (up to 2 MW). A facility's class and its generation type (i.e., solar, wind, etc.) determine its size limitation and the valuation of its bill credits. In addition, there are special net metering rules for municipal or other governmental entities, which allow these customers to net meter up to 10 MW. The following table provides more information on these complex policies.

Facility Class	Facility Type	Bill Credit Valuation*
Class I	Wind, Solar, Agricultural, Anaerobic Digestion	Product of • Excess kWh by time-of-use (TOU) rate, if applicable • Sum of following charges applicable to the rate class under which the Host Customer takes service: 1. Default service kWh charge 2. Distribution kWh charge 3. Transmission kWh charge 4. Transition kWh charge
Class II	Wind, Solar, Agricultural, Anaerobic Digestion	
Municipality or Other Governmental Entity (any Class)	Wind, Solar, Agricultural, Anaerobic Digestion	
Class I	Anything other than Wind, Solar, Agricultural, or Anaerobic Digestion	Product of • Excess kWh by TOU rate, if applicable • Average Independent System Operator-New England (ISO-NE) monthly clearing price (an energy-only rate)
Neighborhood	Depends on Class	Product of • Excess kWh by TOU rate, if applicable • Sum of following charges applicable to the rate class under which the Host Customer takes service: 1. Default service kWh charge 2. Transmission kWh charge 3. Transition kWh charge
Class III	Wind, Solar, Agricultural, Anaerobic Digestion	

* Never includes the demand-side management and renewable energy kilowatt-hour charges.

The primary difference between the Neighborhood and VNEM programs are their customer eligibility requirements and locational restrictions.

Neighborhood Net Metering requires that a participating facility serve at least 10 residential customers. A facility may be owned by and serve other customers (i.e., commercial, etc.) so long as it meets the residential customer requirement. In addition, the facility and all participating meters must be located within the same "neighborhood," as well as the same ISO-NE load zone[45] and utility service territory. A "neighborhood" means "a geographic area within a Municipality... that: (a) is recognized by the residents as including a unique community of interests; (b) falls within the service territory of a single Distribution Company and within a single ISO-NE load zone; and (c) may encompass residential, commercial, and undeveloped properties."[46]

Virtual Net Metering does not restrict eligibility by customer class or location, beyond requiring that the facility and all participating meters be within the same ISO-NE load zone and utility service territory.

It is important to note that the structure of net metering projects in Massachusetts is driven in part by the State's Solar Renewable Energy Credit (SREC) program, which includes various requirements impacting the value of the SRECs that a facility may receive. In other words, if a project can meet certain SREC requirements, it can receive a more valuable credit. Importantly the SREC rules encourage "community shared solar generation," which they define as a solar generation facility involving three or more accounts, with no more than two large (> 25 kW) accounts. The combined share of these two large accounts cannot exceed 50% of the total capacity of the shared facility.

Links to applicable rules and other information

Massachusetts Net Metering Legislation and Regulation: http://www.mass.gov/eea/grants-and-tech-assistance/guidance-technical-assistance/agencies-and-divisions/dpu/dpu-divisions/legal-division/dpu-and-green-communities-act/net-metering/net-metering-legislation-and-regulations.html

Net Metering Rules (220 CMR 18.00): http://www.mass.gov/eea/docs/dpu/cmr/220cmr1800r2.pdf

National Grid Tariff: https://www.nationalgridus.com/non_html/Net_Metering_Tariff.pdf

SREC Rules (225 CMR 14.00): http://www.mass.gov/courts/docs/lawlib/220-229cmr/225cmr14.pdf

[45] The ISO-NE designates three load zones for Massachusetts: Western/Central, Northeast/Boston and Southeast. See http://www.ferc.gov/market-oversight/mkt-electric/new-england/elec-ne-reg-des.pdf.
[46] Massachusetts Net Metering Rules, 220 CMR 18.02, http://www.mass.gov/eea/docs/dpu/cmr/220cmr1800r2.pdf.

Minnesota

In late 2014, the Minnesota Public Utilities Commission adopted Community Solar Garden (CSG) rules for the state's largest IOU, Xcel Energy. Under these rules, a third-party developer may operate CSGs up to 1 MW, with no cap on CSG development. There also is no limit to the number of solar gardens that can be placed on a property, but no single garden may exceed the 1 MW system cap. Participants may subscribe to shares from these CSG facilities equaling up to 120% of their average annual consumption of electricity. Each customer must own at least 200 watts but no more than 40% of the system's total capacity. Each CSG project must have a minimum of five subscribers.

Xcel opened its CSG offering to developers in December 2014 and, within the first week, received applications for more than 420 MW of CSG facilities. CSG subscribers will receive their otherwise applicable retail rate plus a renewable energy credit adder, based on whether the customer is residential or nonresidential. For residential customers, the bill credit rate will start at approximately 14 or 15 cents per kWh, depending on the project size. For nonresidential customers with a demand meter, the bill credit rate will start at approximately 11.5 or 12.5 cents per kWh. The credit rate for net excess generation remaining at the end of an annual period depends on the size of a CSG facility. For systems less than 40 kW, excess is paid at the retail rate; for systems sized between 40 kW and 1 MW, excess credits are paid at the utility's avoided cost rate (i.e., only costs a utility avoids because of this distributed generation, which generally includes only the energy and capacity components of a customer's bill).

Subscribers must be retail customers of the utility and located in the same county as the generation facility or a county contiguous to where the facility is located. Third-party ownership is allowed, and a Garden Operator must have a state certificate of good standing in order to partner with Xcel.

Links to applicable rules and other information

MN HF 729 of 2013:
https://www.revisor.mn.gov/bills/text.php?number=HF729&version=4&session=ls88&session_year=2013&session_number=0

MN PUC rules (search for the PUC Order issued on 9/17/2014, in Docket 13-867):
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&userType=public

Xcel Energy Tariff (Section 9-69):
http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/rates/MN/Me_Section_9.pdf

New Hampshire

In 2014, the New Hampshire Public Utility Commission (PUC) modified its net metering rules (Chapter PUC 900) to allow groups of customers to share in the generation of a net-metered system. Systems

must be no larger than 1 MW or the electric needs of all customer accounts combined, whichever is less. Group net metering is included within the state's NEM rules and is therefore also subject to the statewide cap of 50 MW, as distributed among the state's utilities (Granite State Electric Company, 4.12 MW; New Hampshire Electric Cooperative, Inc., 3.16 MW; Public Service Company of New Hampshire, 36.55 MW; and Unitil Energy Systems, Inc., 6.17 MW).

The rules allow a "host" customer-generator to assume the administrative and other obligations of hosting a system for a group (of one or more customers) who are not customer generators. Different excess generation crediting practices apply to "large" (>100 kW – 1 MW) and "small" (≤100 kW) net metering customers. Both customers may offset their generation on a 1:1 kWh basis, but "small" customers receive a retail rate kWh credit for excess generation, whereas "large" customers are credited only at the default energy service rate (i.e., an energy-only rate that does not include distribution components) for their surplus generation. The utility pays the host customer for excess generation at the end of each month. On an annual basis, the electric utility calculates a payment adjustment if the host's surplus generation payment is greater than the group's total electricity usage. Payment for excess energy beyond the group's total usage is paid at the utility's avoided cost or its default service rate.

The group of customers must be default service customers (i.e., those that have not elected to receive retail service under a competitive supplier) of the same electric distribution utility as the host. The host customer must provide a list of the host and group members' account information, projected annual load allocation and other relevant information. A member may sign an agreement with more than one host, but the portions of that member's load that are allocated to each host, when combined, must not exceed that member's total electricity load. The host customer must own or operate the system and third-party ownership is allowed.

Links to applicable rules and other information

New Hampshire's Group NEM Enabling Statute, SB 98 (2013):
http://www.gencourt.state.nh.us/legislation/2013/SB0098.html

NH PUC net metering rules:
http://www.puc.state.nh.us/Regulatory/Rules/Puc%20902%20and%20909%20final%20proposal%20-%20Adopted%20Rules.pdf

Public Service of New Hampshire's net metering page: https://www.psnh.com/netmeter/

New York

In February 2015, the New York Public Service Commission (PSC) opened a proceeding to develop community net metering rules. While rules have not been finalized, the PSC issued a proposal that identifies the following potential structure for a community net metering program.

Under the proposal, community net metering systems would be limited to those eligible for standard net metering (up to 2 MW) and would count against a utility's cap (6% of utility's 2005 demand for most renewables, 0.3% for wind). All members would have to be within the same utility service territory and New York Independent System Operator (NYISO) load zone,[47] and the generator would have to be located behind a "host meter." Community net metering credits generated in excess of the host's load would be calculated at the same rate as the host and distributed among the members. Excess credits would have to be used within a year.

Each community net-metered project would have a host organizer that would interface among the project developer, utility and facility membership. The host organizer would have to provide the utility with a list of members' accounts, allocation percentages and other information. The utility could change the host and members to same billing cycle to facilitate billing. Third-party ownership of systems would be allowed under the current proposal.

Links to applicable rules and other information

Rules have not yet been adopted. The PSC proceeding is being held under Case 15-E-0082, which can be found at http://www.dps.ny.gov/.

Vermont

Vermont offers group net metering for renewable energy systems up to 500 kW in capacity and qualified micro-CHP systems using nonrenewable fuels up to 20 kW. Group net metering falls within the state's net metering rules and is therefore subject to the statewide cap of 15% of a utility's 1996 peak demand or the peak demand during the most recent calendar year, whichever is greater.

Under Vermont's rules, the utility issues an aggregated bill for the entire group, which is responsible for determining a method to allocate credits among its individual members. In the case of group systems using multiple meters, the credit calculation is made by converting all meters to a nondemand, non-time-of-day meter and equalizing them to the company's tariffed kilowatt-hour rate. Net metering customers using solar energy, including group net metering customers, receive an additional credit, or "solar adder," that is calculated by subtracting the customer's highest residential rate from $0.20 if the system is 15 kW or less and $0.19 otherwise. That credit for Green Mountain Power, Vermont's largest

[47] The NYISO designates 15 load zones for the state of New York. See http://www.nyiso.com/public/markets_operations/market_data/maps/index.jsp.

utility, currently ranges between $0.04 - $0.06 per kWh. If, at the end of 12 months, the group still has a credit on their bill, it reverts to the utility with no compensation to the customer.

The group must file information with the utility that includes the customers' accounts in the group system, the method for adding and removing meters, the person designated to communicate with the utility and other relevant information. Meters must be located within the same electric service territory and the generation facility must be located on the property of one of the group's members. The Vermont Public Service Board may allow a noncontiguous group of customers to net meter if the PSB determines it will promote the general good.

Links to applicable rules and other information

Vermont net metering rules (5.100):
http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/5100adoptedrule_2.pdf

Vermont's Group Net Metering enabling statute, H. 702 (2104):
http://www.leg.state.vt.us/DOCS/2014/ACTS/ACT099.PDF

Green Mountain Power Net Metering Tariff:
http://www.greenmountainpower.com/upload/photos/426Self-Generation_and_Net_Metering_1-1-2015.pdf

Washington, D.C.

The District of Columbia's City Council enacted the Community Renewable Energy Act (CREA) of 2013 and adopted rules in April 2015. Subscribers of any customer class may participate in facilities up to 5 MW. A Community Renewable Energy Facility (CREF) must have at least two subscribers, each of whom may offset up to 120% of their electric demand from the previous 12 months with their subscription. There is no aggregate capacity limit for CREFs in the District.

The CREA specifies the credit rate for CREF generation will be calculated at the Standard Offer Service (SOS) rate for the General Service Low Voltage non-Demand Customer class (an energy-only rate). Excess credits carry over to the subscriber's next bill indefinitely. CREF facilities can be built, owned and operated by third parties.

Links to applicable rules and other information

Community Renewable Energy Amendment Act of 2013:
http://dcclims1.dccouncil.us/images/00001/20131003111525.pdf

Community Renewable Energy Rules, DCMR 15-900 et seq.:
http://www.dcregs.dc.gov/Gateway/ChapterHome.aspx?ChapterNumber=15-9[48]

[48] Note that the new rules will be in effect when they are published in the Federal Register, so this link has not been updated yet.

Appendix A. Utility Resources

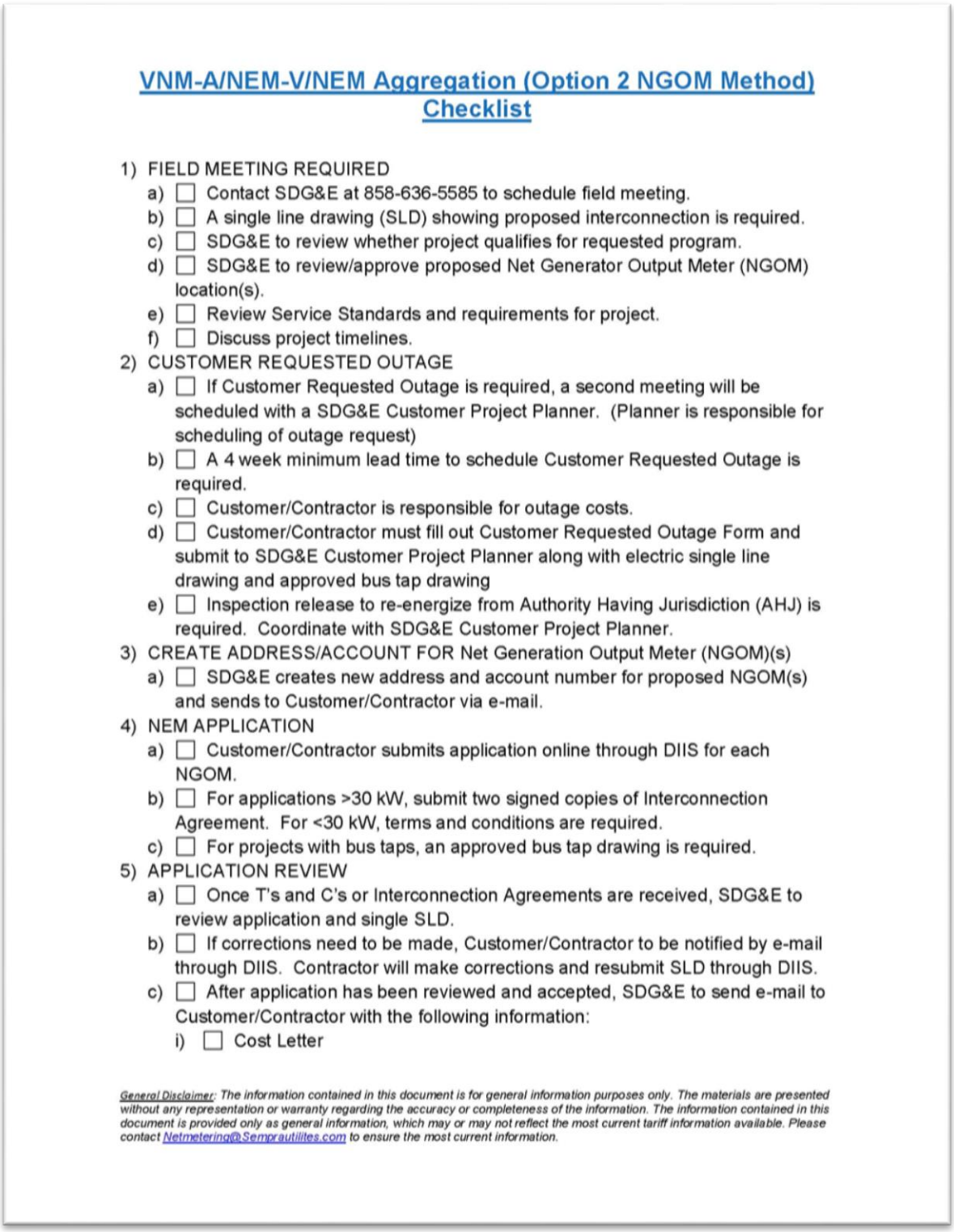
Table A-1: NEM-V Tariff Homepages for CA PUC and IOUs

	Tariff Homepage
CPUC	Virtual Net Metering Background[49]
SDG&E	SDG&E NEM Programs Overview[50]
SCE	SCE Virtual Net Metering[51]
PG&E	PG&E Net Metering[52]

Table A-2: Electric Schedule NEM-V links for CA IOUs

	Electric Schedule NEM-V
SDG&E	http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_NEM-V.pdf
SCE	https://www.sce.com/NR/sc3/tm2/pdf/CE344.pdf
PG&E	http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_NEMV.pdf

[49] http://www.cpuc.ca.gov/PUC/energy/DistGen/vnm.htm
[50] http://www.sdge.com/clean-energy/nem-programs-overview
[51] https://www.sce.com/wps/portal/home/residential/generating-your-own-power/virtual-net-metering/!ut/p/b1/hc_NCoJAFAXgZ2nhMufoRFm7qczGlimjbDahYZNgTpglvX0WbaS_uzuX78C9RJCAiCy8JjIsEpWF6SOL9tawHDbmPrg1oS3wfsteegMTzoBWYFMBfBmGf_01EXXijIwhuLsy_CmG8Gf0DSw65gPYU69
[52] http://www.pge.com/en/b2b/energytransmissionstorage/newgenerator/netenergymetering/index.page



VNM-A/NEM-V/NEM Aggregation (Option 2 NGOM Method) Checklist

1) FIELD MEETING REQUIRED
   a) ☐ Contact SDG&E at 858-636-5585 to schedule field meeting.
   b) ☐ A single line drawing (SLD) showing proposed interconnection is required.
   c) ☐ SDG&E to review whether project qualifies for requested program.
   d) ☐ SDG&E to review/approve proposed Net Generator Output Meter (NGOM) location(s).
   e) ☐ Review Service Standards and requirements for project.
   f) ☐ Discuss project timelines.
2) CUSTOMER REQUESTED OUTAGE
   a) ☐ If Customer Requested Outage is required, a second meeting will be scheduled with a SDG&E Customer Project Planner. (Planner is responsible for scheduling of outage request)
   b) ☐ A 4 week minimum lead time to schedule Customer Requested Outage is required.
   c) ☐ Customer/Contractor is responsible for outage costs.
   d) ☐ Customer/Contractor must fill out Customer Requested Outage Form and submit to SDG&E Customer Project Planner along with electric single line drawing and approved bus tap drawing
   e) ☐ Inspection release to re-energize from Authority Having Jurisdiction (AHJ) is required. Coordinate with SDG&E Customer Project Planner.
3) CREATE ADDRESS/ACCOUNT FOR Net Generation Output Meter (NGOM)(s)
   a) ☐ SDG&E creates new address and account number for proposed NGOM(s) and sends to Customer/Contractor via e-mail.
4) NEM APPLICATION
   a) ☐ Customer/Contractor submits application online through DIIS for each NGOM.
   b) ☐ For applications >30 kW, submit two signed copies of Interconnection Agreement. For <30 kW, terms and conditions are required.
   c) ☐ For projects with bus taps, an approved bus tap drawing is required.
5) APPLICATION REVIEW
   a) ☐ Once T's and C's or Interconnection Agreements are received, SDG&E to review application and single SLD.
   b) ☐ If corrections need to be made, Customer/Contractor to be notified by e-mail through DIIS. Contractor will make corrections and resubmit SLD through DIIS.
   c) ☐ After application has been reviewed and accepted, SDG&E to send e-mail to Customer/Contractor with the following information:
      i) ☐ Cost Letter

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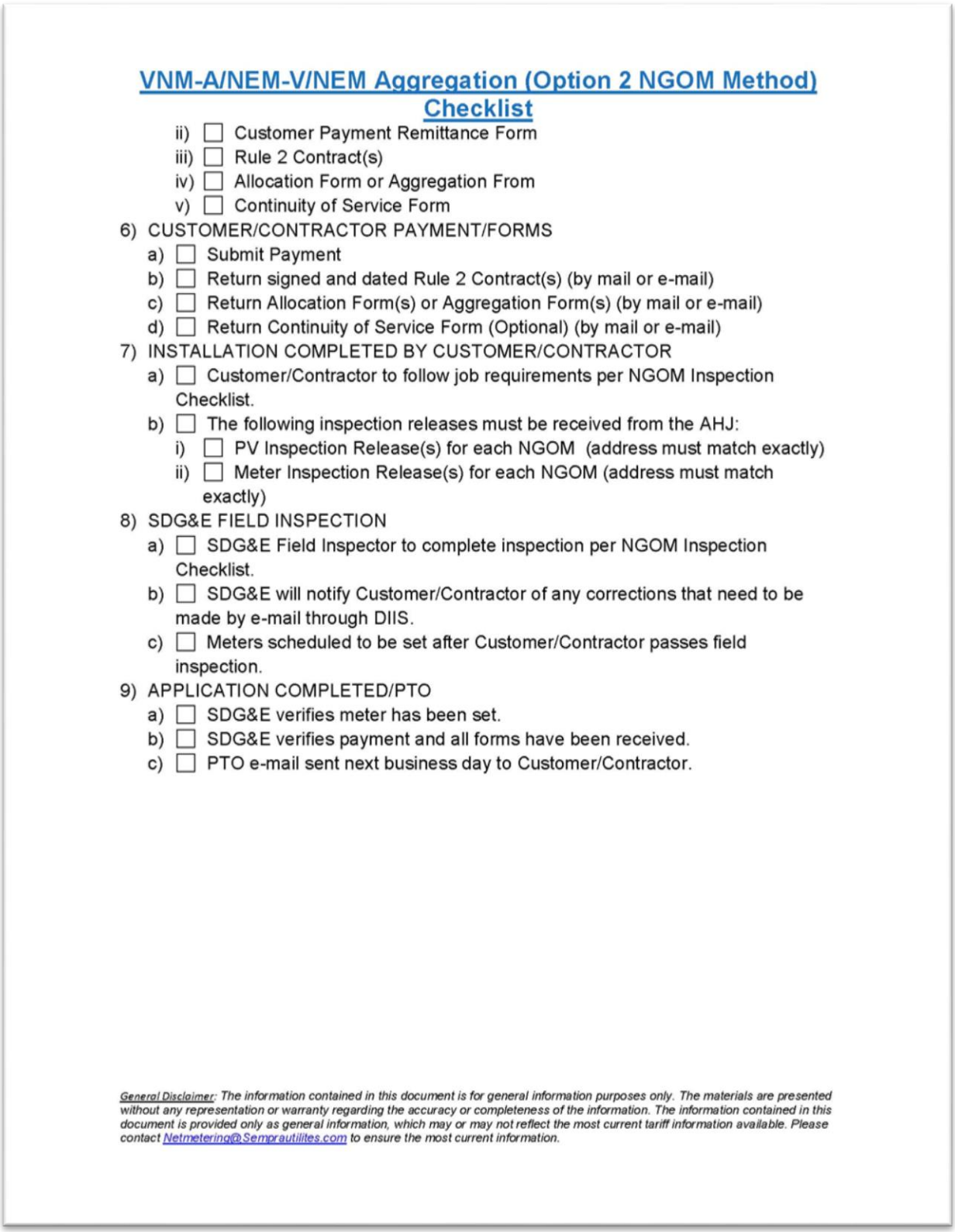
Figure 2: SDG&E NEM-V Application Checklist



VNM-A/NEM-V/NEM Aggregation (Option 2 NGOM Method) Checklist

ii) ☐ Customer Payment Remittance Form
iii) ☐ Rule 2 Contract(s)
iv) ☐ Allocation Form or Aggregation From
v) ☐ Continuity of Service Form

6) CUSTOMER/CONTRACTOR PAYMENT/FORMS
   a) ☐ Submit Payment
   b) ☐ Return signed and dated Rule 2 Contract(s) (by mail or e-mail)
   c) ☐ Return Allocation Form(s) or Aggregation Form(s) (by mail or e-mail)
   d) ☐ Return Continuity of Service Form (Optional) (by mail or e-mail)
7) INSTALLATION COMPLETED BY CUSTOMER/CONTRACTOR
   a) ☐ Customer/Contractor to follow job requirements per NGOM Inspection Checklist.
   b) ☐ The following inspection releases must be received from the AHJ:
      i) ☐ PV Inspection Release(s) for each NGOM (address must match exactly)
      ii) ☐ Meter Inspection Release(s) for each NGOM (address must match exactly)
8) SDG&E FIELD INSPECTION
   a) ☐ SDG&E Field Inspector to complete inspection per NGOM Inspection Checklist.
   b) ☐ SDG&E will notify Customer/Contractor of any corrections that need to be made by e-mail through DIIS.
   c) ☐ Meters scheduled to be set after Customer/Contractor passes field inspection.
9) APPLICATION COMPLETED/PTO
   a) ☐ SDG&E verifies meter has been set.
   b) ☐ SDG&E verifies payment and all forms have been received.
   c) ☐ PTO e-mail sent next business day to Customer/Contractor.

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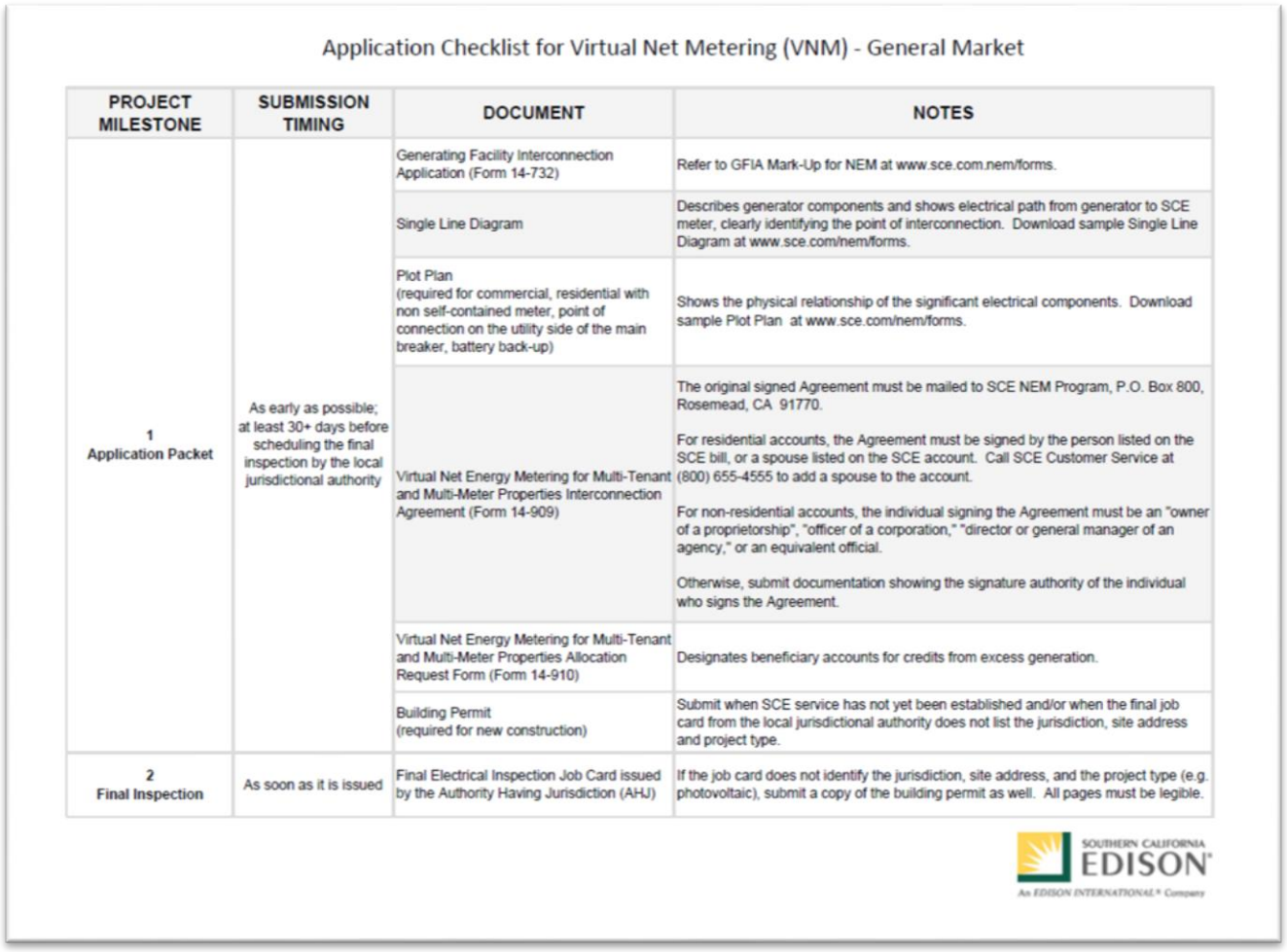
Figure 3: SDG&E NEM-V Application Checklist, Page 2



Application Checklist for Virtual Net Metering (VNM) - General Market

PROJECT MILESTONE	SUBMISSION TIMING	DOCUMENT	NOTES
1 Application Packet	As early as possible; at least 30+ days before scheduling the final inspection by the local jurisdictional authority	Generating Facility Interconnection Application (Form 14-732)	Refer to GFIA Mark-Up for NEM at www.sce.com.nem/forms.
		Single Line Diagram	Describes generator components and shows electrical path from generator to SCE meter, clearly identifying the point of interconnection. Download sample Single Line Diagram at www.sce.com/nem/forms.
		Plot Plan (required for commercial, residential with non self-contained meter, point of connection on the utility side of the main breaker, battery back-up)	Shows the physical relationship of the significant electrical components. Download sample Plot Plan at www.sce.com/nem/forms.
		Virtual Net Energy Metering for Multi-Tenant and Multi-Meter Properties Interconnection Agreement (Form 14-909)	The original signed Agreement must be mailed to SCE NEM Program, P.O. Box 800, Rosemead, CA 91770. For residential accounts, the Agreement must be signed by the person listed on the SCE bill, or a spouse listed on the SCE account. Call SCE Customer Service at (800) 655-4555 to add a spouse to the account. For non-residential accounts, the individual signing the Agreement must be an "owner of a proprietorship", "officer of a corporation," "director or general manager of an agency," or an equivalent official. Otherwise, submit documentation showing the signature authority of the individual who signs the Agreement.
		Virtual Net Energy Metering for Multi-Tenant and Multi-Meter Properties Allocation Request Form (Form 14-910)	Designates beneficiary accounts for credits from excess generation.
		Building Permit (required for new construction)	Submit when SCE service has not yet been established and/or when the final job card from the local jurisdictional authority does not list the jurisdiction, site address and project type.
2 Final Inspection	As soon as it is issued	Final Electrical Inspection Job Card issued by the Authority Having Jurisdiction (AHJ)	If the job card does not identify the jurisdiction, site address, and the project type (e.g. photovoltaic), submit a copy of the building permit as well. All pages must be legible.

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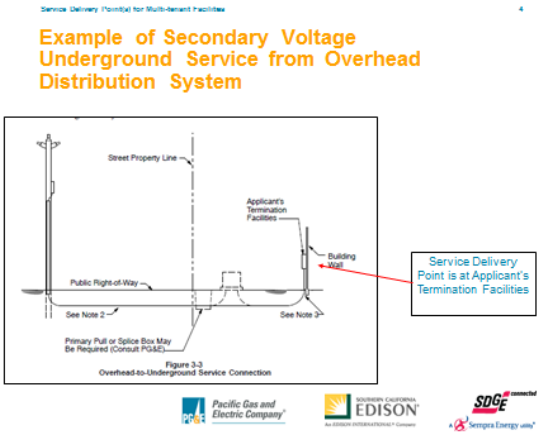
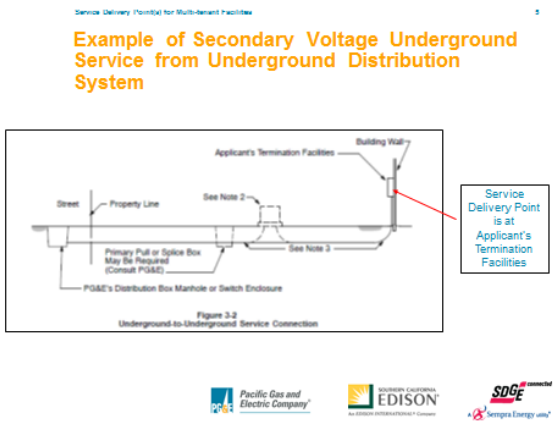
Figure 4: SCE Virtual Net Metering Application Checklist– General Market

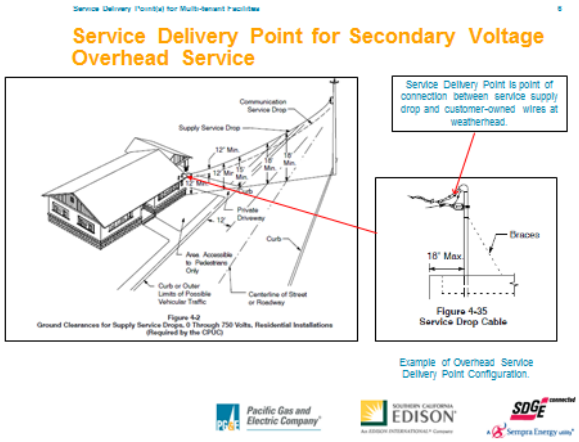
Appendix B. Service Delivery Point(s) for Multitenant Facilities[53]

For purposes of the General Market Virtual Net Metering tariff, the Service Delivery Point (SDP) identifies the physical location at which the Generating Account and its designated Benefitting Accounts, and the eligible generating facility, are all connected with the IOUs Delivery Facilities.

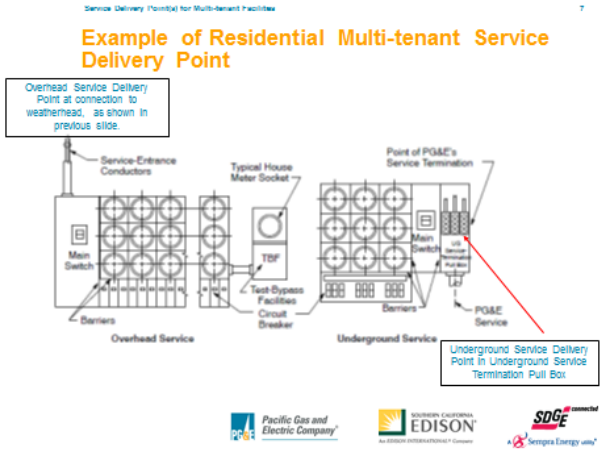
By definition, the Generating Account, its designated Benefitting Accounts and the eligible generating facility are located in the same physical location. The SDP is the physical demarcation between the IOU facilities serving these accounts and the customer.

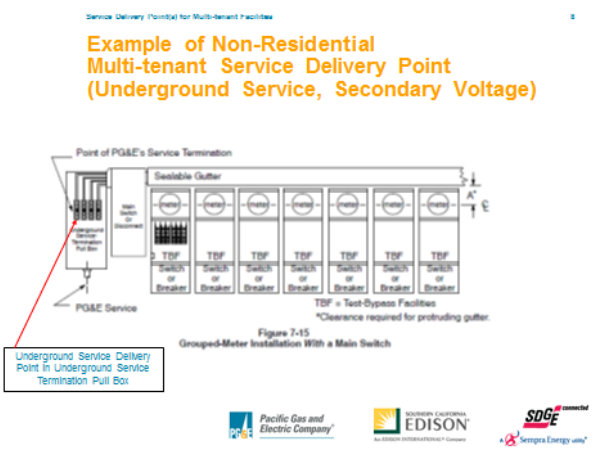






[53] http://www.cpuc.ca.gov/PUC/energy/DistGen/vnm.htm; "CPUC_ServiceDeliveryPoint12_2011.ppt"





Appendix C. NEM-V Reallocation Example

A multifamily property consists of nine tenant apartments, five one-bedroom and four two-bedroom. There are two common, or "house," meters on the property, one serving the building's laundry and outdoor lighting and a single meter serving an administration office. All meters are behind a single service delivery point (SDP). All apartments are occupied at the time the utility has given permission to operate under NEMV.

The property owner, who is the customer of record for the common area accounts, is also the owner/operator of the eligible generation system. The owner has initially determined and designated the following credit allocation percentages.

Apt1	10%
Apt2	10%
Apt3	10%
Apt4	10%
Apt5	10%
Apt6	10%
Apt7	10%
Apt8	10%
Apt9	10%
Common	9%
Office*	1%

*Designated default account that receives unallocated credits.

After three billing cycles, the owner receives feedback that some of the apartments have been potentially over or under allocated credits, and makes the following changes.

Apt1	7%
Apt2	7%
Apt3	7%
Apt4	7%
Apt5	7%
Apt6	15%
Apt7	15%
Apt8	15%
Apt9	15%
Common	4%
Office*	1%

*Designated default account that receives unallocated credits.

This initial reallocation costs nothing. However, by the beginning of the following month (5-1-15), a tenant moves out and the space is unoccupied for three additional billing cycles. While the unit is unoccupied, the office account, as the default account, receives the unallocated credits of that unit. When the new tenant moves in, the owner simply assigns the same allocations as the previous tenant. After one billing cycle, however, the owner receives feedback that the allocation is significantly larger than the tenant needs. After some thought, the owner makes the following modification.

Apt1	7%
Apt2	7%
Apt3	7%
Apt4	7%
Apt5	7%
Apt6 (NEW)	**10%**
Apt7	15%
Apt8	15%
Apt9	15%
Common	**9%**
Office*	1%

*Designated default account that receives unallocated credits.

Since the new account's relevant period starts at the time when the account takes service under NEM-V, there is no charge for the modification to this account, as this is the account's first modification within its relevant period. However, this is the common area account's second modification within its relevant period, so the owner will have to pay a modification charge on that account.

Appendix D. State Policy Comparison Table

Table A-D: State Policy Comparison Table

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
CA	Virtual Net Metering (NEMV or VNEM) for multi-tenant properties	No larger than the energy requirements of all benefitting accounts but with a maximum total size of 1 MW	Included within the state's NEM cap - 5% of utility's Aggregate Customer Peak Demand	Multi-tenant properties and customers	Owner designates percentage of generation to be allocated to each meter.	Monetary credits are applied to each account based on the customer's otherwise-applicable retail rate. Annual net excess generation is paid out at the utility's average default load aggregation point (DLAP) price + Renewable Energy Credit (REC) adder.	Must be located onsite for multi-tenant buildings.	Owner or Operator of property, third party or tenant with a separately metered account.	Loads must be connected through a common Service Delivery Point.
CA	Multi-family Affordable Housing (MASH) Virtual Net Metering (VNM)	1 MW	Included within the state's NEM cap - 5% of utility's Aggregate Customer Peak Demand	Low-income housing properties and residents	Generation allocated to Generator, Common Area or Residential Accounts	Otherwise applicable retail rate, applied as a dollar credit	Generation must be located onsite or on contiguous property	Owner or operator, third party ownership allowed.	N/A

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
CA*	Green Tariff Shared Renewables (GTSR) with Enhanced Community Renewables (ECR) option	Green Tariff (GT): 500 kW - 20 MW ECR: 500 kW - 3 MW	600 MW total, divided up among utilities; 100 MW low-income carve-out	All sectors	Customers subscribe to a percentage of their usage	The bill credit rate includes various credits (generation credit and solar value adjustment) and charges (generation cost, indifference adjustment, grid charges, resource adequacy charges, and administrative charges).	GT/ECR: Projects must be located within same IOU territory as participants. ECR: Participants and project must be in same municipality or county, or within 10 miles of participant.	GT: Utility ownership ECR: Third-party ownership	N/A
CO	Community Solar Gardens (CSG)	CSG subscriptions may supply no more than 120% of each subscriber's annual electricity consumption, up to 2 MW	6.5 - 30 MW annually for Xcel in 2015-2016	All sectors	A CSG must have at least 10 subscribers. Each subscriber must subscribe to ≥ 1 kW up to 40% of the system output.	Residential credits calculated by multiplying the Subscriber's share (% of total) times the utility's Total Aggregate Retail Rate (including all billed components) as charged to the Subscriber. Credits roll over indefinitely	Subscribers must be in the same or adjacent county as the CSG facility	Utility or third-party ownership allowed.	N/A

* Final rules and/or tariffs have not yet been approved for these programs, as described above, so program details may change.

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
CT	Virtual Net Metering (VNM)	3 MW	Participation is limited to customers whose total monetary credits combined do not exceed $10,000,000	State, municipal, and agricultural	VNM customer may include up to 10 additional beneficial accounts, 5 of which may be non-state or non-municipal, so long as they are connected to "critical facilities" on a microgrid. Monetary credits allocated first to the host customer in proportion to customer consumption.	Retail rate against the generation service component and a declining percentage of the transmission and distribution charges billed to the beneficial accounts.; Credits rollover for 1 year, credited to host customer's account at the end of the year.	Accounts must be located within the same electric service territory.	Systems can be owned by the customer, leased by the customers, or owned by a third-party on a customer's property.	
CT*	Shared Clean Energy Facility Pilot Program	4 MW	6 MW	All sectors	TBD	The Department of Energy and Environmental Protection will determine a bill credit for participants	Facility must be located in the same electric distribution company service territory as the individual subscriptions.	Systems may be owned by a for-profit, not-for-profit or third party organization.	TBD
D.C.	Community Renewable Energy Facilities (CREF)	5 MW	N/A	All sectors	Must have at least 2 subscribers	CREF Credit Rate, which equals the Standard Offer Service rate for the General Service Low Voltage non-Demand Customer class (energy-only rate).	N/A	Owner or operator, third party ownership allowed.	N/A

* Final rules and/or tariffs have not yet been approved for these programs, as described above, so program details may change.

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
DE	Community Net Metering	110% expected aggregate electricity consumption; Residential = 25 kW, Non-residential DP&L = 2 MW, Non-residential (others) = 500 kW, Agriculture = 100 kW	Included within the state's NEM cap - 5% of aggregated customer monthly peak demand	All sectors	Allocated per customers' preference. Utility may put customers on same billing cycle.	Retail rate if meters are located at the same feeder; customers not on the same feeder are credited at the supply service charge rate. Utility may elect to pay the host customer instead of issuing credits. Excess credits can be paid to the host customer once a year.	Customers on the same feeder receive higher bill credit rate than those not on the same feeder.	Direct ownership, joint ownership and third-party ownership allowed.	N/A
HI*	Community-Based Renewable Energy Program	TBD	TBD	All sectors	TBD	TBD	TBD	Any person or entity	TBD

* Final rules and/or tariffs have not yet been approved for these programs, as described above, so program details may change.

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
MA	Neighborhood Net Metering	Class I < 60 kW Class II = 60 kW - 1 MW Class III = 1 - 2 MW Govt. < 10 MW (same for all NEM)	Included in state's NEM cap - 4% of peak load for non-government (private) entities, 5% of peak load for government (public) entities	All sectors, so long as serving > 10 residential customers	Must serve at least 10 residential customers	Calculated according to Class and type of facility (same for all NEM). Credited to customers' next bills indefinitely; utilities may choose to pay for the net metering credits for Class III facilities rather than allocating the credits.	Facility and participating meters must be located in a single "neighborhood," ISO-NE Load Zone and utility distribution territory.	Third party ownership allowed.	N/A
MA	Virtual Net Metering	Class I < 60 kW Class II = 60 kW - 1 MW Class III = 1 - 2 MW Govt. < 10 MW (same for all NEM)	Included in state's NEM cap - 4% of peak load for non-government (private) entities, 5% of peak load for government (public) entities	All sectors	Host Customer designates in writing to utility how to allocate credits among other participating customers.	Calculated according to Class and type of facility (same for all NEM). Credited to customers' next bills indefinitely; utilities may choose to pay for the net metering credits for Class III facilities rather than allocating the credits.	Facility and participating meters must be in the same ISO-NE Load Zone and utility distribution territory.	Third party ownership allowed.	N/A

* Final rules and/or tariffs have not yet been approved for these programs, as described above, so program details may change.

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
ME	Community Net Metering	IOUs: 660 kW; Municipal/co-ops: 100 kW	N/A	All sectors	Up to 10 accounts. The transmission and distribution utility allocates kilowatt-hour credits based on the ownership interest of the shared ownership customers in the facility. Utility may place customers on the same billing cycle.	Retail rate. Participants may roll excess credits forward for up to 12 months, after which unused credits will expire with no compensation.	N/A	Shared ownership customers must have an "ownership interest" in a shared facility (i.e. they must have legal rights to the energy generated from a shared facility).	N/A
MD*	Community Solar Energy Pilot Program	2 MW	Included within the state's NEM cap of 1,500 MW	All sectors	A community facility must have at least two subscribers. Subscriptions larger than 200 kW must not make up more than 60% of a facility's subscriptions	The pilot program will use virtual net metering, as determined by the PSC, to credit subscriber electricity bills; a subscriber may not receive credit for generation exceeding 200% of their baseline usage.	TBD	Must be owned by a person or group of subscribers; may not be owned by a utility	TBD

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
MN	Community Solar Gardens (CSG)	1 MW; 120% of the average annual consumption of electricity	N/A	All sectors	Each customer must own ≥ 200W up to 40% of the system; minimum 5 subscribers.	Applicable retail rate plus REC adder (residential or non-residential). Annual net excess generation rate depends on size of system -- < 40 kW at retail rate, 40 kW - 1 MW at avoided cost rate.	Subscribers must be retail customers of the utility and located in the same county or a county contiguous to where the facility is located.	Third party ownership allowed. A CSG Operator must have a state certificate of good standing.	There is no limit to the number of CSGs that can be placed on a property, but no single garden can exceed the 1 MW system cap.
NH	Group Net Metering	1 MW (or no larger than all accounts combined)	Included within the state's NEM cap of 50 MW	All sectors	A customer generator may become a group host for a group of customers who are not customer generators.	Credits beyond the host customer's needs are paid to the host each month at the host's retail rate, credited to customers' next bills indefinitely.	The group of customers must be default service customers of the same electric distribution utility as the host.	Host customer must own or operate the system; third party ownership allowed.	N/A

* Final rules and/or tariffs have not yet been approved for these programs, as described above, so program details may change.

State	Policy Name	Allowable Size Limit	Cumulative Capacity Limit	Eligible Sectors	Participation Requirements and Restrictions	Bill Credit Rate and Rollover	Locational Restrictions	Ownership	Additional Restrictions
NY*	Community Net Metering	2 MW	Included within the state's NEM cap - 6% of utility's' peak demand	All sectors	There must be a single community net metered project host organization for each project to interface between project developer, utility and membership. Host organizer provides list of members' accounts, allocation, and other info to utility. Utility may change host and members to same billing cycle.	Calculated at the host load rate; no annual roll-over/cash-out.	All customers must be within same utility service territory and NYISO zone; generator must be located behind a "host meter".	Third party ownership allowed.	N/A
VT	Virtual Net Metering	All others = 500 kW	Included within the state's NEM cap - 15% of utility's 1996 peak demand or peak demand during the most recent calendar year, whichever is greater.	All sectors	Allocated per group preference; group must file with the utility regarding preference for allocating net excess generation.	Credits calculated by converting all meters to a non-demand, non-time-of-day meter, and equalizing them to tariffed kWh rate; if no net excess generation preference, generation credits go to the generator account.	Meters must be located within the same electric service territory. Facility must be located on the property of 1 group member.	Third party ownership allowed.	N/A

Appendix E. California Utility Filings Implementing Virtual Net Metering

SDG&E

Advice Letter 2551-E, *Revisions to SDG&E's Electric Schedules NEM, NEM-V, and VNM-A in Compliance with AB 920 and D.11-06-016*, November 26, 2013.

Advice Letter 2404-E, *Revisions to Electric Schedules NEM (Net Energy Metering), VNM-A (Virtual Net Energy Metering for Multi-Family Affordable Housing) and NEM-V (Virtual net Energy Metering for Multi-Tenant/Multi-Meter Properties) in Compliance with D.12-05-036*, October 4, 2012.

Advice Letter 2277-E, *Revisions to SDG&E's Electric Schedule VNM-A (Virtual Net Energy Metering for Multi-Family Affordable Housing) in Compliance with D.11-07-031*, August 15, 2011.

Advice Letter 2269-E-A, *Supplemental: Revisions to SDG&E's Electric Schedule NEM (Net Energy Metering), Schedule VNM-A (Virtual Net Energy Metering for Multi-Family Affordable Housing), and ERRA (Energy Resource Recovery Account) in compliance with Assembly Bill (AB) 920, Decision (D) 11-06-016, and Resolution E-4422*, September 23, 2011.

Advice Letter 2214-E, *Revisions to Electric Rate Schedules NEM and VNM-A in Compliance with Assembly Bill 510*, December 10, 2010.

Advice Letter 2145-E, *Revisions to SDG&E's Electric Schedules NEM (Net Energy Metering) And VNM-A (Virtual Net Energy Metering for Multi-Family Affordable Housing) in Compliance with Assembly Bill (AB) 920*, February 1, 2010.

Advice Letter 2064-E-A, *Supplemental – Establishment of Schedule VNMA in Compliance with D.08-10-036*, April 17, 2009.

SCE

Advice Letter 3199-E-A, *Supplemental: Proposed Standalone Multifamily Affordable Solar Housing (MASH) Program Handbook to Incorporate Changes to the MASH Program Necessary to Align with Decision (D.)15-01-027,* April 20, 2015.

Advice Letter 3041-E, *Modifications to Schedules NEM, MASH-VNM and NEM-V and Associated Forms to Implement Net Energy Metering (NEM) Transition Provisions Pursuant to AB 327 and D.14-03-041*, May 19, 2014.

Advice Letter 2904-E, *Modifications to Schedule NEM, Schedule MASH-VNM and Form 14-653 to Allow Direct Access and Community Choice Aggregation Service Customer Participation*, May 24, 2013.

Advice Letter 2790-E-A, *Changes to Schedule NEM, Schedule NEM-V and Schedule MASH-VNM Regarding the Calculation of Non-Coincident Aggregate Customer Peak Demand for the Net Energy Metering Cap Pursuant to D.12-05-036 in R.10-05-004*, December 7, 2012.

Advice Letter 2790-E, *Changes to Schedule NEM, Schedule NEM-V and Schedule MASH-VNM Regarding the Calculation of Non-Coincident Aggregate Customer Peak Demand for the Net Energy Metering Cap Pursuant to D.12-05-036 in R.10-05-004*, October 4, 2012.

Advice Letter 2617-E, *Modifications to SCE Company's Schedule MASH-VNM, Multifamily Affordable Solar Housing, Virtual Net Metering*, August 15, 2011.

Advice Letter 2538-E, *Revisions to SCE Company's Schedules NEM-Net Energy Metering and MASH-VNM-Multifamily Affordable Solar Housing Virtual Net Metering*, December 17, 2010.

Advice Letter 2447-E, *Revisions to Schedule MASH-VNM (Multifamily Affordable Solar Housing-Virtual Net Metering) Necessitated by Assembly Bill 920*, March 5, 2010.

Advice Letter 2322-E-A, *Supplemental Filing for Establishment of Schedule Multifamily Affordable Solar Housing, Virtual Net Metering (MASH-VNM)*, April 14, 2009.

PGE

Advice Letter 3890-E, *Modifications to Schedule NEMVNMA Pursuant to D.11-07-031, Ordering Paragraph 1*, August 15, 2011.

Advice Letter 3870-E, *Revisions to Electric Schedules NEM – Net Energy Metering and NEMVNMA – Virtual Net Energy Metering for Multifamily Affordable Housing (MASH/NSHP) With Solar Generator(s) in Compliance with Assembly Bill (AB) 920 and D.11-06-016*, July 11, 2011.

Advice Letter 3778-E, *Revisions to Electric Rate Schedules NEM and NEMVNMA in Compliance with Assembly Bill 510 to Increase the Participation Cap to 5% and Add an Inspection Reporting Requirement*, December 14, 2010.

Advice Letters 3718-E-A, *Revision to Schedule NEMVNMA – Virtual Net Energy Metering (VNM) Service for Individually Metered Residential Units and Owners with Housing Receiving Incentives from the Multifamily Affordable Solar Housing (MASH) Program or the New Solar Homes Partnership Program (NSHP) Affordable Housing and Supplemental Filing,* September 15, 2010.

Advice Letter 3718-E, *Revision to Schedule NEMVNMA – Virtual Net Energy Metering (VNM) Service for Individually Metered Residential Units and Owners with Housing Receiving Incentives from the Multifamily Affordable Solar Housing (MASH) Program or the New Solar Homes Partnership Program (NSHP) Affordable Housing and Supplemental Filing,* August 16, 2010.

Advice Letter 3638-E, *Revisions to Rate Schedule NEMVNMA, Virtual Net Energy Metering for Multifamily Affordable Housing (MASH/NSHP) with Solar Generator(s), to Provide an Alternative Metering Option*, March 24, 2010.

Advice Letter 3605-E, *Changes to Electric Rate Schedules NEM and NEMVNMA in Compliance with Assembly Bill (AB) 920*, January 28, 2010.

Advice Letter 3422-E-A, *Supplement – Establishment of Schedule NEMVNMA – Virtual Net Energy Metering (VNM) Service for Individually Metered Residential Units and Owners with Housing Receiving Incentives from the Multifamily Affordable Solar Housing (MASH) Program or the New Solar Homes Partnership Program (NSHP) Affordable Housing*, April 10, 2009.