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**PROPOSED DECISION**

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Decision **PROPOSED DECISION OF COMMISSIONER PICKER**  
(Mailed 3/4/2016)

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking Regarding  
Policies, Procedures and Rules for the  
California Solar Initiative, the Self-Generation  
Incentive Program and Other Distributed  
Generation Issues.

Rulemaking 12-11-005  
(Filed November 8, 2012)

**DECISION ADOPTING NET ENERGY METERING BILL CREDIT ESTIMATION  
METHODOLOGY FOR GENERATING FACILITIES PAIRED WITH SMALL  
STORAGE DEVICES**

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**DECISION ADOPTING NET ENERGY METERING BILL CREDIT ESTIMATION  
METHODOLOGY FOR GENERATING FACILITIES PAIRED WITH ~~WITH~~  
SMALL STORAGE DEVICES****Summary**

This decision adopts an estimation methodology for determining Net Energy Metering (NEM) billing credits for storage devices with a capacity of 10 kilowatts (kW) or less that are an addition or enhancement to a NEM-eligible generation facility. For solar photovoltaic (PV) generating facilities paired with a small (10 kW or less) storage device (solar PV paired systems), the Commission adopts an estimation methodology to cap NEM credits on a monthly basis based on modeled monthly production. Specifically, this ~~Decision~~[decision](#) adopts the estimation methodology proposed in the November 4, 2014 Assigned Commissioners Ruling (ACR) that caps credits for NEM exports based on monthly estimates of NEM generating facilities' output, with one modification. This decision also clarifies that customers with solar PV paired systems may also elect to "opt-out" of using the estimation methodology and instead install metering equipment to measure the actual PV output eligible for NEM credits. Finally, for non-solar PV paired systems, we adopt the same metering requirements ~~that were~~ adopted in ~~Commission~~ Decision 14-05-033 for storage devices larger than 10 kW.

**1. Background****1.1. Net Energy Metering Program Background**

The Net Energy Metering (NEM) program was created by Assembly Bill

(AB) 656<sup>1</sup> and has been modified numerous times.<sup>2</sup> The NEM program is an electricity tariff billing mechanism designed to facilitate the installation of renewable distributed generation (DG) by offering utility customers with customer-sited generation facilities retail-rate billing credits for energy exported to the grid at times when onsite generation exceeds onsite energy demand. In Decision (D.) 02-03-057, the Commission determined that Pub. Util. Code § 2827 was intended to exempt NEM program participants, as customer-generators, from interconnection application fees, supplemental review fees, and costs for distribution upgrades. Pub. Util. Code § 2827 also explicitly exempts NEM program participants from standby charges.

In 2011, Senate Bill 489<sup>3</sup> expanded the technologies eligible for the NEM tariff to include all Renewables Portfolio Standard (RPS)-eligible technologies.<sup>4</sup> Specifically, Pub. Util. Code § 2827(b)(11) provides that a renewable electrical generation facility “means a facility that generates electricity from a renewable source listed in paragraph (1) of subdivision (a) of Section 25741 of the Public Resources Code.”<sup>5</sup>

In December 2015, the Commission issued D.16-01-044 adopting a successor to the NEM tariff, which takes effect when ~~the~~ Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company (investor-owned utilities ~~or~~ IOUs) reach their Pub. Util. Code. § 2827

<sup>1</sup> Ch. 369, Statutes of 1995.

<sup>2</sup> The NEM program was most recently modified in a January 28, 2016 Decision adopting a net energy metering successor tariff, which can be found at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M158/K285/158285436.pdf>.

<sup>3</sup> Ch. 593, Statutes of 2011.

<sup>4</sup> At that time, Pub. Util. Code § 2827 (b)(5), which has been renumbered to Pub. Util. Code § 2827 (b)(11) since modification of the statute in 2013.

<sup>5</sup> See: <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=puc&group=02001-03000&file=2821-2829>.

NEM caps.<sup>6</sup> Among other things, the NEM successor tariff requires NEM participants with systems sized 1 MW or less to pay ~~an~~ a standardized interconnection fee, ~~and prohibits~~ (with systems larger than 1 MW paying actual interconnection costs), requires NEM participants ~~from using NEM credits to offset certain~~ to pay non-bypassable charges ~~assessed on their utility bill, on each~~ kilowatt-hour (kWh) they consume from the grid in each metered interval, and requires customers accepting service on the NEM successor tariff to be on a time-of-use (TOU) retail rate. Pursuant to D.16-01-044, small storage devices paired with NEM generating facilities are not exempt from interconnection fees.

### **1.2. Storage as an Addition or Enhancement to Renewable Generation**

On June 10, 2015, the California Energy Commission (CEC) adopted the eighth edition of the RPS Eligibility Guidebook (Guidebook). This latest edition of the Guidebook includes a section on energy storage technologies, § III.F, which defines the conditions under which an energy storage device may be considered an addition or enhancement to a renewable electrical generation facility ~~per Cal.~~ pursuant to Pub. Resources Code § 25741(a)(1).<sup>7</sup>

Section III.F establishes two categories of energy storage that “may be considered an addition or enhancement to a renewable electrical generation facility” ÷ (1) “integrated” and (2) “directly connected.” “Integrated” energy storage is described as “(an) energy storage device (that) is capable of storing only energy produced by the facility, either as an intermediary form of energy

<sup>6</sup> Pub. Util. Code § 2827(c)(1) required the Commission to adopt a NEM successor tariff when “the total rated generating capacity used by eligible NEM customer-generators exceeds 5 percent of the electric utility’s aggregate customer peak demand.”

<sup>7</sup> The RPS Eligibility Guidebook (8th Edition, June 2015) is available at <http://www.energy.ca.gov/2015publications/CEC-300-2015-001/CEC-300-2015-001-ED8-CMF.pdf>.

during the generation cycle or after electricity has been generated.”<sup>8</sup> For a storage device to be deemed “directly connected” to the facility, “electricity must be delivered from the renewable generator to the energy storage device behind the meter used for RPS purposes and any electricity from a source other than the renewable generator is included as an energy input to the facility. The energy storage device must be operated as part of the facility represented in the application and not in conjunction with any other facility, renewable or otherwise.”<sup>9</sup>

### **1.3. Benefits of NEM Paired with Storage and TOU Rate Structures**

Storage devices paired with NEM-eligible generating facilities can provide a broad range of benefits to host customers and the utility grid. The Commission has recognized the benefits of storage in multiple proceedings.<sup>10</sup> These benefits include, but are not limited to, supplying back-up power during grid outages, reducing a customer’s peak demand, shifting a customer’s electricity needs to align with grid supply, reducing a customer’s total energy purchases, and supplying reliability services to the grid.

Furthermore, the Commission has adopted policies to move IOU customers on to a TOU rate structure to better align retail rates with the actual costs for supplying energy at a given time of the day. Residential IOU customers will be defaulted to service on TOU rates as early as 2019 and all customers accepting service on the NEM successor tariff will be on TOU rates.<sup>11</sup> Along with the NEM successor tariff decision, the Commission recently issued an Order

<sup>8</sup> RPS Eligibility Guidebook at 43.

<sup>9</sup> *Id.* at 43.

<sup>10</sup> These include [the](#) storage-related [Commission](#) Rulemakings, (R.) 10-12-007, and most recently, R.15-03-011.

<sup>11</sup> D.15-07-001 at Ordering Paragraph (OP) 9; D.16-01-~~044~~[044](#) at OP 12, 13.

Instituting Rulemaking (OIR) on December 28, 2015, R.15-12-012, to develop a framework for designing, implementing, and modifying time periods for use in future TOU rates. A goal of this OIR is to adopt TOU rates that provide accurate incentives for energy generation, storage, and use at appropriate times throughout each day. As such, generating facilities paired with storage devices can respond to TOU price signals and optimize behind-the-meter output to align with system needs and be compensated accordingly.

#### **1.4. Interconnection and Metering of NEM Paired Systems**

On May 23, 2014, the Commission issued D.14-05-033 to resolve a number of issues related to the interconnection of NEM paired generating facilities. Through D.14-05-033, the Commission clarified its existing policy by stating that if storage devices are 1) paired with NEM-eligible generation, and 2) meet the RPS Guidebook requirements to be considered an "addition or enhancement" to NEM-eligible systems, then these systems are exempt from interconnection application fees, supplemental review fees, costs for distribution upgrades, and standby charges when interconnecting under the current NEM tariffs.<sup>12</sup>

In order to ensure the integrity of a customer's NEM credits for energy exports to the utility grid, or in other words, in order to ensure that a customer's NEM credits can only be generated by eligible customer-sited generating facilities and not from energy taken from the utility grid, D.14-05-033 implemented certain [new rules. Those rules include](#) sizing limitations and metering requirements on qualifying large (greater than 10 kW) NEM paired systems~~—~~, [an exemption for small paired systems from NEM integrity validation until a NEM estimation methodology is adopted by the Commission, and a requirement for previously-installed small paired systems to be subject to the](#)

<sup>12</sup> D.14-05-033 at 2.

NEM estimation methodology that is ultimately adopted in this Decision.<sup>13</sup>

D.14-05-033 also required the IOUs to file Tier 2 Advice Letters within 30 days of this Decision to update their NEM tariffs to incorporate the sizing and metering requirements adopted in that Decision.

The Commission determined that in circumstances where a storage device larger than 10 kW is paired with a NEM eligible generating facility, the customer would have to:

- 1) Install a non-export relay storage device(s);
- 2) Install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling; or
- 3) Install an interval meter directly to the NEM-eligible generator(s).<sup>13</sup><sup>14</sup>

This approach mirrors configuration and metering requirements under the utilities' respective NEM multi-tariff (NEM-MT) provisions.

However, for small NEM paired systems, where the storage device is 10 kW or less, the Commission determined that "small NEM eligible generating facilities (with storage sized at 10 kW (AC) or less) should be permitted to use an estimation methodology based on a presumed generation profile of the generating facility's NEM generator to validate the eligible NEM credits accrued to the generating facility."<sup>14</sup><sup>15</sup> D.14-05-033 also found, "NEM-paired storage systems with storage devices sized at 10 kW or smaller should have no requirement to be sized to the customer demand or the generator."<sup>16</sup> As such, there are no sizing limitations for storage paired with a NEM generating facility so long as the storage device's capacity is 10 kW or less.

<sup>13</sup> D.14-05-033 at OPs 7 and 9.

<sup>13</sup>~~D.14-05-033~~ Id. at OP 9.

<sup>14</sup><sup>15</sup> Id. at Conclusion of Law (COL) 12.

<sup>16</sup> Id. at COL 3.



D.14-05-033 also stated, “The Commission shall issue a separate ruling in this proceeding, R.12-11-005, describing the process for finalizing the presumed generation profile based estimation methodology for eligible NEM generators to be incorporated into a revised NEM tariff for NEM-eligible generating facilities with NEM paired storage devices sized at 10 kilowatts alternating current or less.”<sup>1517</sup> Pursuant to D.14-05-033, a ruling that ~~included~~requested comments on an estimation methodology was issued by the assigned Commissioner on November 4, 2014.

2. **Assigned Commissioner Ruling on Proposed Estimation Methodologies**

The November 4, 2014 Assigned Commissioner Ruling (ACR) proposed two approaches for finalizing an estimation methodology to determine NEM billing credits for small NEM paired systems when the storage device has a capacity of 10 kW or less. The ACR noted that the proposed estimation methodologies are only applicable to customers with NEM paired systems on TOU rates because NEM only provides a financial advantage to NEM paired systems that can consume grid energy at a cheaper rate during one time period and then receive bill credits for discharging energy into the grid at a higher rate during another time period.<sup>1618</sup> Customer-generators not on a TOU rate can only increase their total bills by actively using their storage systems. As a result, the estimation methodology addressed in this Decision to cap NEM credits for paired systems only applies to customers on a TOU rate. The ACR invited parties to comment on the proposed methods in the Attachment to the Ruling.

<sup>1517</sup> Id. at OP 6.

<sup>1618</sup> November 4, 2014 ACR, Attachment A, at 1.

## **2.1. Key Differences Between Estimation Methodologies**

Method 1 from the Attachment to the ACR would establish a maximum hourly output profile for a NEM paired system to estimate NEM billing credits. Under Method 1, the IOUs would model an hourly generation profile estimate for a 1 kW solar PV generation system in each climate zone using the National Renewable Energy Laboratory's (NREL) PV Watts Calculator.<sup>17</sup><sup>19</sup> The IOUs would then scale up/down the modeled hourly generation to match the annual production estimate for a 1 kW solar PV system located in each climate zone using the California Solar Initiative (CSI) Expected Performance-Based Buydown (EPBB) calculator.<sup>18</sup><sup>20</sup> Finally, the IOUs would scale up the adjusted 1 kW hourly generation profile based on the installed capacity of a customer's solar PV system. Customer-generators would then be eligible to receive NEM credits for grid exports up to an hourly maximum amount set at the NEM paired system's modeled hourly generation profile. Any grid exports beyond the modeled amount for a given hour would not be eligible for NEM credits.

Method 2 from the Attachment to the ACR would require the IOUs to establish monthly maximum allowable output limits for NEM generation facilities. Any export by the customer's system exceeding this limit would not be eligible for NEM credit and would be forfeited. The maximum monthly output profile for a NEM paired system would be based on a solar PV system's projected solar output for a particular month in a specific location using the EPBB calculator. Customer generators would then be eligible to receive NEM credits for grid exports up to the amount estimated by Method 2 for each month. Grid exports beyond the modeled monthly generation amount under Method 2 would

<sup>17</sup><sup>19</sup> See NREL's PV Watts Calculator at: <http://pvwatts.nrel.gov/>.

<sup>18</sup><sup>20</sup> See the CSI EPBB calculator here: <http://www.csi-epbb.com>.

not be eligible for NEM credits during that monthly period.

## **2.2. Key Similarities Between Estimation Method 1 and Method 2**

- Both methods seek to provide a cost-effective methodology to estimate generation eligible for NEM credits for small paired systems, thereby avoiding the need for costly additional metering equipment which would adversely impact the project economics for small paired systems.
- Both methods seek to protect the integrity of NEM credits by preventing owners from receiving NEM bill credits for non-renewable energy or energy taken from the grid, stored, and later discharged back into the grid.
- Both methods set a cap on the maximum allowable energy exports to the grid that can receive NEM credits as to not exceed the total estimated generation profile of the PV system.
- In both methods, exports above the eligible amount do not receive NEM credits and are forfeited by the customer.

## **3. Comments on Proposed Estimation Methodologies**

Opening comments to the November 4, 2014 ACR were filed on November 20, 2014 by Southern California Edison Company (SCE), Clean Coalition (CleanCo), California Energy Storage Alliance (CESA), jointly by San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas), Interstate Renewable Energy Council, Inc. (IREC), SolarCity Corporation (SolarCity), and Pacific Gas and Electric Company (PG&E).

Reply Comments to the November 4, 2014 ACR were filed on Dec 2, 2014 by PG&E, jointly by SDG&E and SoCalGas, CESA, SolarCity, SCE, CleanCo, California Solar Energy Industries Association (CalSEIA), the Center for Sustainable Energy (CSE), the Office of Ratepayer Advocates (ORA), and IREC.

### **3.1. Method 1: Estimation Based on an Hourly Output Profile**

#### **3.1.1. Arguments in Favor of an Hourly Estimation Methodology**

PG&E, SCE, and SDG&E (the IOUs) each express support for Method 1 because they consider it to be easier to implement, as well as more accurate and less costly than Method 2. PG&E supports Method 1 primarily because it most closely matches the NEM-MT methodology used for larger storage devices greater than 10 kW.<sup>1921</sup> Under Method 1, NEM-eligible output from the renewable generating facility is approximated using an hourly production estimate.

SCE asserts that Method 1 is more efficient and less costly from a billing standpoint, since the Method 1 billing process mirrors the process used for all other NEM-MT customers.<sup>2022</sup> PG&E agrees, stating that a lookup table of PV output set at a billing interval level can be integrated into IOU billing systems through a one-time modification, and can be used seamlessly from then on.<sup>2123</sup> Specifically, the time interval data can be generated, added into current billing IT systems, and compared against total system exports automatically. Thus, the IOUs argue administrative costs are minimized under Method 1.

PG&E and SCE also argue that Method 1 estimates the actual output of PV systems more accurately than Method 2.<sup>2224</sup> They assert Method 1 is based on more granular hourly generation data, whereas Method 2 requires a monthly PV output maximum, which allows for allocation of NEM credits to energy exports that may occur when the sun is not shining and therefore leads to greater

<sup>19\_21</sup> PG&E Reply Comments at 4.

<sup>20\_22</sup> SCE Opening Comments at 5.

<sup>29</sup> PG&E Reply Comments at 8.

<sup>22\_24</sup> PG&E Reply Comments at 7.

potential for inaccurate NEM credit allocation.<sup>2325</sup>

SDG&E claims that the potential for rate arbitrage<sup>2426</sup> exists with both methods, as customers could withdraw energy from the grid during off-peak hours to charge their batteries and discharge that same grid energy from the batteries at a later on-peak period and receive NEM credits for discharging grid energy. As such, SDG&E believes that Method 1 is the more appropriate of the two options, since it is more granular and accurate and provides a greater limitation on the ability to arbitrage rates under the NEM program than does Method 2.<sup>2527</sup>

Lastly, PG&E and SCE argue that Method 1 is easier for customers to understand than Method 2 because the solar PV generation profiles would match the time that their customer-sited solar PV systems are generating. As a result, NEM bill credits would match the time of generation in Method 1, whereas in Method 2, customers exceeding their monthly credit cap would forfeit NEM bill credits starting with the highest-priced billing period, which may not align with their solar PV's generation profile. SCE adds that "for rates with a winter on-peak period, such as SCE's TOU-D-T rate schedule, the forfeiture of excess generation credits would jump from the summer on-peak period to the winter on-peak period, then back to the summer off-peak period and finally to the winter off-peak period."<sup>2628</sup> The IOUs believe that accounting for credits in this way would lead to unnecessary customer confusion.

The IOUs assert that parallels between Method 1 and the existing

<sup>23\_25</sup> PG&E Opening Comments at 3.

<sup>24\_26</sup> The rate arbitrage scenarios SDG&E refers to would occur if customers with paired systems charged their storage device with grid energy during an off-peak period and then later discharged that energy back into the grid for NEM credits during an on-peak period. By doing so, customers would be able to profit from the difference in retail rates between off- and on-peak periods.

<sup>2527</sup> SDG&E Opening Comments at 1-2.

<sup>2628</sup> SCE Opening Comments at 5.

NEM-MT credit allocation rules, which are the same as the rules for NEM paired systems larger than 10 kW, would be easier to implement, more accurate, and easiest for customers to understand. PG&E states that “there is no substantial difference between the smaller and the larger NEM paired storage devices other than size, and therefore smaller NEM paired storage devices should be treated similarly from a policy standpoint.”<sup>2729</sup>

### **3.1.2. Arguments Opposed to an Hourly Estimation Methodology**

CESA, IREC, SolarCity, CalSEIA, CSE, CleanCo, and ORA oppose Method 1. CESA, SolarCity, and IREC argue that Method 1 is operationally inflexible and incompatible with the energy storage “end use” cases, since a paired system is not incentivized to store behind-the-meter solar generation mid-day and discharge that energy to meet on-site load or for export to the grid later in the day when the solar generating facility is no longer producing energy.<sup>2830</sup> Additionally, CESA and SolarCity argue that Method 1 can artificially cap NEM credits for a NEM paired system below the actual level of a solar PV generating facility’s energy production and that Method 1 restricts customers from using their storage device to turn their paired system into a flexible asset that benefits the grid.<sup>2931</sup>

CESA, IREC, SolarCity, CalSEIA, CSE, CleanCo, and ORA argue that Method 1 limits the ability of customers to utilize their paired systems to “time shift” their behind-the-meter solar PV production by storing on-site surplus PV generation during a non-peak period and later discharging that energy into the grid during a peak period when the behind-the-meter solar PV generating facility

<sup>2729</sup> PG&E Opening Comments at 3.

<sup>2830</sup> See D.12-08-016, Attachment A, at ~~14~~14, for a list of the twenty Storage “End Uses” identified by the Commission.

<sup>2931</sup> SolarCity Reply Comments at 6; CESA Opening Comments at 2-3.

is no longer generating energy. For example, if customers intend to store their solar PV production during mid-day and then export excess generation during an evening peak period, customer exports during the evening peak would likely exceed the hourly solar production estimate under Method 1 and thus not be eligible for NEM credits.<sup>30,32</sup> Given this limitation, CESA, IREC, SolarCity, CalSEIA, CSE, CleanCo, and ORA argue that Method 1 is suboptimal, since it does not incentivize customers to export energy during later on-peak hours when it may have the most value to the grid.

CESA argues that Method 1 can over- or underestimate solar PV system output in any given hour, but it will only act as a one-way penalty leading to forfeited NEM credits.<sup>31,33</sup> For example, when actual solar PV production exceeds the estimate, customers will forfeit NEM credits that exceed the maximum hourly estimated output.<sup>32,34</sup> However, when actual solar PV system production is lower than the estimated amount, customers will receive no additional benefit because they cannot receive NEM credits for energy that is not generated by their solar PV generating facilities and exported to the grid.<sup>33,35</sup>

Lastly, SolarCity argues that the IOUs' previous arguments that solar energy is an unreliable, intermittent resource is incompatible with their preference for Method 1, which would limit incentives for paired systems to function as a reliable, flexible resource. SolarCity points out that the IOUs have historically opposed ascribing reliability values to customer-sited solar PV generation because it is an as-available resource that delivers energy at times

<sup>30,32</sup> SolarCity Opening Comments at 4.

<sup>31,33</sup> CESA Reply Comments at 2-4.

<sup>32,34</sup> This would occur when the actual hour is sunny and solar PV production was high, but the estimate for that hour was that it would be cloudy and solar PV production would be low.

<sup>33,35</sup> This would occur when the actual hour is cloudy and solar PV production is low, but the estimate was that it would be sunny and solar PV production would be high.



when it may be less valuable to the system. Further, SolarCity cites that PG&E has argued that “over time, the peak hours of need will be shifting later in the day, thus reducing the relative capacity value of customer solar.”<sup>3436</sup> Taking into account the IOU critiques of customer-sited solar PV, SolarCity finds it inconsistent that the IOUs are favoring Method 1, which would place an hourly cap on NEM credits, limiting NEM credits for paired systems that can store energy for discharge when it has the most value to the grid.

### **3.2. Method 2: Estimation Based on a Monthly Output Profile**

#### **3.2.1. Arguments in Favor of a Monthly Estimation Methodology**

CESA, IREC, SolarCity, CalSEIA, CSE, CleanCo, and ORA argue that Method 2 provides incentives to TOU customers to discharge customer generation when it has the highest value to the grid. Method 2 would allow storage devices to store energy mid-day when solar production peaks, and dispatch that energy for export to the grid later in the day without forcing a customer to forfeit hourly NEM credits, since the NEM export credit cap would be applied on a monthly basis. This becomes more important as the Commission shifts customers on to default and mandatory TOU rates.<sup>3537</sup> In the IOUs most recent Rate Design Window applications,<sup>3638</sup> the IOUs propose on-peak rates that are later in the day to reflect the increased afternoon supply of electricity from renewable resources, most notably solar, and the potential for oversupply during

<sup>34,36</sup> Solar City Reply Comments at 2-4.

<sup>35</sup> ~~It is worth noting~~<sup>37</sup> Note that the TOU rates are being developed in R.12-06-013, R.15-12-012 and ~~all~~various rate cases. Pursuant to D.15-07-001, most residential customers will be defaulted to a TOU rate in 2019. ~~Customers~~However, pursuant to D.16-01-044, customers accepting service on the NEM successor tariff, with a temporary exception for SDG&E customers, will be required to be on a TOU rate.

<sup>36,38</sup> The IOUs have proposed their respective TOU rate design windows in SCE Application (A.) 13-12-015, SDG&E A.14-01-027, and PG&E A.14-11-014.



certain times, particularly weekday afternoons.<sup>3739</sup> To optimize grid exports with these shifting peak periods, SolarCity argues that Method 2 incentivizes NEM paired systems to serve as dispatchable resources that export stored energy to the grid at peak times.<sup>3840</sup>

Lastly, CESA argues that Method 2 is more predictive of actual generation from a generating facility than Method 1. Specifically, they argue that when comparing historical and actual weather on an hourly basis (Method 1), the probability of matching irradiance levels drops considerably. Thus, the mismatch between modeled and actual energy generation under Method 1 does not balance out across natural differences in weather, and therefore inherently limits NEM credits below actual NEM-eligible generating facility generation. In sum, CESA believes the probability of irradiance estimates matching actual irradiance over a monthly timeframe is much higher than hourly estimates.<sup>3941</sup>

### **3.2.2. Arguments Opposed to a Monthly Estimation Methodology**

The IOUs prefer Method 1 because it calculates the NEM bill credit cap based on a more granular hourly interval estimate. SCE opposes Method 2 because it does not align with their current billing practices, which are calculated at the hourly interval level. They also assert that Method 1 avoids a proration problem that Method 2's monthly calculation may present. For instance, billing periods can cross over months, requiring proration of the monthly maximum NEM cap. In addition, bill periods can cross over seasonal splits (transition from summer to winter or vice versa) or factor changes (when SCE implements new billing factors for the system). SCE argues that the combination of these events occurring in a given billing period could complicate billing accuracy due to the

<sup>37\_39</sup> See A.15-12-012 TOU OIR at 10.

<sup>38\_40</sup> PG&E Comments on the NEM Cost-Effectiveness Evaluation Proposal at 6.

<sup>39\_41</sup> CESA Reply Comments at 3-4.

sequencing of the proration calculation.<sup>4042</sup> Similarly, PG&E opposes Method 2 because it would require onerous pro-rating of NEM credits and customer load data if billing periods do not match up with monthly periods.<sup>4143</sup>

The IOUs are also concerned that Method 2 will undermine the integrity of NEM by enabling customers to charge batteries off-peak by drawing from the grid, storing energy in their storage devices, and then exporting the grid-derived energy during peak hours to gain NEM credits. PG&E argues that there is no way of measuring whether or not the energy exported to the grid is generated from the customer-sited generating facility, eroding the integrity of NEM.<sup>4244</sup>

Lastly, the IOUs argue that Method 2 is less accurate than Method 1, which utilizes more granular interval data. Specifically, PG&E argues that Method 1 more accurately assigns PV output data at the time PV output occurs: during the hours that the sun is shining. PG&E further asserts this has the dual benefit of matching the NEM-MT interval billing process and making sure credits for exports are provided in line with renewable energy production.<sup>4345</sup>

#### 4. **Discussion of Proposed Estimation Methodologies**

##### 4.1. **Discussion of Method 1**

IOUs argue Method 1 most closely matches the NEM-MT methodology for larger storage devices, minimizes administrative costs associated with billing, and thus provides the most consistent methodology with the policy for larger NEM paired generating facilities. IREC disagrees and states that the IOUs' point is irrelevant because storage systems paired with generators under 10 kW are currently exempt from NEM-MT.<sup>4446</sup> The Commission agrees that similarity to

<sup>40\_42</sup> SCE Opening Comments at 4.

<sup>41\_43</sup> PG&E Reply Comments at 9.

<sup>42\_44</sup> PG&E Reply Comments at 4-5.

<sup>43\_45</sup> PG&E Reply Comments at 7.

<sup>44\_46</sup> IREC Reply Comments at 4.

NEM-MT is not a compelling reason to adopt Method 1.

The Commission disagrees with the IOUs' assertion that similarity to NEM-MT would make Method 1 easier for customers to understand, since NEM-MT is utilized almost exclusively by commercial customers. NEM customers with small storage devices are likely to include many residential customers who are not familiar with NEM-MT. Rather, we concur with the assertion of several parties that a monthly limit on exports is at least as simple, if not simpler, for customers to understand as an hourly limit.<sup>4547</sup>

The Commission also agrees with CESA and SolarCity who dispute the IOUs' argument that the increased granularity of Method 1 would provide for more accurate generation estimation data. CESA and SolarCity contend that the probability of irradiance estimates matching actual irradiance over a monthly timeframe is higher than for individual hourly estimates.<sup>4648</sup> While Method 1 can over- or underestimate a solar PV system's output in any given hour, as CESA argues, it will act as a one-way penalty leading to forfeited NEM credits. We believe that if customers receive fewer credits than they were entitled to due to disallowances based on ex ante hourly estimates, it will cause customer confusion and frustration. Under Method 2, actual ~~kilowatt-hours (kWh)~~ of generation will be closer to the modeled output over a monthly interval, because over a longer period of time, the mismatch between modeled and actual production is more likely to balance out.

In response to the IOU rate arbitrage concerns associated with Method 2, the Commission already determined in D.14-05-033 that metering is not required for small NEM paired systems and that an estimation methodology would be sufficient while "balancing the Commission's priority of ensuring NEM integrity

<sup>45\_47</sup> See Reply Comments of CleanCo, CSE, IREC, and SolarCity.

<sup>46\_48</sup> CESA Reply Comments at 2.

with a cost-effective solution.”<sup>4749</sup> IREC posits that if rate arbitrage were a serious concern, metering would have been required for all systems and the Commission would not have asked parties to comment on the proposed possible estimation methodologies.<sup>4850</sup> We agree with IREC’s assertion and do not believe arbitrage is a concern that favors Method 1 over Method 2. By design, the proposed estimation methodologies offer trade-offs as stated in the November 2014 ACR. While arbitrage is a theoretical concern under both methods, the Commission agrees with IREC that battery charging from off-peak grid energy for later dispatch back into the grid is theoretically possible under Method 2, but would be uneconomical based on current battery costs, current differentials in TOU period pricing, and round trip efficiency losses of 10-20%.<sup>4951</sup> ~~Therefore~~That said, ~~the IOUs’ argument is rejected by the~~ Commission also recognizes that rate arbitrage using grid power may be a greater concern as costs for storage decline, storage technologies improve, and TOU periods change. ORA recommends that we require the IOUs to monitor small storage adoption rates in their monthly NEM transition reporting information-only advice letters. SolarCity and CleanCo recommend the IOUs can track arbitrage from small paired systems through smart meter data review and present any evidence of arbitrage using grid power to the Commission at a later date, if it does occur. We agree that such data should be tracked, and we encourage the utilities to bring this information to our attention before the review of the NEM successor tariff with suggestions for future modifications to the methodology adopted herein.

#### **4.2. Discussion of Method 2**

The purpose of an estimation methodology is to preserve NEM bill credit

<sup>47\_49</sup> D.14-05-33 at 20.

<sup>48\_50</sup> IREC Reply Comments at 4.

<sup>49\_51</sup> IREC Reply Comments at 6.

integrity while providing a cost-effective alternative to costly metering equipment for small NEM paired generating facilities. Method 2 is consistent with this goal. The Commission adopts Method 2, as modified below, since it avoids the possibility of disallowing legitimate NEM export credits due to inaccurate hourly forecasts while placing a reasonable cap on the allowable number of kWh exported.

As SolarCity cited in its reply comments, the IOUs have historically expressed concerns that distributed solar PV generation is problematic because it is an as-available resource that delivers energy at times when there is a lessened, or even non-existent, need for additional electricity deliveries to the grid.<sup>5052</sup> As such, the IOUs believe that distributed solar PV generation has a diminished value due to its misalignment with peak system demand. The Commission has noted that this concern can be mitigated by energy storage benefits, which were identified in the Customer and Transmission/Distribution “end-use” cases. The Commission agrees with CESA, IREC, SolarCity, CalSEIA, CSE, CleanCo, and ORA that Method 2 incentivizes paired systems’ benefits, since NEM paired systems can flexibly shift their output to align with a later period of peak demand. Specifically, Method 2 alleviates the IOUs’ concern with DG by allowing storage devices to store customer-sited solar generation mid-day when solar production peaks, and dispatch that energy for compensated export to the grid later in the day, while still capping NEM credits based on a system’s estimated monthly generation profile. As a result, the Commission favors Method 2 over Method 1.

The Commission recognizes PG&E’s concern that Method 2 would make it possible for customers to charge their storage devices from the grid during

<sup>50\_52</sup> [SolarCity Reply Comments at 2-3.](#)

low-cost periods and then later discharge that energy to the grid during high-cost periods, while using their solar PV system to meet their onsite load. This is an imperfection with both Method 1 and Method 2, but not a fatal flaw for Method 2, since customers would only receive NEM export credits up to the estimated monthly cap. Furthermore, the Commission agrees with IREC that the costs associated with charging a storage device with grid energy for later dispatch would dissuade this practice.

The additional IOU concerns of onerous billing administration and inaccurately pro-rating monthly production estimates due to Method 2's misalignment with the IOU billing cycle are addressed later in the amendments section.

#### 5. **Discussion of Proposed Amendments to Method 2**

We now discuss proposed amendments to Method 2 [as described in the ACR](#) that were submitted in comments by CESA, IREC, and SolarCity.

CESA recommends that the Commission preserve options for more accurately modeling energy production, should they exist. CESA points out that with high efficiency modules, solar production calculators such as EPBB and PV Watts can underestimate a system's expected energy production. Therefore, CESA recommends developing technology-specific loss-factors for use in calculators to more accurately model energy production. Additionally, while CESA supports Method 2, they believe customers with small paired systems should also have the option to "opt-out" and follow the metering requirements for paired systems with a storage device larger than 10 kW. <sup>51</sup>[53](#)

The Commission notes CESA's first argument and recommends further discussion in a future workshop. The Commission approves CESA's second

<sup>51</sup>[53](#) CESA Opening Comments at 4.

suggestion to allow customers with small paired systems to “opt-out” and follow the NEM-MT metering requirements. The November 2014 ACR proposes to

apply the same requirements that were adopted in D.14-05-003 for storage

devices larger than 10 kW for non-solar PV technologies.<sup>5254</sup> The Commission finds that it is reasonable for small paired systems to follow the same requirements should a customer want to purchase and install the required metering equipment. Should a customer decide to opt-out of using the estimation methodology adopted in this Decision and instead follow the NEM-MT metering requirements, that customer is only allowed to switch between the estimation methodology and the NEM-MT metering requirements at the start of a new NEM relevant period. Although D.14-05-033 required that the Commission adopt an estimation methodology for a small NEM-eligible generating facility’s presumed generation, ~~the Commission also believes~~ metering the generating facility would accurately achieve the same goal.

IREC suggests simplifying Method 2 by aligning the modeled output estimation period with the customer’s billing period to avoid the issue of pro-rating monthly output estimates.<sup>5355</sup> For example, if a customer’s billing period runs from January 15 to February 15, the customer’s cap would be set at the estimated amount of the system’s generation for the month of January. In other words, customers would be subject to the estimated monthly export cap for the calendar month that falls on the first day of their billing period. The

<sup>52\_54</sup> November 14, 2014 ACR, Attachment A<sub>7</sub> at 1.

<sup>53\_55</sup> IREC Opening Comments at 5-7.



November 14 ACR originally proposed that Method 2 would pro-rate the monthly estimate when the customer's billing date does not fall on the first of the month, but we are persuaded this proposal is preferable due to its simplicity and ease of IOU administration. Additionally, the annual cap of NEM output totaled over 12 months would remain the same, which aligns with the Commission's reasoning for approving Method 2. The Commission adopts this modification since aligning monthly output with the customer billing period should avoid the IOU's need to pro-rate estimates across different billing periods or change billing period dates and will simplify a customer's understanding of a utility bill.

IREC also proposes simplifying the monthly output estimation methodology by basing all paired systems' generation estimates on a single per kW profile for each climate zone based on a south-facing array, or by eliminating any limit on storage device exports, given how unlikely it is for customers to attempt arbitrage on a regular basis.<sup>5456</sup> IREC argues that this proposed simplification will minimize IOU administrative resources and avoid the need for the IOUs to calculate a monthly output estimation for each NEM customer's paired system based on its specific location and characteristics. We disagree with IREC's other proposed simplifications including eliminating the cap on exports and standardizing generation estimates based on a single south-facing system profile for each climate zone, since there may be unanticipated consequences if the estimation methodology is standardized for all systems in a given climate zone. As such, the Commission declines to adopt IREC's proposed modifications.

Lastly, SolarCity and IREC propose that customers should have access to smart meter or comparable data in order to track total exports, with no more than

<sup>54\_56</sup> IREC Opening Comments at 6-7, SolarCity Opening Comments at 5.



a twenty-four-hour delay.<sup>55,57</sup> Since any monthly excess grid exports above the NEM estimation cap are forfeited, IREC says NEM customers will need to have some way of tracking their total exports to manage their paired system and know when they are close to reaching the maximum monthly output cap. This would enable customers to optimize financial decisions about exporting energy during peak periods. PG&E has dismissed the export data access proposal as “onerous,”<sup>56,58</sup> but we support the proposal if technically feasible and recommend it be discussed further in a future workshop. Without data access, customers would not know how close they are to hitting their export caps and may not be able to maximize the value of the output from their paired systems.

In comments to the proposed decision (PD), SolarCity, PG&E, Clean Co, CESA, and ORA recommend developing policies that encourage DC-coupled “fully integrated” storage that is incapable of charging from grid power. This proposal has merit for multiple reasons, since a paired storage device would only be able to charge from a NEM-eligible generating facility, thereby nullifying the need for an estimation methodology and dismissing the IOU concern that customers could arbitrage TOU rates by charging their storage device with grid power.

Additionally, SCE, CleanCo, and SolarCity addressed the fact that the CSI program administrators’ EPBB calculator contracts will terminate when the CSI program sunsets at the end of 2016. SCE argues that the IOUs should have discretion to use the most cost-effective and efficient generation estimation tools after the contract expires. SolarCity supports the use of the EPBB calculator over an unknown alternative and recommends that the IOUs continue to recover costs for ongoing maintenance of the EPBB calculator. CleanCo recommends

<sup>55,57</sup> IREC Opening Comments at 8-9.

<sup>56,58</sup> PG&E Reply Comments at 6.

addressing the issue in a future Commission workshop.

SCE, CleanCo, and SolarCity correctly point out that funding for the EPBB calculator will expire at the end of 2016. As such, the IOUs may recover funding from their general rate cases to maintain and update the EPBB calculator, once funding from the CSI program is no longer available. Any updates to the EPBB calculator tool may be addressed in a future workshop.

In sum, the Commission adopts an estimation methodology based on Method 2 described in the ACR with the following changes ~~to Method 2~~:

1. The monthly output estimation period should align with the first day of the customer billing period. (e.g., if the customer's billing date is January 15, the maximum allowed NEM export should be based on a January output estimation).
2. We ~~clarify~~reaffirm our order in D.14-05-033 that customers have the right to "opt-out" of utilizing an estimation methodology and follow the same metering requirements as large paired systems greater than 10 kW but we clarify that customers may only switch at the start of the NEM relevant period.

The IOUs should file Tier 2 advice letters within 180 days to implement appropriate tariff changes to effectuate these rule changes and to demonstrate that their billing and information technology systems will be in place within 180 days. Accordingly, their billing and information technology systems should be available within 180 days.

We also defer a host of technical refinement proposals and issues described in this ~~Decision~~decision to a future workshop where other potential changes to paired systems' NEM bill credit integrity and accounting should be explored and ultimately addressed in R.14-07-002. Specifically, a workshop could be helpful to further explore developing technology-specific estimation factors proposed by CESA ~~and~~, providing customers with access to data to track their paired systems' NEM exports, updating the EPBB calculator, and exploring the applicability of an

[estimation methodology for DC-coupled NEM paired storage systems.](#)

6. **Metering Requirements for Non-Solar Small Paired Systems**

The November 2014 ACR also asked parties to comment on the ACR's proposed requirements for non-solar generators paired with storage, which is summarized below:

For non-solar PV technologies, (the Commission) propose(s) to

apply the same metering requirements that were adopted in

D.14-05-033 for storage facilities larger than 10 kW. Specifically,

non-solar paired generating facilities will be required to 1) install a

non-export relay on the storage device(s); 2) install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling; or, 3) install an interval meter directly to the NEM-eligible generator(s). A \$600 limit will be imposed for fees associated with this metering requirement. Because other renewable energy technologies typically have much larger capacities than residential PV systems (e.g., wind or biogas), they will rarely be paired with storage systems sized 10 kW or less. Even if such cases arise, the metering cost will comprise a smaller share of the total costs of the paired renewable and storage systems. <sup>57</sup><sub>59</sub>

6.1. **Summary of Party Comments**

SCE supports the Commission's proposed approach as does PG&E with

<sup>57</sup><sub>59</sub> November 4, 2014 ACR, Attachment A at 1.

one proposed modification. PG&E would like the same exemption to the \$600 fee limit for complex systems pairing storage with other types of renewable generators, as allowed in D.14-05-033 for storage devices paired with PV systems.<sup>5860</sup> PG&E believes there is no basis for treating non-solar PV renewable generating facilities differently than solar PV generating facilities in this instance, since metering configurations could theoretically be just as complex for these non-PV combinations as PV-paired storage configurations.<sup>5961</sup>

Lastly, in comments to the PD, SolarCity expressed concerns that the IOUs have not transparently assessed metering costs for complex systems and requested that IOU invoices for complex metering arrangements break out the costs of materials as well as the costs associated with engineering and labor. SCE replied by stating that they will provide greater clarity regarding how SCE defines “complex metering solutions” in its Tier 2 AL implementing this decision.

SolarCity does not oppose the ACR’s proposal, but notes that “unlike solar, whose production is relatively predictable based on solar insolation and system design, other technologies may be less predictable. Thus it may be challenging to rely on an estimation methodology in lieu of metering data for non-solar generators.”<sup>6062</sup> While SolarCity does not oppose the ACR’s proposed approach, they believe the Commission should allow reasonably accurate estimation methodologies, where they exist, to be applied in the case of non-solar technologies paired with storage devices sized at 10 kW or less. SolarCity asserts this will help ensure other technologies paired with storage are able to compete on equal footing with solar technologies.<sup>6163</sup>

IREC suggested that small bioenergy generating facilities do not need a

<sup>58\_60</sup> D.14-05-033, OP 10.

<sup>59\_61</sup> PG&E Opening Comments at 6.

<sup>60\_62</sup> SolarCity Opening Comments at 6.

<sup>61\_63</sup> SolarCity Opening Comments at 6.

storage solution at this time, but they proposed a simple estimation method for small wind generators under 10 kW. IREC suggests an assumed 20% capacity factor and an assumed average 30-day month of 720 hours for any wind NEM generating facility. Based on these assumptions, small wind generating facilities would be expected to produce 144 kWh per kW of capacity. IREC suggests to then round up to allowed monthly exports of 150 kWh per kW on installed behind-the-meter wind capacity.

In their reply comments, SCE opposes IREC's proposal to treat small wind generating facilities differently than other small non-solar generating facilities. SCE reiterates their support of the ACR's position on non-solar metering requirements, arguing that these requirements are fair to the other NEM-eligible technologies and align with SCE's existing NEM-MT requirements.<sup>6264</sup>

## **6.2. Discussion of Metering Requirements for Non-Solar Paired Systems**

For the reasons stated in the November 2014 ACR,<sup>6365</sup> the Commission maintains it is reasonable that all non-solar paired systems meet the same metering requirements as solar PV paired systems sized over 10 kW and NEM-MT systems. Parties are also broadly in agreement with this proposal. We acknowledge SolarCity's recommendation to adopt an estimation methodology for non-solar small paired systems, but choose to implement the ACR's proposed approach as it has been fully vetted and is applicable across technology types. We reject IREC's modifications to the proposal on a similar basis.

The Commission finds it appropriate to apply the same metering

<sup>62\_64</sup> SCE Reply Comments at 3-4.

<sup>63\_65</sup> November 14, 2014 ACR, Attachment A<sub>7</sub> at 1 states "Because other renewable energy technologies typically have much larger capacities than residential PV systems (e.g., wind or biogas), they will rarely be paired with storage systems sized 10 kW or less. Even if such cases arise, the metering cost will comprise a smaller share of the total costs of the renewable and storage systems."

requirements that are required for storage facilities larger than 10 kW to non-solar paired systems. Specifically, non-solar paired systems will be required to: 1) install a non-export relay on the storage device(s); (2) install an interval meter for the NEM-eligible generation, meter the load, and meter total energy flows at the point of common coupling; or, 3) install an interval meter directly to the NEM-eligible generator(s). A \$600 limit will be imposed for fees associated with this metering requirement consistent with D.14-05-033 and the exemption for systems requiring complex metering solutions also applies. Following the suggestion of SCE, each IOU should provide greater clarity on the definition of “complex metering arrangements” in its implementation advice letter. Additionally, when billing customers for complex metering arrangements, the IOUs must clearly break out metering costs associated with complex metering arrangements and include each cost as a line item on the customer’s invoice.

The IOUs should file Tier 2 advice letters within 180 days to implement appropriate tariff changes to effectuate these rule changes.

#### 7. **Comments on Proposed Decision**

The proposed decision of Commissioner Picker in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission’s Rules of Practice and Procedure.

Comments were filed on \_\_\_\_\_, March 24, 2016 by CalSEIA, CESA, CleanCo, Custom Power Solar, SDG&E, SEIA, SCE, SolarCity, ORA and PG&E and reply comments were filed on \_\_\_\_\_ ~~by~~ \_\_\_\_\_ March 29, 2016 by CESA, CleanCo, ORA, PG&E, SCE, SDG&E, and SolarCity.

SCE notes in its comments that D.16-01-044 sets forth rules regarding interconnection fees and costs for NEM successor tariff customers, and that this decision should be consistent. We agree. The interconnection fee that applies to NEM successor tariff customers under 1 MW should apply to NEM successor tariff customers with paired storage systems, and for paired storage systems where the generator is greater than 1 MW, all interconnection costs should apply pursuant to D.16-01-044, with the condition that metering costs do not exceed \$600 unless the utility determines that a complex metering arrangement is required. Accordingly, this decision has been modified to reflect that pursuant to D.16-01-044, small storage devices paired with NEM generating facilities are not exempt from interconnection fees.

Additionally, in comments the IOUs request more time to implement billing of the estimation methodology. While D.14-05-033 required the IOUs to file Tier 2 advice letters within 30 days of today's decision to update their NEM tariffs to incorporate the sizing and metering requirements for NEM paired storage systems, we determine that this timeline is impractical given the additional time it will take to implement the necessary billing systems. Accordingly, we modify that requirement to require that all tariff modifications needed to effectuate D.14-05-033 and today's decision should be filed within 180 days, and preferably earlier to ensure that the tariffs and billing systems are in place within 180 days.

Other revisions to the proposed decision have been made to reflect party comments, as appropriate.

#### **8. Assignment of Proceeding**

Michael Picker is the assigned Commissioner and Regina DeAngelis is the assigned Administrative Law Judge in this proceeding.



**Findings of Fact**

1. The Commission determined in D.14-05-033 that “small Net Energy Metering (NEM)-eligible generating facilities (with storage devices sized at 10 kilowatts (kW) alternating current (AC) or less) should be permitted to use an estimation methodology based on a presumed generation profile of the generating facility's NEM generator to validate the eligible NEM credits accrued to the generating facility.”

2. The November 4, 2014 ACR proposed two approaches for finalizing an estimation methodology to determine NEM billing credits for small NEM paired systems, when the storage device has a capacity of 10 kW or less.

3. The November 4, 2014 ACR noted that the proposed estimation methodologies are only applicable to customers with NEM paired systems on TOU rates because NEM only provides a financial advantage to NEM paired systems that can consume grid energy at a cheaper rate during one time period and then receive bill credits for discharging energy into the grid at a higher rate during another time period.

4. [D.16-01-044 establishes rules for NEM successor tariff customers, including rules related to interconnection fees, payment of non-bypassable charges and use of TOU rates. Pursuant to D.16-01-044, small storage devices paired with generating facilities are not exempt from interconnection fees.](#)

5. ~~4.~~ Both Method 1 and Method 2 [included as proposed estimation methodologies in the ACR](#) seek to provide a cost-effective methodology to estimate generation eligible for NEM credits for small paired systems, thereby avoiding the need for costly additional metering equipment, which would adversely impact the project economics for small paired systems.



6. ~~5.~~ Both methods seek to protect the integrity of NEM credits by preventing owners from receiving NEM bill credits for non-renewable energy or energy taken from the grid, stored, and later discharged back into the grid.

7. ~~6.~~ Both methods set a cap on the maximum allowable energy exports to the grid that can receive NEM credits as to not exceed the total estimated generation profile of the PV system.

8. ~~7.~~ In both methods, exports above the estimation cap do not receive NEM credits and are forfeited by the customer.

9. ~~8.~~ Similarity to NEM-MT would not necessarily make Method 1 easier for customers to understand, since NEM-MT is utilized almost exclusively by commercial customers.

10. ~~9.~~ NEM customers with small storage devices are likely to include many residential customers who are not familiar with NEM-MT.

11. ~~10.~~ A monthly limit on exports is conceptually at least as simple, if not simpler, for customers to understand as an hourly limit.

12. ~~11.~~ The increased granularity of Method 1 would not necessarily provide for more accurate generation estimation data.

13. ~~12.~~ The probability of irradiance estimates matching actual irradiance is higher over a monthly timeframe than it is over individual hours.

14. ~~13.~~ If customers receive fewer NEM credits than they were entitled to due to disallowances based on ex ante hourly estimates, it will cause customer confusion and frustration. Under Method 2, actual kWh of generation will be closer to the modeled output over a monthly interval, because over a longer period of time, the mismatch between modeled and actual production is more likely to balance out.

15. ~~14.~~ In response to the IOUs' rate arbitrage concerns associated with Method 2, the Commission already determined in D.14-05-033 that metering is not required for small NEM paired systems and that an estimation methodology would be sufficient while "balancing the Commission's priority of ensuring NEM integrity with a cost-effective solution."

16. ~~15.~~ The proposed estimation methodologies offer trade-offs as stated in the November 2014 ACR. While rate arbitrage is a theoretical concern under both methods, battery charging from off-peak grid energy for later dispatch back into the grid is theoretically possible under Method 2, but would be uneconomical based on current battery costs, current differentials in TOU period pricing, and round trip efficiency losses of 10-20%.

17. ~~16.~~ Method 1 can over- or underestimate a solar photovoltaic system's output in any given hour, but it would act as a one-way penalty leading to forfeited NEM credits, since customers would receive no additional benefit when estimated production exceeds actual production.

18. ~~17.~~ Method 2 avoids the possibility of disallowing legitimate NEM export credits due to inaccurate hourly forecasts while placing a reasonable cap on the allowable number of kWh exported.

19. ~~18.~~ Setting the monthly export cap based on the calendar month that falls on the first day of customers' billing periods will simplify the billing process compared to prorating the cap based on the number of days in each calendar month.

20. Pursuant to D.14-05-033, there are no sizing limitations for NEM paired systems so long as the capacity of the storage system is 10 kW or less.

21. Should a customer decide to opt-out of using the estimation methodology adopted in this decision and instead follow the NEM-MT metering requirements,

the customer may only switch between the estimation methodology and the NEM-MT metering requirements at the start of a new NEM relevant period.

22. Program administrators' EPBB calculator contracts will terminate when the CSI program sunsets at the end of 2016.

23. The IOUs have not transparently assessed metering costs for complex systems. SCE stated that they will provide greater clarity regarding how SCE defines "complex metering solutions" in their Tier 2 AL implementing this decision.

24. D.14-05-033 required the IOUs to file Tier 2 Advice Letters within 30 days of today's decision to update their NEM tariffs to incorporate the sizing and metering requirements for NEM paired storage systems.

25. It is not practical for the IOUs to effectuate tariff changes to implement billing systems pursuant to this decision's requirements for NEM paired storage systems within 30 days.

### **Conclusions of Law**

1. It is reasonable to find that NEM solar photovoltaic generating facilities paired with storage devices 10 kW or less may use the estimation methodology referred to as Method 2 in the November 4, 2014 ACR, which caps maximum allowable NEM bill credits based on a *monthly* output profile.

2. It is reasonable to find that the monthly output estimation should align with a customer's billing period (e.g., if the customer's billing date is January 15, the maximum allowed NEM export should be based on a January output estimation).

3. Non-solar generation technologies paired with storage devices 10 kW or less should meet the same metering requirements for larger storage systems as described in D.14-05-033.

4. Consistent with the requirements for large NEM paired storage devices adopted in D.14-05-033, imposing a \$600 limit will on fees associated with metering, and the exemption for systems requiring complex metering solutions, should also apply for storage devices smaller than 10 kW that are paired with non-solar NEM generation facilities or solar NEM generation facilities that opt in to NEM-MT.

5. PG&E, SCE, SDG&E must clearly break out metering costs associated with complex metering arrangements and include each cost as a line item on the customer's invoice.

6. The IOUs should track arbitrage from small paired systems using smart meter data and present any evidence of arbitrage using grid power to the Commission at a later date, if it does occur.

7. The IOUs should recover funding from their general rate cases to maintain and update the EPBB calculator, once funding from the CSI program is no longer available.

8. All IOUs should provide greater clarity regarding how they define "complex metering solutions" in their Tier 2 Advice Letters implementing this decision.

9. It is reasonable to modify Ordering Paragraph 11 of D.14-05-033 that required implementing advice letters to be filed within 30 days of this decision.

10. The IOUs should file Tier 2 advice letters within 180 days implementing the sizing and metering requirements from D.14-05-033 and from this decision as well demonstrating that the billing and information technology will be in place within 180 days to effectuate rule changes.

11. The IOUs should update their billing and information technology systems within 180 days to implement the estimation methodology adopted in this decision.

## O R D E R

### IT IS ORDERED that:

1. Net Energy Metering (NEM) solar generators paired with storage devices ~~smaller than 10 kilowatt~~ 10 kilowatts (kW) or less may use the estimation methodology referred to as Method 2 in the November 4, 2014 Assigned Commissioner's Ruling, with the changes adopted in this decision, which caps maximum allowable NEM bill credits based on a *monthly* output profile. The monthly output estimation should align with the first day of a customer's billing period (e.g., if the first day of a customer's billing period is January 15, the maximum allowed NEM exports should be based on a January output estimation).

2. Non-solar generation facilities paired with ~~10 kilowatts (kW) or less~~ storage ~~systems~~ devices sized 10 kilowatts (kW) or less will be required to meet the same metering requirements that were adopted in Decision 14-05-033 for ~~NEM~~ Net Energy Metering paired storage ~~facilities~~ systems sized greater than 10 kW ~~or more~~.

3. ~~Solar customer generators~~ Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company shall permit customers with Net Energy Metering-eligible solar generating facilities paired with storage devices 10 kilowatts or less ~~may elect~~ to "opt-out" and install metering equipment consistent with the metering requirements applicable to

Large Generating Facilities adopted in Decision 14-05-33 to measure actual solar photovoltaic output.

4. A \$600 limit shall apply on fees associated with metering the systems described in Ordering Paragraphs 2 and 3, with an exemption for systems requiring complex metering solutions.

5. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company shall file advice letters within 180 days of today's decision to update their Net Energy Metering tariffs to incorporate the sizing and metering requirements adopted in D.14-05-033 and in this Decision.

6. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company shall update their billing and information technology systems within 180 days to implement the estimation methodology adopted in this Decision.

7. ~~5.~~ Rulemaking 12-11-005 remains open.

This order is effective today.

Dated \_\_\_\_\_, at San Francisco, California.

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Padding cell	

Statistics:	
	Count
Insertions	221
Deletions	181
Moved from	1
Moved to	1
Style change	0
Format changed	0
Total changes	404