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December 13, 2021

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Ratesetting

TO PARTIES OF RECORD IN RULEMAKING 20-08-020:

This is the proposed decision of Administrative Law Judge Kelly A. Hymes. Until and unless the Commission hears the item and votes to approve it, the proposed decision has no legal effect. This item may be heard, at the earliest, at the Commission's January 27, 2022 Business Meeting. To confirm when the item will be heard, please see the Business Meeting agenda, which is posted on the Commission's website 10 days before each Business Meeting.

Parties of record may file comments on the proposed decision as provided in Rule 14.3 of the Commission's Rules of Practice and Procedure.

The Commission may hold a Ratesetting Deliberative Meeting to consider this item in closed session in advance of the Business Meeting at which the item will be heard. In such event, notice of the Ratesetting Deliberative Meeting will appear in the Daily Calendar, which is posted on the Commission's website. If a Ratesetting Deliberative Meeting is scheduled, *ex parte* communications are prohibited pursuant to Rule 8.2(c)(4).

/s/ ANNE E. SIMON

Anne E. Simon

Chief Administrative Law Judge

AES:jnf

Attachment

Decision PROPOSED DECISION OF ALJ HYMES (Mailed 12/13/2021)

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to
Revisit Net Energy Metering Tariffs
Pursuant to Decision 16-01-044, and to
Address Other Issues Related to Net
Energy Metering.

Rulemaking 20-08-020

**DECISION REVISING NET ENERGY METERING
TARIFF AND SUBTARIFFS**

TABLE OF CONTENTS

Title	Page
DECISION REVISING NET ENERGY METERING TARIFF AND SUBTARIFFS .	1
Summary	2
1. Legislative and Regulatory History of Net Energy Metering in California	3
2. Procedural Background	6
3. Guiding Principles	9
4. Lookback Study	10
5. E3 White Paper on Net Energy Metering Revisions	13
6. Proposals for Net Energy Metering Tariff Changes	16
6.1. AARP Recommendation	16
6.2. CALSSA Proposal	16
6.3. CCSA Proposal	18
6.4. Californians for Renewable Energy Proposal	19
6.5. CESA Proposal	19
6.6. CalWEA Proposal	20
6.7. Clean Coalition Proposal	20
6.8. Foundation Windpower Recommendations	20
6.9. GRID Alternatives/Vote Solar/Sierra Club Proposal	21
6.10. Ivy Energy Multifamily VNEM Proposal	22
6.11. Joint Utilities Proposal	23
6.12. NRDC Proposal	24
6.13. PCF Recommendations	25
6.14. Public Advocates Office Proposal	27
6.15. Sierra Club Proposal	28
6.16. SBUA Proposal	29
6.17. SEIA/Vote Solar Proposal	30
6.18. TURN Proposal	31
7. Issues Before the Commission	32
8. Revising the Net Energy Metering Tariff	33
8.1. Reliance on the Lookback Study	34
8.1.1. The Lookback Study's Analysis is Sound	34
8.1.2. The Lookback Study Demonstrates NEM 2.0 Negatively Impacts Non-Participant Ratepayers	38
8.1.3. The Lookback Study Shows NEM 2.0 is Not Cost-effective	42
8.1.4. The Lookback Study Shows NEM 2.0 Disproportionately Harms Low-Income Ratepayers	44
8.2. Analyzing Tariff Elements and Proposals	47

- 8.2.1. Tariff Participation Growth Should Not Require Nonparticipant Financial Burden 48
- 8.2.2. Cost-effectiveness Analyses Shall be Conducted Pursuant to D.19-05-019 Using 2021 Avoided Cost Calculator 51
- 8.2.3. The Number of Years to Payback Should Appropriately Balance Participant and Nonparticipant Needs 61
- 8.2.4. NREL Cost of Solar is Reasonable 68
- 8.3. Policies for the Successor Tariff 70
 - 8.3.1. The Successor Tariff Should Include a Glide Path 70
 - 8.3.2. The Successor Should Promote Equity and Inclusion 73
 - 8.3.3. The Successor Should Promote Electrification 78
 - 8.3.4. The Successor Should Transition the Solar Market to a Solar Paired with Storage Market 83
- 8.4. Elements to Include in the Successor Tariff..... 85
 - 8.4.1. Compensation Structure and Export Rate 86
 - 8.4.2. Nonresidential Successor Tariff 91
 - 8.4.3. Import Rate 94
 - 8.4.4. Grid Benefits Charges 97
 - 8.4.5. Nonbypassable Charges 101
 - 8.4.6. Market Transition Credit 102
 - 8.4.7. Minimum Bill 105
 - 8.4.8. Netting..... 105
 - 8.4.9. True-Up Period..... 107
- 8.5. The Successor Tariff..... 109
 - 8.5.1. Export Compensation Based on Avoided Cost Calculator Values... 110
 - 8.5.2. Market Transition Credit as a Path to Solar Paired with Storage 116
 - 8.5.3. Rate Structure 123
 - 8.5.4. Terms of Service and Billing Rules 128
 - 8.5.5. Modeling Results of the Successor Tariff 129
- 8.6. Related Subtariffs..... 132
 - 8.6.1. Low- and Medium- Income Customer Tariffs..... 132
 - 8.6.2. Virtual Net Energy Metering and Net Energy Metering Aggregation 139
 - 8.6.3. Community Project Tariffs 143
 - 8.6.4. Revisions to NEM 1.0 and NEM 2.0 Tariffs 144
- 8.7. Implementation of the Successor Tariff 152
- 9. Comments on Proposed Decision..... 155
- 10. Assignment of Proceeding 155
- Findings of Fact..... 155

Conclusions of Law 175
ORDER..... 180

Appendix A – Customer Explanation of Net Billing Tariff

Appendix B – Modeling Inputs and Results

DECISION REVISING NET ENERGY METERING TARIFF AND SUBTARIFFS

Summary

Pursuant to Public Utilities Code Section 2827.1, this decision adopts a successor net energy metering tariff that addresses the guiding principles adopted in Decision 21-02-011 as well as the requirements of the code. We revise the current net energy metering tariff and subtariffs to balance the multiple requirements of the code and the needs of the grid, the environment, participating ratepayers, as well as all other ratepayers.

Our review of the current net energy metering tariff, referred to as NEM 2.0, found that the tariff negatively impacts non-participating customers; is not cost-effective; and disproportionately harms low-income ratepayers. This decision determines that, to address the requirements of the guiding principles and the findings related to the NEM 2.0 tariff, the successor tariff should promote equity, inclusion, electrification, and paired storage and provide a glide path so that the industry can sustainably transition from the current tariff to the successor. This decision also makes revisions that impact current customers of the NEM 2.0 tariff and the previous tariff, known as NEM 1.0, based on the findings of the NEM 2.0 tariff review.

In the successor tariff, we revise the structure of the tariff to be an improved version of net billing, with an export compensation rate aligned with the value behind-the-meter energy generation systems provide to the grid based on avoided cost values and import rates that encourage electrification and solar paired with storage. The successor tariff ensures all customers pay for their usage of the grid. To ensure the growth of distributed generation, the successor tariff provides a glide path in the form of a Market Transition Credit, which

offers a transition period for the solar market and solar customers, while balancing the needs of all other ratepayers.

1. Legislative and Regulatory History of Net Energy Metering in California

Senate Bill (SB) 656 (Alquist, Stats. 1995, ch. 369) established net energy metering in California, an electricity tariff-based billing mechanism created to “encourage private investment in renewable energy resources, stimulate in-state economic growth, enhance the continued diversification of California’s energy resource mix, and reduce utility interconnection and administrative costs.” SB 656 added Section 2827 to the Public Utilities Code, which directed every electric utility in California to develop a standard contract or tariff to allow eligible customer-generators (customers who own and operate a solar electrical generating facility to offset part or all its own electrical requirements) to receive a financial credit on their electric bills for any surplus energy fed back to the utility’s grid.

In the first net energy metering tariff, referred to as NEM 1.0, customer-generators received a full retail rate bill credit for power generated by their onsite systems that was fed back into the grid when generation exceeded onsite energy demand. The credits offset a customer’s monthly electricity bills and could be used on subsequent bills for up to one year.

Assembly Bill (AB) 327 (Perea, Stats. 2013, ch. 611) added Section 2827.1 to the Public Utilities Code and mandated that the Commission adopt a successor to the existing net energy metering tariff with the following objectives:

- (1) Ensure that the standard contract or tariff made available to eligible customer-generators ensures that customer-sited renewable distributed generation continues to grow sustainably and include specific alternatives designed for

growth among residential customers in disadvantaged communities.

- (2) Establish terms of service and billing rules for eligible customer-generators.
- (3) Ensure that the standard contract or tariff made available to eligible customer-generators is based on the costs and benefits of the renewable electrical generation facility.
- (4) Ensure that the total benefits of the standard contract or tariff to all customers and the electrical system are approximately equal to the total costs.
- (5) Allow projects greater than one megawatt that do not have significant impact on the distribution grid to be built to the size of the onsite load if the projects with a capacity of more than one megawatt are subject to reasonable interconnection charges established pursuant to the commission's Electric Rule 21 and applicable state and federal requirements.
- (6) Establish a transition period during which eligible customer-generators taking service under a net energy metering tariff or contract prior to July 1, 2017, or until the electrical corporation reaches its net energy metering program limit pursuant to subparagraph (B) of paragraph (4) of subdivision (c) of Section 2827, whichever is earlier, shall be eligible to continue service under the previously applicable net energy metering tariff for a length of time to be determined by the commission by March 31, 2014. Any rules adopted by the commission shall consider a reasonable expected payback period based on the year the customer initially took service under the tariff or contract authorized by Section 2827.
- (7) The commission shall determine which rates and tariffs are applicable to customer generators only during a rulemaking proceeding. Any fixed charges for residential customer generators that differ from the fixed charges allowed pursuant to subdivision (f) of Section 739.9 shall be authorized only in a rulemaking proceeding involving

every large electrical corporation. The commission shall ensure customer generators are provided electric service at rates that are just and reasonable.

Subsequently, the Commission approved Decision (D.) 16-01-044, which adopted a revised net energy metering tariff, now referred to as NEM 2.0. In NEM 2.0, customers continue to receive full retail rate credit for excess energy exported to the grid during a 12-month billing cycle, as well as receive net surplus compensation.¹ However, NEM 2.0 customers are currently required to pay some charges that align their costs more closely with non-NEM customer costs. For example, customer-generators applying for and participating in NEM 2.0 must pay a one-time interconnection fee and monthly nonbypassable charges.² Further, NEM 2.0 customers must take service under a time-of-use rate. D.16-01-044 established a date of 2019 as the time for a review of NEM 2.0.³ Additionally, the decision required Energy Division staff to continue to monitor implementation of NEM 2.0 and explore other compensation structures for customer-sited generation with a view to considering an export compensation

¹ Net surplus compensation payment was authorized by AB 920 (Huffman), Stats. 2009, ch. 376, and implemented by the Commission in D.11-06-016. A customer producing power in excess of their on-site load over the 12-month period may be eligible for net surplus compensation under certain conditions.

² D.16-01-044 lists the relevant nonbypassable charges as Public Purpose Program Charge; Nuclear Decommissioning Charge; Competition Transition Charge; and Department of Water Resources bond charges. These charges are typically specified as nonbypassable for departing load. The decision notes that independent of the net energy metering successor tariff or any other rate schedule, the customers of community choice aggregators and direct access customers also pay the Powe Indifference Adjustment. D.16-01-044 at 89 and Footnote 100.

³ D.16-01-044 at 86, Conclusion of Law 25 and Ordering Paragraph 11. (*See also* Conclusion of Law 29 and Ordering Paragraph 12.)

rate that considers locational and time-differentiated values of customer-sited generation.⁴

2. Procedural Background

On August 27, 2020, the Commission adopted the *Order Instituting Rulemaking to Revisit Net Energy Metering Tariffs Pursuant to Decision 16-01-044, and to Address Other Issues Related to Net Metering*, with the focus of the proceeding to be the development of a successor tariff pursuant to the requirements of AB 327. The assigned Administrative Law Judge presided over a telephonic prehearing conference on November 2, 2020, to discuss the proceeding scope and schedule and other procedural matters. On November 19, 2020, the assigned Commissioner issued her *Joint Assigned Commissioner's Scoping Memo and Administrative Law Judge Ruling Directing Comments on Proposed Guiding Principles* (Scoping Memo), which established the scope of issues to be addressed in the proceeding. The final scope of issues is presented in Section 7 below.

The record of this proceeding includes the *NEM 2.0 Lookback Study* (Lookback Study) conducted by Verdant Associates (Verdant), Energy and Environmental Economics (E3), and Itron, Inc. On January 21, 2021, a ruling presented the Lookback Study to parties and instructed parties to respond to Issue 2 of the Scoping Memo, related to the study. The following parties filed comments on February 4, 2021: American Association of Retired Persons (AARP); California Solar and Storage Association (CALSSA); Ivy Energy; Natural Resources Defense Council (NRDC); Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California

⁴ D.16-01-044 at 103.

Edison Company (SCE) (Joint Utilities); Protect Our Communities Foundation (PCF); Public Advocates Office of the Public Utilities Commission (Public Advocates Office); Small Business Utility Advocates (SBUA); The Utility Reform Network (TURN); and Vote Solar with the Solar Energy Industries Association (SEIA/Vote Solar). The following parties filed reply comments on February 16, 2021: CALSSA; Joint Utilities; PCF; Public Advocates Office; and SBUA. A brief overview of the Lookback Study is presented in Section 4 below.

Also in the record of this proceeding is a white paper entitled, *Alternative Ratemaking Mechanisms for Distributed Energy Resources in California* (White Paper), written by E3 and Verdant. On January 28, 2021, a ruling introduced the White Paper to parties, noting it would be the subject of a workshop. During the workshop, held on February 8, 2021, E3 hosted a discussion of the White Paper. As noted in the January 28, 2021 ruling and further described below in Section 5, the White Paper is meant to provide a framework for parties to develop their own proposals for a successor to the current net energy metering tariffs.

On February 11, 2021, the Commission adopted Guiding Principles for the development of a successor to the current net energy metering tariff, which we provide in Section 3 below. As noted in D.21-02-007, “[t]hese principles reflect the statutory requirements of Public Utilities Code Section 2827.1,” which is described in Section 3 below.⁵ Additionally, the principles speak to specific objectives of the Commission and the California Legislature, while providing the Commission with flexibility in its determination of a successor.

As directed by the Scoping Memo and further instructed in the January 28, 2021 ruling, parties filed proposals for a successor to the net energy

⁵ D.21-02-007.

metering tariff on March 15, 2021. The parties discussed each of the 19 filed proposals presented at the March 23-24, 2021 virtual workshop. A high-level description of each proposal is presented in Section 6 below.

Opening testimony was served on June 18, 2021, and rebuttal testimony was served on July 16, 2021. A mandatory status conference was held on July 13, 2021, to ensure all parties were able to connect to and participate in a virtual hearing through the Webex platform and a telephonic conference line. The assigned Administrative Law Judge presided over twelve days of virtual evidentiary hearing between July 26, 2021 and August 10, 2021.

The following parties filed opening briefs on August 31, 2021, addressing Issues 2 through 5: Agricultural Energy Consumers Association and California Farm Bureau (Agricultural Parties); Albion Power Company (Albion); California Building Industries Association (CBIA); California Energy Storage Association (CESA); CALSSA; California Wind Energy Association (CalWEA); Californians for Renewable Energy; Coalition for Community Solar Access (CCSA); Coalition of California Utility Employees (CUE); Foundation Windpower (Foundation); GRID Alternatives with Vote Solar and Sierra Club (GRID *et al.*); Independent Energy Producers Association (IEPA); Ivy Energy; Joint Utilities; NRDC; PCF; Public Advocates Office; SEIA/Vote Solar; Sierra Club; SBUA; TURN; and Walmart, Inc. (Walmart). The following parties filed reply briefs on September 14, 2021: Agricultural Parties; CBIA; California Low-Income Coalition; CALSSA; CalWEA; Clean Coalition; CCSA; CUE; Foundation; GRID *et al.*; IEPA; Ivy Energy, Joint Utilities; NRDC; PCF; Public Advocates Office; SEIA/Vote Solar; Sierra Club; San Diego Community Power with San Jose Clean Energy; SBUA; TURN; and Walmart. The record stands submitted as of September 14, 2021.

3. Guiding Principles

In D.21-02-007, the Commission adopted the following eight guiding principles to assist in the development and evaluation of a successor to the current net energy metering tariff:

- (a) A successor to the net energy metering tariff should comply with the statutory requirements of Public Utilities Code Section 2827.1;
- (b) A successor to the net energy metering tariff should ensure equity among customers;
- (c) A successor to the net energy metering tariff should enhance consumer protection measures for customer-generators providing net energy metering services;
- (d) A successor to the net energy metering tariff should fairly consider all technologies that meet the definition of renewable electrical generation facility in Public Utilities Code Section 2827.1;
- (e) A successor to the net energy metering tariff should be coordinated with the Commission and California's energy policies, including, but not limited to, Senate Bill 100 (2018, DeLeon), the Integrated Resource Planning process, Title 24 Building Energy Efficiency Standards, and California Executive Order B-55-18;
- (f) A successor to the net energy metering tariff should be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities;
- (g) A successor to the net energy metering tariff should maximize the value of customer-sited renewable generation to all customers and to the electrical system; and
- (h) A successor to the net energy metering tariff should consider competitive neutrality amongst Load Serving Entities.

4. Lookback Study⁶

The Commission engaged Verdant, E3, and Itron, Inc. to conduct an evaluation of the NEM 2.0 tariff. The Lookback Study entailed: 1) a cost-effectiveness analysis consistent with the Commission's Standard Practice Manual and D.19-05-019, *Decision Adopting Cost-Effectiveness Analysis Framework Policies for all Distributed Energy Resources*, and 2) a cost-of-service analysis that compares the cost to serve NEM 2.0 customers against their total bill payments. As noted in the study, the objectives of the Lookback Study were to examine the impacts of the NEM 2.0 tariff and compare how metrics changed in the transition from NEM 1.0 to NEM 2.0.

The cost-effectiveness analysis performed in the Lookback Study considers the cost-effectiveness of NEM 2.0 systems using the Participant Cost Test (PCT),⁷ the Program Administrator Cost (PAC) test,⁸ the Total Resources Cost (TRC) test⁹ and the Ratepayer Impact Measure (RIM) test.¹⁰ As noted in the Lookback Study, D.19-05-019 designated the TRC test as the primary cost-effectiveness

⁶ The Lookback Study is in the administrative record of this proceeding through the January 21, 2021 Ruling and is also in the evidentiary record of this proceeding as exhibit PCF-15. In briefs, parties cite to either the Lookback Study or PCF-15. It is the same copy and therefore has the same page numbers.

⁷ The PCT is the measure of the quantifiable benefits and costs to the customer due to participation in a program. (Standard Practice Manual at 8.)

⁸ The PAC test measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. (Standard Practice Manual at 23.)

⁹ The TRC measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. (Standard Practice Manual at 18.)

¹⁰ The RIM test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by a program. The Rim test has been described as the Non-Participant Test. (Standard Practice Manual at 13).

test.¹¹ The Lookback Study also explains that because the Societal Cost Test is still in the testing phase, it was not used in this analysis.¹² Avoided costs used in the four tests are based on the 2020 Avoided Cost Calculator approved by the Commission on June 25, 2020.¹³

Table 1 presents a summary of cost-effectiveness results for each of the three investor-owned utilities.

Table 1				
Lookback Study Cost-Effectiveness Results by Electric Utility¹⁴				
Utility	Weighted Average Benefit-Cost Ratio			
	PCT	TRC	RIM	PAC
PG&E	1.81	0.80	0.33	41.08
SCE	1.54	0.91	0.49	10.99
SDG&E	2.03	0.84	0.31	129.58
Total	1.77	0.84	0.37	22.98
NPV Total Benefits (\$M)	21,329	7,960	7,576	7,576
NPV Total Costs (\$M)	12,041	9,462	20,583	330

The full cost of service analysis performed in the Lookback Study compares an estimate of the utility cost of servicing NEM 2.0 customers with the customer's utility bills.¹⁵ The Lookback Study describes the utility cost of servicing a NEM 2.0 customer as based on the customer's use of the grid and an allocation of the fixed costs of service. For the purposes of the Lookback Study,

¹¹ Lookback Study at 43.

¹² Lookback Study at 44.

¹³ Lookback Study at 56.

¹⁴ Lookback Study at Table 5-1.

¹⁵ Lookback Study at 45.

the consultant used general rate case Phase 2 data, transmission and regulatory costs derived from utility rates, and incremental costs from utility advice letters.¹⁶

Table 2							
Ratio of Bill Payment to Cost of Service, NEM 1.0 vs. NEM 2.0¹⁷							
	Sector	Ratio of Bill Payment / Cost of Service					
		PG&E		SCE		SDG&E	
		Pre-NEM	Post-NEM	Pre-NEM	Post-NEM	Pre-NEM	Post-NEM
NEM 1.0	Residential	171%	88%	152%	86%	101%	54%
	Nonresidential	128%	106%	110%	105%	124%	122%
	Total	146%	99%	122%	100%	119%	111%
NEM 2.0	Residential	139%	18%	91%	9%	94%	9%
	Nonresidential	189%	152%	118%	108%	178%	166%
	Total	157%	60%	99%	34%	113%	46%

The Lookback Study presented several key takeaways.

First, with respect to cost-effectiveness, the study found the benefits to NEM 2.0 customers in the form of bill savings and the federal investment tax credit (ITC) outweigh the costs. The Lookback Study concluded that NEM 2.0 systems are not cost-effective from the combined participant/utility perspective, which is shown by the TRC benefit-cost ratio result of less than 1.0. Further, the study also found customer-sited renewables under the NEM 2.0 tariff have a

¹⁶ Lookback Study at 45.

¹⁷ Lookback Study at Table 1-7.

RIM benefit-cost ratio less than 1.0, “indicating that the NEM 2.0 program may result in an increase in rates for ratepayers.”¹⁸

In terms of the cost-of-service analysis, the Lookback Study indicates that for both residential and nonresidential customers average bill payments prior to installing a NEM 2.0 system are higher than the cost of service. The study found that, after installing the NEM 2.0 system, residential customers on average pay lower bills than the utility’s cost to serve them. Finally, in the case of nonresidential customers installing NEM 2.0 systems, the study found these customers pay bills that are slightly higher than their cost of service due to demand charges and the lower ratio of system size to customer load in comparison to residential customers.¹⁹

5. E3 White Paper on Net Energy Metering Revisions

The Commission engaged E3 to support and facilitate the development of a successor to the net energy metering tariff. E3 developed the White Paper to provide a perspective on a framework that aligns compensation for customer-sited renewable generation with the net benefits the generation provides to the electric system and allows for sustainable growth of behind-the-meter renewable generation as required by AB 327.

According to the White Paper, the key to preserving a viable market is providing a glide path that includes a gradual export compensation rate reform and an external transitional support mechanism – a Market Transition Credit – that enables a reasonable payback period for new customers investing in onsite

¹⁸ Lookback Study at 13.

¹⁹ Lookback Study at 13.

renewable generation.²⁰ The White Paper recommends the Market Transition Credit be fixed over a defined payback period for each cohort of new customers (vintage), which would be based on time, number of subscribed customers or the volume of adoption. The Market Transition Credit would be gradually phased out over successive vintages as technology costs decline and/or developers adjust to rate changes, enabling customers to afford onsite renewable generation while receiving export compensation rates that are increasingly aligned with the underlying value of the onsite renewable generation.

The White Paper proposes that a central element of the framework would be a new successor export compensation rate for customers that will increase efficiency in adoption of behind-the-meter generation while producing more equitable outcomes for all ratepayers. The successor export compensation rate would replace retail rate-based credits for energy injections into the grid with export compensation rates that reflect avoided costs and are time and seasonally differentiated.

An underlying recommendation of the White Paper is that during the transitional period, customers would contribute more towards fixed costs of service than under NEM 2.0. However, the White Paper proposes that the successor import rate would not be cost-based initially to limit the size of the Market Transition Credit needed to provide a reasonable payback period.

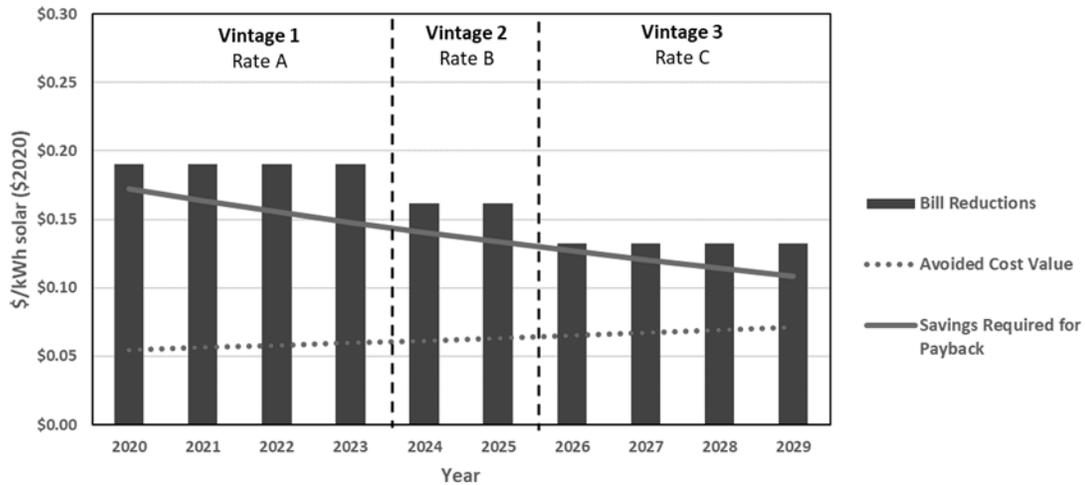
One additional element of the White Paper is time. The White Paper explains that time “can be used to guide the speed at which the transition would occur” and would allow for export compensation rate modification, adjustments

²⁰ White Paper at 3-6.

to the Market Transition Credit, and gauging impacts on bill savings and payback periods.²¹

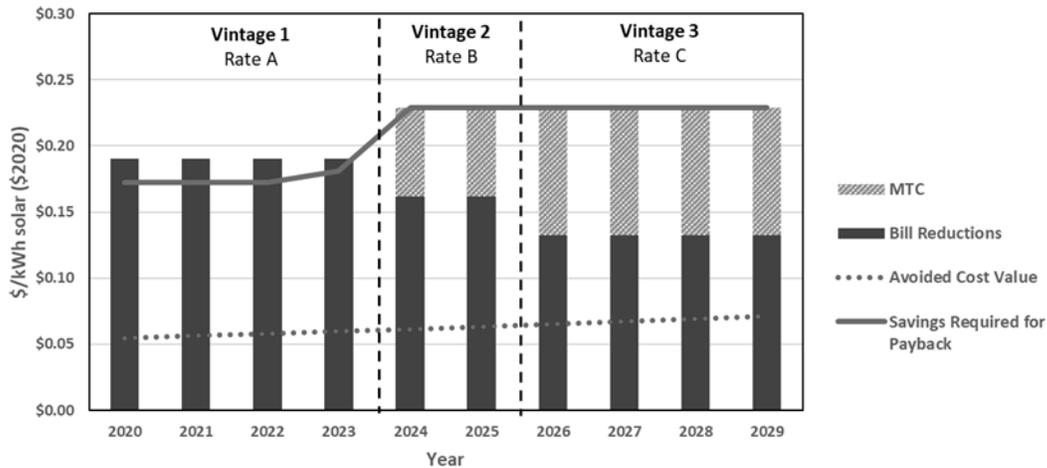
Figures 1 and 2 below illustrate how these elements would work together through time and each vintage of customers. Figure 1 presents an optimistic scenario where technology costs decline sufficiently such that a Market Transition Credit is not necessary. Figure 2 provides a more conservative scenario where technology costs remain flat. The White Paper presumes the combination of increasingly cost-reflective export compensation rates, and the flexibility of the Market Transition Credit, will allow for a gradual transition to a net energy metering tariff framework that more accurately reflects underlying value while supporting electrification, paired storage, and the reduction of greenhouse gas emissions.

Figure 1. Bill Reductions and MTC, Optimistic Scenario²²



²¹ White Paper at 4 and Table 1.

²² White Paper at Figure 1.

Figure 2. Bill Reductions and MTC, Flat Technology Cost Scenario²³

6. Proposals for Net Energy Metering Tariff Changes

Parties individually or jointly filed proposals for a successor to the current net energy metering tariff. Below, we present an overview of each response filed on March 15, 2021.²⁴ The overview includes a brief description of the major elements of each filed proposal. In a few instances, parties only presented narrowly defined proposals or recommendations, which we also summarize.

6.1. AARP Recommendation

AARP did not file a proposal but recommends the Commission use the White Paper as a foundation because it is a straightforward framework that calls out the alleged cost shift and identifies a Market Transition Credit that would diminish over time as conditions change.

6.2. CALSSA Proposal

CALSSA recommends the Commission maintain the current net energy metering tariff for nonresidential customers but revise the tariff for residential

²³ White Paper at Figure 2.

²⁴ We note the party, CARE, filed its proposal on March 14, 2021.

customers. CALSSA's residential proposal focuses on export compensation and includes a glide path based on deployment targets.

CALSSA proposes export compensation would decrease over the course of five steps based on a percentage of each utility's retail rate, which CALSSA contends results in rates more reflective of avoided costs. Step five would result in a 50 percent decrease for PG&E's participating customers' rates, 75 percent for SCE customers' rates, and 45 percent for SDG&E customers' rates. CALSSA recommends the decrease in rates be less for customers installing paired storage, which would decrease in step five to 80 percent for PG&E customers, no decline for SCE customers, and 65 percent for SDG&E customers. CALSSA proposes the step-down thresholds be based on cumulative residential megawatts per utility.

Other aspects of the CALSSA proposal include a 20-year lock on the export rate framework. Further, CALSSA proposes customers would be required to pay what they owe monthly and eliminate the annual true-up. CALSSA also proposes the Commission require utilities to create a portal to enable contractors to reasonably access customer interval data, which CALSSA contends would increase accuracy of savings estimates and reduce project development costs.

CALSSA also proposes maintaining aspects of the NEM 2.0 residential tariff specifically designed for renters and low-income households. For households with income below 80 percent of Area Median Income (AMI), CALSSA proposes these customers receive net energy metering credits at full retail rates minus nonbypassable charges. For customers eligible for California Alternate Rates for Energy (CARE) and the Family Electric Rates Assistance (FERA) programs, net energy metering credits would be compensated at the same level as the non-CARE rates of their otherwise applicable rate schedule. Households living in multi-family rental properties located in census tracts with

income less than 120 percent of the AMI would be eligible for virtual net energy metering (VNEM) at full retail rates, minus nonbypassable charges.

6.3. CCSA Proposal

CCSA's proposal is focused solely on community distributed energy resources and is modeled on the concept described in the White Paper. CCSA proposes that renewable energy projects up to five megawatts interconnected to the distribution system receive monetary credits that would then be applied to the utility bills of customers in the same utility service area who subscribe to the project (Subscribers or Benefiting Accounts). CCSA explains that the credits would be based on the value provided to the grid and when that value is provided. Energy would be valued based on California Independent System Operator (CAISO) Day Ahead Zonal Prices, with an applied Avoided Cost Calculator loss factor. Generation and Transmission & Distribution Capacity will have a fixed value based on the Avoided Cost Calculator values. Other value provided would include Environmental Value in the form of greenhouse gas rebalancing and a greenhouse gas adder. CCSA proposes that rates for Benefiting Accounts would be set based on the effective tariff rate at the execution of the interconnection agreement and fixed for 25 years.

Subscribers could be in any customer class and could be a bundled or unbundled customer but must be in the same utility service area as the project. Subscribers would not be required to commit to a set amount of time. The credits would be rolled over indefinitely until utilized, but if a customer leaves the utility service, credits on the account are forfeited. Exiting fees for CARE/FERA eligible customers and customers on other low-income programs would be prohibited. CCSA also proposes that if there is unsubscribed generation capacity, the Generator Account may bank the credits and allocate

them to Benefitting Accounts within two years. Enrollment would be a capacity-based subscription and would require at least 50 percent capacity serving residential and small commercial customers.

6.4. Californians for Renewable Energy Proposal

Californians for Renewable Energy proposes the Commission compensate customer-generators by creating a small renewable qualifying facility net energy metering customer-generator tariff or power purchase agreement for facilities up to three megawatts. This proposal contends customer-generators should be compensated at a rate equal to the utility's avoided cost as defined by the Public Utility Regulatory Policies Act, which is the incremental cost to an electric utility of electric energy or capacity or both which such utility would otherwise generate itself or purchase from another source. This party did not propose a rate structure, application of secondary customer benefits, terms of service, or billing rules in its proposal filing.

6.5. CESA Proposal

CESA filed two narrow proposals focused on energy storage enhancements to be overlaid on any successor tariff.

Proposal 1 would enable virtual pairing of separate solar and offsite energy storage resources that are contractually linked to synchronize charging and generation profiles. For net energy metering generation exported during a specific time interval, a virtually-paired storage resource would charge during that same time interval to absorb the generation and be credited at the export compensation rate at the time it exports. Where the investment to install solar and storage onsite is less advantageous, virtual pairing would support development of community storage to create economies of scale and enable

customers to claim shares in community storage to absorb the generation and deliver it to times of greatest grid value.

Proposal 2 would remove the size limit for energy storage systems paired with net energy metering generators, by extending the three-year temporary suspension adopted in the Microgrids proceeding and extending the policy to all sizes of energy storage systems.

6.6. CalWEA Proposal

CalWEA did not file a proposal for a successor but instead recommends six policies by which the Commission should judge the successor proposals:

- 1) end the alleged cost-shift from participating to non-participating customers;
- 2) reconcile potentially conflicting statutory goals and define “sustainable growth;”
- 3) make any remaining cost-shifting transparent and routinely reviewed;
- 4) establish an income-based subsidy for participating customers;
- 5) do not equate equity with installing customer generation at low-income households;
- and 6) require NEM 1.0 and NEM 2.0 customers support any subsidies.

6.7. Clean Coalition Proposal

Clean Coalition proposes the Commission adopt a Feed-in Tariff, similar to the pilot program adopted by the Los Angeles Department of Water and Power, as the successor to the current net energy metering tariff. Clean Coalition proposes a flat rate combined with a Time of Delivery and seasonal multipliers to compensate behind-the-meter solar and energy storage on either side of the customer meter. Clean Coalition recommends an incentive to deploy storage but opposes any transmission access charges or demand charges.

6.8. Foundation Windpower Recommendations

Foundation does not provide a proposal for a successor to the current tariff but rather provides three recommendations solely for medium/large commercial,

industrial, and agricultural customers. First, Foundation recommends that for this customer class (with demand greater than 500 kilowatts, with fixed and demand charges, and who install behind-the-meter wind energy facilities at 1 megawatt or greater), the Commission should provide an option to remain on the current tariff or opt in to any new successor tariff. Second, Foundation contends the Commission should find that customers with wind energy facilities sized at 1 megawatt or greater and where net excess generation compensation does not exceed its value to the grid do not have significant impact on the distribution grid. Third, Foundation also contends that the Commission should permit currently installed wind energy generation facilities that have been de-rated from the manufacturer's original nameplate capacity down to 1.0 megawatt to operate at their intended nameplate capacity provided that doing so would cause no significant impacts on the distribution grid.

6.9. GRID Alternatives/Vote Solar/Sierra Club Proposal

The GRID *et al.* proposal is the adoption of two policies: 1) reducing low-income energy burden by equalizing the net energy metering export value, and 2) extending the benefits of the current net energy metering tariff for 20 years for projects owned and controlled by a California cooperative corporation or nonprofit organization. The proposal does not opine on other aspects of the successor to the net energy metering tariff.

The energy burden reduction policy would apply to customers with incomes less than or equal to 80 percent of the AMI and would be applicable on all future net energy metering tariffs, including VNEM.

GRID *et al.* proposes eligible customers would remain on their retail rate for imports but would be assigned a time-varying rate for exports equal to the

2021 default residential time-of-use rate. This rate would remain in place for 20 years from interconnection and remain fixed to 2021 values, thus reducing the nonparticipant cost shift impact over time, compared to NEM 2.0. Eligible customers would be billed on a net billing basis. GRID *et al.* proposes the net costs of this policy would be assigned to all ratepayers.

The community projects policy would apply to projects owned and controlled by a California cooperative corporation or nonprofit organization, or a public entity, representing an Environmental and Social Justice (ESJ) community. The policy would not limit the geographic locations of the projects. GRID *et al.* proposes maintaining the structure of the current net energy metering tariff for 20 years from interconnection of the new projects. GRID *et al.* notes this policy is not meant to nor does it address the nonparticipant cost shift impacts. Rather, this policy is meant to increase the deployment of clean energy among middle and lower-income customers.

6.10. Ivy Energy Multifamily VNEM Proposal

Ivy Energy's proposal focuses on a VNEM tariff for multifamily dwellings and proposes to maintain the existing VNEM tariff structure and export compensation until reservation capacity reaches 10,000 megawatts, at which time the Commission would then transition VNEM to the successor tariff. Ivy Energy proposes several changes to the current VNEM tariff. First, Ivy Energy recommends the Commission adopt the requirement of a firm timeline of 30 days for utilities to update benefiting account lists when requested and an update notification process. Ivy Energy also recommends allowing CARE customers to retain their discount when a shared distributed energy resource is installed, thus allowing CARE benefits to be provided on an aggregated basis, similar to master metered arrangements. Ivy Energy also suggests the

Commission offer additional incentives to existing multifamily properties to encourage the installation of new VNEM systems.

6.11. Joint Utilities Proposal

Joint Utilities propose a Distributed Generation Successor Tariff for both residential and nonresidential customers, which is focused on a net billing arrangement that sets export compensation based on avoided costs while also recovering transmission, distribution, and public purpose costs.

Joint Utilities recommend establishing export compensation rates by using the 8,760 hourly avoided cost values produced by the Avoided Cost Calculator, weighting the avoided costs by metered customers' exports, and capping rates at no more than the corresponding retail commodity volumetric rate in each time period. The resulting rates would be updated annually following the adoption of the annual Avoided Cost Calculator.

Joint Utilities propose a two-part rate for imports from the grid, which would require net energy metering customers to be placed on cost-based time-of-use differentials and a monthly grid benefits charge based on installed capacity.

With respect to billing arrangements, Joint Utilities propose for each billing cycle, a customer's exported energy would be priced at the applicable export compensation rate explained above and depending on the time-of-use period, up to the amount that is delivered to the customer during the billing period. Any remaining exported energy would be paid at the monthly net surplus compensation rate. Joint Utilities propose a monthly true-up in which no energy credits would be banked or carried forward from prior billing cycles. Joint Utilities explain that customers would only be allowed to offset within each time-of-use period and not offset kilowatt-hours exported during low-cost hours against grid consumption during high-cost on-peak hours.

To address equity issues, Joint Utilities propose a transitional Income-Qualified Rider to be applied in conjunction with programs for which a customer might qualify, including CARE, FERA, and Medical Baseline, and would operate alongside any low-income solar incentive program. Here, Joint Utilities propose a reduced grid benefits charge of \$1.50 per kilowatt²⁵ while export compensation for income-qualified customers would be the same as other net energy metering customers.

Joint Utilities also propose two virtual crediting tariffs: one for income-qualified customers and one for other customers. All exports to the grid from the generating account would be valued at the export compensation rates. There would be no netting of customer load using an allocation of kilowatt-hours because the energy generated by the generating facility is not consumed on site for any of the exported electricity. All interconnection and increased billing costs would be paid by the owner. There would be no true-up. Customer consumption would continue to be billed according to their current tariff based on meter data and receive a monthly credit from the generation exported from the VNEM facility.

6.12. NRDC Proposal

NRDC's proposal applies to residential customers only. NRDC proposes that solar customers be paid for the total value that their panels provide at near-term hourly avoided costs, with a lock-in period of 10 years. This export value would vary hourly, which would encourage customers to export electricity when it is most valuable to the grid and provide incentives to install battery storage. Further, NRDC proposes to add a fixed grid benefits charge to address the

²⁵ This would equate to \$9.00 a month for a six kilowatt system.

benefits that solar customers get from being connected to the grid. NRDC recommends basing nonbypassable charges on total (grid and estimated solar) consumption.

Other details of NRDC's proposal include an up-front cash adoption incentive, or market transition credit, to ensure a ten-year payback period. NRDC proposes the incentive could be funded from sources other than energy bills, such as through cap-and-trade revenue. NRDC suggests the incentive could be flexible, *i.e.*, higher in communities where rooftop solar is most needed.

To address equity issues, NRDC recommends the establishment of a clean energy equity fund to get clean energy benefits directly to Californians with lower incomes. Here, NRDC proposes to levy a modest charge to solar owners on existing net energy metering tariffs who have already recouped their initial investment.

6.13. PCF Recommendations

PCF puts forth five recommendations, which are not full successor tariff proposals.

Proposal A is focused on growing community storage and would require net energy metering customers to submit a fee of 20 percent of their NEM system cost when they provide their interconnection fee. PCF proposes this fee would be provided to a Community Storage Program Manager, which is the local community choice aggregator or government who owns all storage purchased. The fees would build storage no more than five miles from the census track where the net energy metering system is located, and no smaller than three megawatts in size. PCF recommends the Commission require each utility to make space for Community Storage of up to 20 megawatts at each substation

within the distribution grid and substations connecting the transmission grid to the distribution grid.

Proposal B is focused on oversizing new net energy metering systems to encourage electrification. PCF recommends setting an annual generation requirement for new net energy metering systems and providing customers double the current wholesale rate compensation for exports during the first five years, afterwards the compensation would be reduced to the wholesale rate compensation received by NEM 2.0 tariff customers.

Proposal C is focused on the issue of equity. PCF proposes to extend the current NEM 2.0 structure for low-income customers and renters, until 10,000 megawatts of installed solar capacity is installed. PCF explains this should be a transitional aspect of moving from the current tariff to a successor tariff.

Proposal D is also focused on the transition between the current and successor tariffs. There are two parts to Proposal D. First, PCF recommends designing a program that works for disadvantaged communities within the successor tariff, which would provide an uncapped net energy metering participation opportunity for low-income and disadvantaged communities, as well as renters. Second, PCF proposes to create a community solar program based on the NEM 2.0 tariff structure to serve CARE and residential customers, with solar arrays owned and operated by a community choice aggregator or other program administrator, sized 50 kilowatts to five megawatts, located on rooftops and parking lots within a five-mile radius. PCF proposes utilities compensate program administrators the full time-of-use retail rate based on the current net energy metering tariff for the electricity produced by the array. The program administrator would then pay the site owner five percent, keep ten

percent for administrative purposes, and pay the remainder to the financier. Once low-income and renter's annual loads have been offset by these community solar arrays, the program administrator must use the funds to provide additional discounts to renter and low-income customer bills.

Proposal E would revise the time-of-use rates to align with energy policy and wholesale electricity prices. PCF proposes the rates align with wholesale rates for electricity unit pricing, minimize retail prices during highest renewable energy production hours, be consistent year-round, maintain a structure with three different prices for three different times of day, be consistent across all three utilities, and be mandatory for net energy metering customers.

6.14. Public Advocates Office Proposal

Public Advocates Office proposes compensating net energy metering participants through the use of net billing at the avoided cost for exported energy and a grid benefits charge to ensure all participants pay their fair share for grid services. Public Advocates Office proposes the export compensation rate would vary by time-of-use period to reflect the time-varying nature of marginal costs and the avoided cost of providing or using a kilowatt of electricity. Public Advocates Office also recommends the export compensation rate for each time-of-use period be set equal to the weighted average avoided costs.

For import rates, Public Advocates Office recommends a time-of-use rate plus a grid benefits charge to recover costs to provide distribution and transmission services and ensure recovery of nonbypassable charges that produce broad societal benefits. Public Advocates Office proposes the grid benefits charge be assessed on a dollar per kilowatt charge per month but CARE and FERA enrolled customers would be exempt from this charge. Further, Public Advocates Office recommends the nonbypassable charges should be

recovered on the basis of volumetric usage served by on-site generation, as statutorily required.

Public Advocates Office proposes instantaneous netting with retail rates for consumption billed based on metered consumption net of on-site generation in real time. Further, Public Advocates Office recommends customers not be allowed to credit net exports against net consumption occurring during a different time. However, Public Advocates Office does recommend the Commission allow excess bill credits to roll over until an annual true-up. The excess bill credits would then be compensated at wholesale energy market prices, which is consistent with the current net energy metering tariff.

Public Advocates Office recommends incentives to encourage customers on existing net energy metering tariffs to transition to the successor tariff and to install storage. Further, Public Advocates Office also proposes the Commission require existing net energy metering customers to take service on the successor tariff after a proposed five-year period for incentives ends.

6.15. Sierra Club Proposal

Sierra Club focuses solely on the residential class of net energy metering customers in its proposal but looks at both current and future net energy metering customers. Similar to the White Paper, Sierra Club proposes to use a net billing approach in addition to a Market Transformation Credit for future net energy metering customers. Current net energy metering customers would be transitioned to existing time-of-use rates for import rates.

Instead of creating a new rate with complex features or fixed charges, Sierra Club proposes successor tariff customers subscribe to highly differentiated time-of-use rates, which would be fixed for 20 years and would not increase with retail rates. Rather, for each gigawatt of total solar deployment, compensation

for each successor “tranche” of net energy metering customers would decrease by ten percent toward avoided costs as determined by that year’s Avoided Cost Calculator. Sierra Club estimates that once the three utilities reach ten gigawatts of total rooftop solar deployment, compensation would reach avoided cost. Sierra Club also proposes to allow systems to be sized to accommodate future installation of all-electric appliances and two electric vehicles.

Sierra Club recommends requiring existing net energy metering customers, except for low-income customers, to take service under existing time-of-use rates with a two to one differential between summer peak evening and summer weekday off-peak periods, beginning eight years from initial interconnection of the solar system.

6.16. SBUA Proposal

SBUA proposes to shift the net energy metering tariff to focus on storage and removes the restriction on grid charging of net energy metering paired storage systems, subject to size restrictions and a daily time-of-use netting period.

SBUA proposes to calculate the export compensation rate using the Avoided Cost Calculator, including all cost elements, to ensure exports are compensated commensurate with the time of delivery to the grid. SBUA supports the use of utility-specific marginal costs. SBUA proposes to double the potential on-to-off peak value differential during the summer and provide a much larger differential during the winter. SBUA recommends maintaining the current treatment of nonbypassable charges. However, SBUA recommends against the use of demand, grid access, or fixed charges.

SBUA recommends that with a few exceptions (customers in disadvantaged communities, small businesses, and critical facilities), net energy

metering customers should be switched to a monthly netting period. SBUA states that netting over a multi-hour time-of-use period would present customers with reasonable pricing signals. Further, SBUA contends a very short-term netting period would encourage customers to waste effort and money on enabling technologies to smooth out inconsequential variations while daily time-of-use netting could be more compatible with management of load and storage.

With respect to net energy metering paired storage systems, SBUA proposes to allow these systems to charge from the grid without restriction using a daily time-of-use netting period limiting the benefit of time-shifting grid energy. Further, SBUA proposes that customers should be able to choose to configure and meter the net energy metering-paired storage system to ensure that compensation would only be earned by eligible renewable electric generation. SBUA offers that, alternatively, customers could choose a simpler configuration for their storage system to allow charging from either the net energy metering generator or the grid.

6.17. SEIA/Vote Solar Proposal

SEIA/Vote Solar's proposal focuses solely on the net energy metering tariff for residential customers with incomes above 80 percent of the AMI. SEIA/Vote Solar contends the Commission should not change the tariff for commercial and industrial customers.

Explaining that the goal of its proposal is to align bill savings with the benefits that the systems' exports provide, SEIA/Vote Solar recommends requiring customers of the successor tariff to take service on a time-of-use rate that promotes electrification and incentivizes the installation of storage. A five-step process, the alignment will begin in in 2023 with PG&E and SDG&E

customers required to use the electrification rate. SEIA/Vote Solar proposes the remaining four steps would each be triggered when specific total capacities of residential systems are installed. SEIA/Vote Solar recommends setting the capacity trigger value equal to one year of expected residential solar or paired storage installations for each utility, based on the utility's annual average over the past five years. SEIA/Vote Solar states that its proposal would result in export compensation reductions, by the year 2027, of 50 percent for PG&E and SDG&E net energy metering successor tariff customers and 25 percent for SCE customers.

The SEIA/Vote Solar proposal maintains net billing with continued exemptions from departing load charges, standing charges and interconnection upgrade costs. SEIA/Vote Solar's proposal would continue the 20-year term of service for the tariff but allow for default monthly billing for residential and small commercial customers with an annual true-up in April for those wanting to maintain annual billing. The proposal also continues netting of imported and exported power in each metered interval and a \$10 monthly minimum bill.

6.18. TURN Proposal

TURN's proposal is a net billing arrangement with export compensation rates based on Avoided Cost Calculator values, import rates based on time-of-use tariffs, a monthly grid charge, a market transition credit for CARE-eligible customers only, and a unique rate for customers with paired storage.

TURN recommends bill credits based on actual hourly exports by the customer's system relying on hourly values from the Avoided Cost Calculator that are modified by actual recorded CAISO market prices. The modification would replace forecasted values for energy, ancillary services, losses, and greenhouse gas cap-and-trade with actual market prices. Credit for exports

would be calculated using an hourly netting approach and billed monthly. TURN proposes that after 12 months, the balance would be adjusted based on the net surplus compensation formula.

Under TURN's proposal, net energy metering customers could choose from the complete list of available time-of-use tariffs to provide flexibility and promote uptake of options tied to identified distributed energy resources.

TURN also proposes a grid charge to recover nonbypassable, unavoidable, and shared costs associated with consumption of onsite generation. The monthly customer-specific charge would be dynamically calculated using a second meter or estimated based on customer self-consumption in each month.

The final two elements of TURN's proposal are focused on subsets of net energy metering customers. First, TURN proposes an up-front buydown incentive or Market Transition Credit for CARE-eligible customers installing a system on existing properties. The second element is a unique rate for customers with paired storage, which includes additional time-of-use rate granularity and price signals, as well as dispatch obligations to respond during emergency grid needs.

7. Issues Before the Commission

The Scoping Memo established the seven issues listed below as the scope of issues for this proceeding. D.21-02-007 addressed Issue 1. This decision will only address Issues 2 through 6. A subsequent decision will address Issue 7.

1. What guiding principles (including those related to Assembly Bill 327 (2013, Perea), equity, environmental goals, and social justice) should the Commission adopt to assist in the development and evaluation of a successor to the current net energy metering tariff?
2. What information from the Net Energy Metering 2.0 Lookback Study should inform the successor and how

- should the Commission apply those findings in its consideration?
3. What method should the Commission use to analyze the program elements identified in Issue 4 and the resulting proposals, while ensuring the proposals comply with the guiding principles?
 4. What program elements or specific features should the Commission include in a successor to the current net energy metering tariff?
 5. Which of the analyzed proposals should the Commission adopt as a successor to the current net energy metering tariff and why? What should the timeline be for implementation?
 6. Other issues that may arise related to current net energy metering tariffs and subtariffs, which include but are not limited to the virtual net energy metering subtariff, net energy metering aggregation subtariff, the Renewable Energy Self-Generation Bill Credit Transfer program, and the net energy metering fuel cell tariff.
 7. What additional or enhanced consumer protections for customers taking service under net energy metering and/or the successor to the current net energy metering tariff should be adopted by the Commission?
- 8. Revising the Net Energy Metering Tariff**

In this proceeding, each of the first five issues in the scoping memo is a building block toward the ultimate determination of the last two scoping issues: the design of the successor and related tariffs. We previously determined the foundation for the successor and related tariffs through the adoption of a set of guiding principles, which will be referenced throughout this decision. In this decision, we first review the Lookback Study to determine the findings upon which we should rely to analyze the tariff elements and, ultimately, the successor and related tariffs. In addition to the Lookback Study, we also review other

methods of analysis and determine what we should rely on in our selection of tariff elements and the successor tariff. With the guiding principles, Lookback Study and analysis methods determined, we discuss the various elements that parties and the White Paper recommend for the successor tariff. After determination of the five building blocks, we review the elements and proposals and adopt a successor and related tariffs.

8.1. Reliance on the Lookback Study

Parties were asked to address what information from the Lookback Study the Commission should use to inform the selection of the successor net energy metering tariff and how that information should be applied. As discussed below, based on the evidence in this proceeding, we find the following Lookback Study conclusions should be considered findings of fact in this proceeding and used in the analysis of proposals and adoption of a successor to the existing net energy metering tariff:

- a) NEM 2.0 has negatively impacted non-participant ratepayers.
- b) NEM 2.0 is not cost-effective.
- c) NEM 2.0 disproportionately harms low-income customers not participating in the net energy metering tariff.

We discuss each of these findings in Sections 8.1.2 through 8.1.4 below. However, we first begin with a more general discussion of the value of the Lookback Study.

8.1.1. The Lookback Study's Analysis is Sound

CALSSA considers the Lookback Study to have very limited value in this case because it analyzes the NEM 2.0 tariff. CALSSA and SEIA/Vote Solar note that few parties propose to keep the NEM 2.0 tariff structure for general market residential customers. CALSSA argues the Commission should give minimal

weight to a “backward facing analysis” of elements and assumptions different from those in the successor tariff proposals.²⁶ Similarly, SEIA/Vote Solar considers the Lookback Study not useful in determining the scope and degree of the needed changes and the speed at which changes are implemented because the study only looks at cost-effectiveness from a historical perspective (*i.e.*, backwards looking) and does not look at the “many successes of the net energy metering program.”²⁷ For example, SEIA/Vote Solar asserts the results of the Lookback Study illustrates that adoption of solar “is often the precursor and catalyst” for adoption of other distributed energy resources.²⁸

However, CUE offers that the Lookback Study “should be used to demonstrate what the new NEM should not be,” and agrees with other parties that the Lookback Study “confirms that the NEM 2.0 [tariff] has severely damaged ratepayers.”²⁹ Further, Joint Utilities state that both the Order Instituting this Rulemaking and the Scoping Memo require the Commission to consider the findings of the Lookback Study and that given past direction by the Commission, Commission staff supervision, substantial stakeholder input, and a consultant with appropriate experience and expertise, the Lookback Study should be “taken seriously and its findings given substantial weight.”³⁰

In a separate argument, CALSSA contends that a number of the study’s assumptions are or appear flawed, and the source code necessary to investigate or replicate the study’s main conclusions is not provided. PCF also contends the

²⁶ CALSSA Opening Brief at 17.

²⁷ SEIA/Vote Solar Opening Brief at 8-9.

²⁸ SEIA/Vote Solar at 10 citing Lookback Study at 62 and Table 3-1.

²⁹ CUE Opening Brief at 6 citing CUE-02 at 7.

³⁰ Joint Utilities Opening Brief at 22.

Lookback Study is flawed due to the use of the Avoided Cost Calculator. PCF asserts the Lookback Study underestimates the benefits of behind-the-meter generation because the calculator does not adequately quantify avoided transmission costs or the resiliency benefits of net energy metering solar, or account for the air quality and climate benefits. CALSSA further asserts the Commission did not make the Verdant analysts available for discovery or cross-examination, and re-running of its model would have been time-consuming.³¹ However, Joint Utilities note that prior to issuance of the Lookback Study in the January 21, 2021 Administrative Law Judge Ruling, D.18-09-044 developed and D.19-10-040 modified the process to receive and address stakeholder input into the draft research plan for the lookback evaluation of the NEM 2.0 tariff.³² Further, Joint Utilities underscore that the Commission published a draft of the Lookback Study on August 14, 2020, and parties were invited to comment on the draft. Joint Utilities point to a matrix in the Lookback Study, which contains a summary of comments submitted by Aurora Solar, Cal Advocates, CALSSA, Foundation Windpower, LLC, GRID Alternatives, the Joint Utilities, CalWEA, TURN, Vote Solar, and SEIA.³³ Joint Utilities state the matrix also summarizes the Study's response to the comments.³⁴

³¹ CALSSA Opening Brief at 18 citing to the CALSSA Reply Comments on the NEM-2.0 Lookback Study, February 16, 2021 at 1.

³² Joint Utilities Opening Brief at 22 at footnote 71 citing PCF-15 (the Lookback Study) at 104-140.

³³ Joint Utilities Opening Brief at 22 at footnote 71 citing PCF-15 (the Lookback Study), Appendix B at 104-140.

³⁴ Joint Utilities Opening Brief at 22 at footnote 71 citing PCF-15 (the Lookback Study), Appendix B at 104-140.

We find the Lookback Study to be a sound analysis of the NEM 2.0 tariff and that it should be used in the development of a successor tariff. CALSSA and SEIA/Vote Solar would have the Commission dismiss the study because it is “backward looking.” The evaluation of the NEM 2.0 tariff tells us whether the tariff is or is not performing as required, thus establishing a foundation for creating the successor tariff. We recognize, as SEIA/Vote Solar states, that the study does not tell the complete story. However, the Lookback Study can inform us of what not to do. Furthermore, CALSSA’s contention that the study “assumptions are or appear flawed” does not persuade us; CALSSA and all stakeholders have been given several opportunities to weigh in on the development and drafting of the study. A disagreement on an assumption does not equate to a flaw in the assumption.

Regarding PCF’s contention that the Lookback Study is flawed because it relies on the Avoided Cost Calculator, PCF’s contention is incorrect. We find the cost-effectiveness analyses to have been conducted in accordance with prior Commission decisions. According to the Lookback Study, D.09-08-026 “provides guidance on the tests to be used, the costs and benefits to be included in each test, and the avoided cost inputs to be used when calculating program costs and benefits. This analysis considers the cost-effectiveness of NEM 2.0 systems using the five distinct tests.”³⁵ The study also states that “the avoided costs used in this analysis are based on the Commission’s 2020 Avoided Cost Calculator v1c approved on June 25, 2020. The avoided costs were generated for all utility and

³⁵ Lookback Study at 41-42.

climate zone combinations. The analysis includes all components of the avoided costs included in the 2020 Avoided Cost Calculator.”³⁶

Accordingly, the Lookback Study should be used as a foundation to create a successor tariff that continues the elements that resulted in positive outcomes but corrects or replaces the elements that resulted in negative outcomes.

**8.1.2. The Lookback Study Demonstrates
NEM 2.0 Negatively Impacts
Non-Participant Ratepayers**

SEIA/Vote Solar states the Lookback Study illustrates the need for reform of the current net energy metering structure in the residential market and that the “reduction of the impact of solar adoption on non-participating ratepayers should be addressed through the successor tariff,” and notes there is little debate on these two points.³⁷ Indeed, many parties agree that the Lookback Study finds the current structure of the net energy metering tariff has had a negative impact on non-participating ratepayers.

Public Advocates Office asserts the study “clearly shows the NEM 1.0 and NEM 2.0 tariffs create equity concerns due to the misalignment between costs and value,” which then “creates revenue under-collections that must be recovered by nonparticipating customers.”³⁸ Public Advocates Office observes that the Lookback Study shows the NEM 2.0 tariff unreasonably burdens non-participants of net energy metering.³⁹ Public Advocates Office estimates the

³⁶ Lookback Study at 56.

³⁷ SEIA/Vote Solar Opening Brief at 8.

³⁸ Public Advocates Office Opening Brief at 7.

³⁹ Public Advocates Office Opening Brief at 6 citing Public Advocates Office-03 at 2-32.

annual cost burden generated by the NEM 1.0 and 2.0 tariffs will be approximately \$3.37 billion in 2021.⁴⁰

Joint Utilities also support this finding, asserting the Lookback Study concludes that NEM 2.0 participating customers receive “significant financial benefits” at the “expense of non-participating customers.” Recognizing the Lookback Study cost shift estimate of \$1 billion only looks at NEM 2.0 customers prior to 2020, Joint Utilities claim that, by looking at all customers who have adopted NEM 2.0 through 2020, NEM 2.0 installations will increase bills paid by non-participant customers by \$13 billion over 20 years.⁴¹ Supporting this disparity, IEPA points to the Lookback Study finding that residential net energy metering customers’ bills are lower than the utility’s cost to serve them while nonparticipant ratepayers see increased rates.⁴²

TURN also agrees with the finding of the Lookback Study that there is a cost shift associated with NEM 2.0, as well as NEM 1.0. However, TURN contends the Lookback Study underestimates the cost shift because the study used 2020 Avoided Cost Calculator values.⁴³ TURN estimates the cost shift at \$1.093 billion (in \$2012) or \$1,600 per NEM 1.0 customer as of 2020 and \$13 billion (over 20 years) or \$31,402 per NEM 2.0 customer as of 2020.⁴⁴

⁴⁰ PAO-03 at 2-17.

⁴¹ Joint Utilities Opening Brief at 23 citing PCF-15 (the Lookback Study) at Table 5-1. Utilities note the Table is in levelized values whereas in nominal dollars, the impact is likely over \$20 billion. *See also* Joint Utilities Reply Brief at 5 explaining the difference between the Lookback Study \$1 billion estimate of the cost shift (Lookback Study at Table 5-10) versus the Joint Utilities \$3.4 billion estimate (IOU-01 at 64:3 – 66:11).

⁴² IEPA Opening Brief at 3 citing PCF-15 at 1 and 13 (the Lookback Study).

⁴³ TURN Opening Brief at 15 citing TRN-01 at 9.

⁴⁴ TURN Opening Brief at 15 citing TRN-01 at 9 and Lookback Study at 125 and Table 5-1.

In its reply brief, IEPA concludes that if the number of net energy metering tariff customers continues to grow, the pool of nonparticipants will shrink; thus, without any changes to the current tariff structure, the financial burden on the shrinking pool of nonparticipants will become unsustainable.⁴⁵

Portraying the cost shift as insubstantial, PCF contends the Lookback Study shows that the cost shift is only \$501.1 million – “far less than the \$3.4 billion” estimated by various parties.⁴⁶ PCF submits the Lookback Study results show that, in 2019, nonresidential NEM 2.0 customers paid \$117.5 million more than the cost to serve them while residential NEM 2.0 customers paid \$618.6 million less than the cost to serve them.⁴⁷ Further, PCF argues the Lookback Study underestimates the benefits of behind-the-meter generation by relying only on the Avoided Cost Calculator, which PCF claims nullifies any existing cost shift.⁴⁸ (We discuss the subject of the Avoided Cost Calculator below in Section 8.2.)

In reply briefs, Joint Utilities dispute PCF’s claims of no cost shift and that the cost shift is shown solely in the bill savings from energy consumption.⁴⁹ Joint Utilities state that the cost shift from participating to non-participating customers is the result of non-participating customers overcompensating net energy metering customers for exports and non-participants paying for the infrastructure and public policy costs that net energy metering customers avoid. Joint Utilities explain that residential net energy metering customers can bypass

⁴⁵ IEPA Reply Brief at 4.

⁴⁶ PCF Opening Brief at 15 citing PCF 24 at 4.

⁴⁷ PCF Opening Brief at 15 citing PCF-15 at 96 (the Lookback Study).

⁴⁸ PCF Opening Brief at 16 citing PCF-15 at 56-57 (the Lookback Study).

⁴⁹ Joint Utilities Reply Brief at 4 citing PCF Opening Brief at 8.

payment of infrastructure and other costs incurred to serve them because such costs are embedded in volumetric rates and, thus, avoided by net energy metering customers; this results in other customers paying the difference.⁵⁰ Public Advocates Office further explain that “under the volumetric rate structure and NEM 2.0 policies, average residential NEM 2.0 customers pay only 18 percent of their total annual cost of service for PG&E, 9 percent for SCE and 9 percent for SDG&E.”⁵¹ Joint Utilities acknowledge that the Lookback Study does not analyze the components of the cost shift it identifies, but note that the Commission’s affordability report explains the cost shift is due to the bill savings exceeding the value the solar generation provides to the system.⁵²

We agree that NEM 2.0 has negatively impacted non-participant ratepayers. While the precise impact depends upon the Avoided Cost Calculator version used, we disagree with PCF’s method of calculating the impact and find PCF’s estimate of \$501 million to be incorrect. As Joint Utilities point out, the impact is caused by more than the simple bill savings from net energy metering customer energy consumption. Rather, the negative impact on non-participant ratepayers is caused by the bypassing of infrastructure and other service costs embedded in volumetric rates from each one of the net energy metering customers in NEM 1.0 and NEM 2.0 over the course of the 20-year length of the customer’s tariff. Accordingly, the Commission should use this information to

⁵⁰ Joint Utilities Reply Brief at 5 citing IOU-01 at 66:3-6, 66:12-67:5, 66:7-11, and 67:6-68:4.

⁵¹ Public Advocates Office Opening Brief at 7, citing the Lookback Study at 12.

⁵² Joint Utilities Reply Brief at 4-5, footnote 9 citing the Commission’s *Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues* at 27-28. Available at <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/en-banc/feb-2021-utility-costs-and-affordability-of-the-grid-of-the-future.pdf>.

develop a revised net energy metering tariff that corrects the cost shift, to the extent possible, while balancing all eight guiding principles. As noted by IEPA, without any changes to the current tariff structure, the financial burden on the shrinking pool of nonparticipants is unsustainable and will fall disproportionately on lower-income ratepayers.

8.1.3. The Lookback Study Shows NEM 2.0 is Not Cost-effective

The Lookback Study presents the cost-effectiveness results for NEM 2.0 for each customer segment in Table 5-3 of the study, which we include below as Table 3.

Table 3

Utility	Customer Sector	Weighted Average Benefit-Cost Ratio			
		PCT	TRC	RIM	PA
PG&E	Agriculture	1.72	1.19	0.41	590.70
	Commercial	1.79	1.12	0.37	437.07
	Industrial	1.47	1.17	0.51	6,128.90
	Residential	1.83	0.69	0.31	28.77
SCE	Agriculture	1.23	1.43	0.85	337.88
	Commercial	1.32	1.35	0.72	96.86
	Industrial	1.16	1.34	0.87	880.11
	Residential	1.62	0.80	0.43	8.20
SDG&E	Agriculture	1.51	1.25	0.53	821.47
	Commercial	1.87	1.18	0.37	1,344.24
	Industrial	1.57	1.21	0.49	16,696.43
	Residential	2.08	0.76	0.29	100.09

We first focus our discussion on the nonresidential sectors of the NEM 2.0 tariff. Walmart asserts the results for the commercial, industrial, and agricultural segments of the NEM 2.0 tariff show NEM 2.0 is cost-effective for these market segments.⁵³ Also concurring with the results, SEIA/Vote Solar submit

⁵³ Walmart Opening Brief at 5 citing Lookback Study at 80-81 and Table 5-13.

commercial, agricultural, and industrial sectors generally pass the TRC test and pay rates that fully cover their costs.⁵⁴

As previously discussed, PCF argues that because the cost-effectiveness tests used in the Lookback Study were performed using the Avoided Cost Calculator, the results underestimate many of the concrete benefits of behind-the-meter generation, including greenhouse gas reductions, system resiliency and reliability.⁵⁵ For the same reasons presented in Section 8.1.1 above, we disagree with PCF.

No other party disputes the PCT, RIM, and TRC cost-effectiveness results for the commercial, agricultural, and industrial sectors and since we have previously found the analyses to have been performed in compliance with Commission directives, we find it reasonable to affirm the cost-effectiveness results for the commercial, agricultural, and industrial sectors. However, as we discuss in Section 8.2.2 below, we should consider results of all three Standard Practice Manual tests when determining the cost-effectiveness of a resource. Hence, while the Lookback Study found commercial, agricultural, and industrial sectors of the NEM 2.0 tariff had TRC and PCT results of 1.0 or better, the results of the RIM test, which fared poorly, should also be considered. Further, Joint Utilities assert that using the 2021 Avoided Cost Calculator, instead of the inaccurate 2020 Avoided Cost Calculator, would result in lower RIM results.⁵⁶ Thus, we do not find the nonresidential sectors of the NEM 2.0 tariff to be cost-effective.

⁵⁴ SEIA/Vote Solar Opening Brief at 10 citing Lookback Study at Table 5-11.

⁵⁵ PCF Opening Brief at 13.

⁵⁶ IOU-02 at 87.

With respect to the residential customer sector for NEM 2.0, Joint Utilities support the Lookback Study finding that NEM 2.0 is not cost-effective for non-participants and “demonstrates a wealth transfer from lower-income to higher-income customers.”⁵⁷ (We discuss this alleged wealth transfer in Section 8.1.4 below.) CUE highlights the low cost-effectiveness RIM and TRC test results for NEM 2.0, noting that NEM 2.0 does not come close to passing the TRC test.⁵⁸ Sierra Club also supports the cost-effectiveness findings in the Lookback Study, which show “TRC and RIM test results as under 1.0 and PCT results as above 1.5 for SCE, above 1.75 for PG&E and above 2.0 for SDG&E.” Sierra Club contends the Commission should rely on these results to support transitioning export compensation rates from being based on retail rates to being based on avoided cost.⁵⁹

The cost-effectiveness analysis results of the Lookback Study for the residential segment are incorporated into this decision as findings of fact. We find the analysis followed the directives of prior Commission rulings. Accordingly, the Commission should conclude that for the residential sector, NEM 2.0 is not cost-effective.

8.1.4. The Lookback Study Shows NEM 2.0 Disproportionately Harms Low-Income Ratepayers

Highlighting results from the Lookback Study, parties contend the study indicates NEM 2.0 leads to great financial disparity between upper- and lower-income brackets of customers. Parties recommend the Commission

⁵⁷ Joint Utilities Opening Brief at 23 citing PCF-15 at 4, 5, and 39.

⁵⁸ CUE Opening Brief at 7 citing the Lookback Study at 6 and 9.

⁵⁹ Sierra Club Opening Brief at 6 citing Lookback Study at 80-81.

should conclude that NEM 2.0 disproportionately harms low-income customers not participating in the net energy metering tariff.

TURN submits that the Lookback Study results demonstrate the existing net energy metering tariffs have disproportionately benefited non-CARE residential net energy metering customers.⁶⁰ TURN offers several examples of such results. First, in referencing the cost-effectiveness test results in the Lookback Study, TURN states “high PCT values and the low residential RIM test scores (average 0.32 for non-CARE customers) was accompanied by the finding that bill payments by residential NEM 2.0 customers, on average, covered between 9-18 [percent] of their cost of service.”⁶¹ Yet, for CARE NEM 2.0 customers, TURN states the Lookback Study indicates that the “NEM 2.0 program yields lower participant cost test values and a longer payback period for CARE customers,” and notes the payback period for a CARE net energy metering customer was two times that of a non-CARE net energy metering customer.⁶²

Taking a different view, GRID *et al.* asserts the Lookback Study makes clear that low-income customers are not participating in net energy metering at levels equal to other residential customers. Pointing to Figure 3-6 of the Lookback Study, GRID *et al.* underscores that the three lowest income brackets had lower rates of net energy metering participation in comparison to their share of the population and the three highest income brackets had higher participation rates compared to their share of population.⁶³ IEPA points to the Lookback

⁶⁰ TURN Opening Brief at 17.

⁶¹ TURN Opening Brief at 16 citing TRN-1 at 10 and Lookback Study at Tables 5-9 and 5-11.

⁶² TURN Opening Brief at 16 citing TRN-1 at 10 and Lookback Study at 33.

⁶³ GRID *et al.* Opening Brief at 4 citing Lookback Study at 33, Figure 3-6.

Study finding that net energy metering systems are located disproportionately in ZIP Codes with high median incomes.⁶⁴ NRDC highlights the Lookback Study finding is corroborated by a Lawrence Berkeley National Laboratory study, which indicates that only about 13 percent of net energy metering customers come from the lowest 40 percent of income, while customers in the top 20 percent of income make up 43 percent of net energy metering adopters.⁶⁵ Additionally, CUE asserts the Lookback Study indicates that both the NEM 1.0 and NEM 2.0 tariffs “disproportionately harm disadvantaged communities” in that while only a small percentage of residential net energy metering systems (11 to 12 percent) are installed in disadvantaged communities, these same communities are responsible for a portion of the costs of systems installed in all communities regardless of the income level.⁶⁶

PCF disputes this concern of income inequity, stating that “parties’ narrative distorts the reality of which customers bear the burdens of the purported cost shift.”⁶⁷ PCF agrees that areas with higher median incomes have higher concentrations of net energy metering customers compared to lower incomes but states that “even in those higher-income areas, the overwhelming majority of households do not have NEM solar installations,” approximately 93 to 97 percent.⁶⁸ PCF argues the disproportional harm does not exist, the cost shift is distributed not only among non-participants in lower-income zip codes

⁶⁴ IEPA Opening Brief at 3 citing PCF 15 at 33 and 35 (the Lookback Study).

⁶⁵ NRD-01 at 5 citing the LBNL Solar Demographic Tool which can be found at: <https://emp.lbl.gov/solar-demographics-tool> (accessed by NRDC on 6/12/2021)

⁶⁶ CUE Opening Brief at 7 citing the Lookback Study at 37.

⁶⁷ PCF Opening Brief at 45.

⁶⁸ PCF Opening Brief at 45-46 citing PCF-15 at 33 (Lookback Study).

but also among the 93 to 97 percent of customers in higher-income zip codes.⁶⁹ PCF argues that 92 percent of the cost shift is being borne by non-CARE customers.⁷⁰

PCF's comments fail to acknowledge that lower-income customers, including those who just barely miss the eligibility criteria for CARE, are disproportionately harmed because they are burdened with the additional expense of a portion of the 82 to 91 percent of the cost of service bypassed by predominantly wealthier NEM 2.0 customers whose "bill payments by residential NEM 2.0 customers, on average, only covered between 9-18 [percent] of their cost of service." We find PCF's arguments disputing the validity of the equity concern to be dismissive and glib.

We agree that the Lookback Study indicates that NEM 2.0 disproportionately harms low-income customers not participating in the net energy metering tariff. The findings in the Lookback Study show that NEM 2.0, and thus NEM 1.0, disproportionately benefited non-CARE residential net energy metering customers while all customers, including those with lower incomes, must bear the addition of the 82 to 91 percent of the cost of service bypassed by net energy metering customers. The Commission finds the Lookback Study indicates that NEM 2.0 disproportionately harms low-income customers not participating in the net energy metering tariff.

8.2. Analyzing Tariff Elements and Proposals

Parties were asked to comment on the methods the Commission should use to analyze the successor program elements and the successor tariff, to

⁶⁹ PCF Opening Brief at 46.

⁷⁰ PCF Opening Brief at 47.

determine whether the proposals comply with the guiding principles. CALSSA states that “the legal standards for the successor tariff inform the methodologies the Commission should use to analyze parties’ proposals and their resulting program elements, while ensuring the proposals comply with the guiding principles.”⁷¹ CALSSA highlights that “while parties largely agree on the types of methodologies to be utilized, parties disagree on both the correct way to execute those methodologies and the assumptions used therein.”⁷² In addition, parties offer differing interpretations of certain aspects of the statute and guiding principles that the tariff elements and tariff proposals are required to follow. Accordingly, we address the following aspects of this scoping issue in the sections below: the definition of sustainable growth; cost-effectiveness approaches and the consideration of other benefits; the appropriate length of time for a net energy metering participant payback period (*i.e.*, cost recovery time); and a definition of “equity among all ratepayers.”

8.2.1. Tariff Participation Growth Should Not Require Nonparticipant Financial Burden

All parties agree that the final successor to the current net energy metering tariff should comply with Public Utilities Code Section 2827.1(b)(1), which mandates that the Commission adopt a successor to the existing net energy metering tariff that “ensures that customer-sited renewable distributed generation continues to grow sustainably and includes specific alternatives designed for growth among residential customers in disadvantaged

⁷¹ CALSSA Opening Brief at 18.

⁷² CALSSA Opening Brief at 19.

communities.” However, parties have varying interpretations of the phrase “grow sustainably” and what that means for the successor tariff.

CALSSA asserts the plain meaning of “grow sustainably” is “continued increase of customer-sited distribution generation in the State in a manner that can continue over a period of time.”⁷³ CALSSA maintains the phrase “grow sustainably” included in AB 327 reflects the Legislature’s desire for net energy metering “to avoid the fits and starts that the previous capped program placed on the industry’s growth.”⁷⁴ Further, CALSSA contends this is consistent with a prior interpretation of the phrase in D.16-01-044 where the Commission stated its “first responsibility under Section 2827.1 is to see to the continued growth of customer-sited renewable [distributed generation].”⁷⁵ TURN, however, points out that the Commission made modifications to D.16-01-044 in response to applications for rehearing to clarify that the “sustainable growth” criteria is no more important than other provisions of the statute, stating that “the Commission was not placing a greater emphasis on achieving sustainable growth” over other statutory obligations.⁷⁶

TURN does not attempt to define the phrase “grow sustainably” but contends that the requirement “can be satisfied if a successor tariff is found to be cost-effective for certain participants over a reasonably defined timeframe.”⁷⁷ Other parties offer other definitions of the term. For example, CUE recommends the Commission adopt the United Nations’ definition: “growth that is

⁷³ CALSSA Opening Brief at 7.

⁷⁴ CALSSA Opening Brief at 10.

⁷⁵ CALSSA Opening Brief at 7, citing D.16-01-044 at 58.

⁷⁶ TURN Reply Brief at 39 citing D.16-09-036 at 13.

⁷⁷ TURN Opening Brief at 47 citing TRN-01 at 31-32.

repeatable, ethical and responsible to, and for, current and future communities.”⁷⁸ CUE submits this means that the growth of the net energy metering tariff “is not sustainable if it does not take into account inequities caused by the tariff, either now or in the future.”⁷⁹

SEIA/Vote Solar counsels the Commission to look to the statute itself when defining the term “continues to grow sustainably” and points out that in *Donovan v. Poway Unified School District*, the court stated, “[w]e must presume that the Legislature intended ‘every word, phrase, and provision...in a statute...to have meaning and to perform in a useful function.’”⁸⁰ SEIA/Vote Solar concludes that the statutory language “grow sustainably” “refers to examining any proposed change to the tariff in light of its impact on the growth of the customer-sited renewable [distributed generation] market.”⁸¹

We turn back to the Commission’s prior statement on “grow sustainably” in which the Commission stated that it “was not placing a greater emphasis on achieving sustainable growth” over other statutory obligations.⁸² There is nothing in the record of this proceeding that would lead us to stray from this position. We agree with SEIA/Vote Solar that any proposed change to the tariff should consider the impact on the growth of the net energy metering market. As multiple parties have acknowledged, the net energy metering program has and

⁷⁸ CUE Opening Brief at 11 citing CUE-02 at 13, citing from “What Does Sustainable Growth Really Mean?” *Forbes*, Rick Miller, August 16, 2018. *See also*, the United Nations view on sustainability at <https://sustainabledevelopment.un.org/rio20/about>.

⁷⁹ CUE Opening Brief at 11.

⁸⁰ SEIA/Vote Solar Opening Brief at 74 citing *Donovan v. Poway Unified School Dist.* (2008) 167 Cal. App. 4th 567, 590-591.

⁸¹ SEIA/Vote Solar Opening Brief at 76.

⁸² D.16-09-036 at 13.

should continue to assist the State in meeting its energy and climate goals. However, because the Commission is mandated to create a tariff that adheres to the entire statute – including equity concerns – the growth of the market should not come at the undue and burdensome financial expense of nonparticipant ratepayers. Accordingly, the Commission analyzed the elements of the tariff and the proposals with the entirety of the statute in mind, as well as the other guiding principles, to develop a successor that balances the requirements of the statute and the guiding principles.

8.2.2. Cost-effectiveness Analyses Shall be Conducted Pursuant to D.19-05-019 Using 2021 Avoided Cost Calculator

With respect to analyzing cost-effectiveness, in D.21-02-007 of this proceeding, *Decision Adopting Guiding Principles*, the Commission stated that:

cost-effectiveness shall be conducted in the manner directed by D.19-05-019. Relatedly, D.16-06-007 requires that cost-effectiveness evaluations for distributed energy resources shall use the most recent version of the Avoided Cost Calculator. We clarify that the most recent version of the Avoided Cost Calculator was adopted by the Commission in D.20-04-010 and Resolution E-5077. Accordingly, requests for changes to the Avoided Cost Calculator in this proceeding will not be considered. However, we underscore that in D.20-04-010, the Commission concluded that “consideration of the benefits of grid services provided by specific distributed energy resources should be addressed in resource-specific proceedings.”⁸³

While some parties express concern about the current Avoided Cost Calculator and offer modifications to these directives, only PCF argues for an alternate cost-effectiveness approach. PCF states, Public Utilities Code

⁸³ D.21-02-007 at 12-13.

Section 2827.1(b) requires that the successor be “based on the costs and benefits of the renewable electrical facility” and that the “total benefits of the standard contract or tariff to all customers and the electrical system are approximately equal to the total costs.”⁸⁴ PCF recommends that to ensure compliance with the statute, the Commission should rely on the Lookback Study’s cost-of-service analysis to identify the actual cost to serve net energy metering customers.⁸⁵ PCF asserts the cost-of-service analysis determines the actual costs to serve net energy metering customers and relies on the actual data that is transparent.⁸⁶ PCF contends the Avoided Cost Calculator underestimates the benefits of behind-the-meter generation such as reduced transmission and distribution costs, reduced greenhouse gases, and system resiliency and reliability.⁸⁷

PCF recognizes the prior determination that requests for changes to the Avoided Cost Calculator in this proceeding will not be considered. In lieu of requesting changes to the Avoided Cost Calculator, PCF asks the Commission to upend three prior decisions requiring use of the Avoided Cost Calculator and replace the calculator with the Lookback Study’s cost-of-service analysis. PCF’s justification for this is its claim that the Avoided Cost Calculator underestimates transmission and distribution costs, reduced greenhouse gases, and system resiliency and reliability; all of which the Commission addressed in D.20-04-010.⁸⁸ Accordingly, we deny the request by PCF to replace the Avoided Cost Calculator with the Lookback Study cost-of-service analysis.

⁸⁴ PCF Opening Brief at 11-12.

⁸⁵ PCF Opening Brief at 12.

⁸⁶ PCF Opening Brief at 13-14.

⁸⁷ PCF Opening Brief at 13.

⁸⁸ D.20-04-010 at 42-43, 50-56, 56-61, and 69-70.

We turn to requested modifications to the adopted approach of analyzing cost-effectiveness. Generally, parties offer two categories of modifications: revisions to the tests themselves and revisions to the weight given to each of the four tests. We begin with the latter.

Several parties support the Commission directive requiring cost-effectiveness analyses to review the TRC, PCT, and RIM test results, but naming the TRC as the primary test by which to evaluate cost-effectiveness.⁸⁹ SBUA concurs with this approach and notes that relying primarily on the TRC test is supported by Public Utilities Code Section 2827.1, which requires the tariff to ensure that total benefits of the tariff to all customers and the electrical system are approximately equal to the total costs.⁹⁰ While agreeing the TRC test is the primary test, CALSSA underscores the principle stated in the Standard Practice Manual that the tests “are not intended to be used individually or in isolation” but, rather, necessitate the consideration of the “tradeoffs between the tests.”⁹¹

IEPA maintains the TRC test does not offer much insight in the costs and benefits of individual proposals for the successor tariff. IEPA submits that a resource can have a TRC test score of more than one indicating cost-effectiveness, but that score does not indicate whether the resource is a better choice than another resource with a higher score.⁹² Similar to CALSSA, IEPA contends use of

⁸⁹ SBUA Opening Brief at 4 citing D.21-02-007 at Finding of Fact 4.

⁹⁰ SBUA Opening Brief at 4.

⁹¹ CALSSA Opening Brief at 43 citing *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*, p. 6, California Public Utilities Commission (October 2001), available at: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf (“Standard Practice Manual”).

⁹² IEPA Opening Brief at 7 citing D.19-05-019.

the TRC test along with the RIM and PCT tests will provide the Commission with useful information about different aspects of proposals.⁹³ Joint Utilities also support use of all three tests, indicating each has its value: the TRC test has the ability to indicate whether a demand side program is cost-effective to the grid relative to other resource options;⁹⁴ the RIM test measures what happens to rates due to changes in utility revenues and operating costs caused by the program;⁹⁵ and the PCT test measures the economic viability of a distributed generation facility to the developer or customer installing the facility and can assist the Commission in determining the level of incentive needed to promote the investment.⁹⁶

In support of the RIM test as the primary test, Public Advocates Office argues use of the RIM test will ensure the most accurate analysis since it is the only test that captures the tariff's cost burden for non-participants, thus addressing the principle of equity.⁹⁷ Public Advocates Office further argues that the co-mingling of participants and nonparticipants in the TRC test (*i.e.*, general ratepayers) does not capture alterations in net energy metering tariff design nor does it address equity concerns.⁹⁸ NRDC points out the impact of distributed generation with a net energy metering tariff is two-fold in that participants are paid for electricity exports and they offset their onsite consumption with self-generation, neither of which are achieved without installing the generation

⁹³ IEPA Opening Brief at 7.

⁹⁴ Joint Utilities Opening Brief at 54 citing the Standard Practice Manual at 5.

⁹⁵ Joint Utilities Opening Brief at 55 citing D.19-05-019 at 9.

⁹⁶ Joint Utilities Opening Brief at 56 citing D.09-08-026 at 65 and Conclusion of Law 5.

⁹⁷ Public Advocates Office Opening Brief at 9 citing PAO-01 at 5-6.

⁹⁸ Public Advocates Office Opening Brief at 9 citing PAO-01 at 5-5.

system.⁹⁹ NRDC contends the RIM tests evaluates the impact of both self-consumption and export.¹⁰⁰ SBUA opposes primary reliance on the RIM test as a measure of cost-effectiveness for all customers, as it “accounts only for certain effects on non-participants, ignoring the benefits to participants, the utility system as a whole, and the environment.”¹⁰¹ Further support for reliance on the RIM test comes from TURN, who argues that because the key elements of tariff design (incentives, export compensation, netting, grid charges, etc.) are not quantified in the TRC, the Commission cannot evaluate the cost-effectiveness of different tariff options.¹⁰² TURN contends the RIM test compares the benefits received by all customers (primarily avoided cost savings) with the incremental costs incurred to serve participating customers including utility program costs, incentives paid to participants, and decreased revenues received from participants.¹⁰³ TURN concludes the RIM test is the only approach that properly accounts for the impact of the tariff design on all customers.

SEIA/Vote Solar acknowledges it advocated for the affirmation in D.21-02-007 that cost-effectiveness analysis would be performed in the manner directed in D.19-05-019 but states the 2021 Avoided Cost Calculator values complicate this support.¹⁰⁴ SEIA/Vote Solar concedes that, using the 2021 Avoided Cost Calculator values, solar alone does not pass the TRC test under any parties’ proposal based on the cost-effectiveness analyses performed

⁹⁹ NRDC Opening Brief at 21.

¹⁰⁰ NRDC Opening Brief at 21.

¹⁰¹ SBUA Opening Brief at 6 citing SBU-01 at 13:26-27 and SBU-08 at 6:12-15.

¹⁰² TURN Opening Brief at 19.

¹⁰³ TURN Opening Brief at 21, citing TRN-01 at 14.

¹⁰⁴ SEIA/Vote Solar Opening Brief at 11-12.

by E3.¹⁰⁵ Thus, SEIA/Vote Solar cautions the Commission to consider other factors when looking at the TRC test results such as the contributions distributed generation can make to the climate goals and other societal benefits.¹⁰⁶ With respect to looking at the RIM test in addition to the TRC test, SEIA/Vote Solar recommends the Commission take a broader view of the RIM test results and require improvement of the RIM test score over time.¹⁰⁷ SEIA/Vote Solar explains this will allow the Commission to ensure that impacts on net energy metering customers (*i.e.*, lower export rates) will not impact the sustainable growth of the distributed energy resources market, as required by AB 327.¹⁰⁸

The record in this proceeding leads us to align our analysis here with prior guidance from the Standard Practice Manual, in that the tests should not be used individually or in isolation but, instead, allow for the consideration of the tradeoffs between the tests. While D.19-05-019 directs the use of the TRC test as the primary test, it also recognized the importance of the PAC and RIM tests. Parties have shown in this proceeding that each test has value and together the tests tell a complete story. Hence, as directed by D.19-05-019, we have reviewed and considered the results of the PAC and RIM tests, in addition to the TRC test, in our final tariff determinations in this decision. Similar to the need to consider the competing requirements of the statute, consideration of all the tests allows us to also consider the values and tradeoffs between the tests. While we do not adopt the recommendation by SEIA/Vote Solar to strive solely for a RIM test

¹⁰⁵ SEIA/Vote Solar Opening Brief at 12, citing *Cost Effectiveness of the NEM Successor Rate Proposals Under Rulemaking 20-08-020*, Energy, Environmental Economic (May, 28, 2021, updated June 15, 2021) at 5.

¹⁰⁶ SEIA/Vote Solar Opening Brief at 12-17.

¹⁰⁷ SEIA/Vote Solar at 17.

¹⁰⁸ SEIA/Vote Solar Opening Brief at 17-20.

score improvement, we also do not strive for perfection in one test but rather a balance of the value and tradeoffs between the tests.

Relatedly, PCF recommends the Commission use the Societal Cost Test to analyze the cost-effectiveness of the successor tariff.¹⁰⁹ PCF asserts the Commission must consider societal benefits to ensure the costs and benefits of any net energy metering tariff are approximately equal.¹¹⁰ Acknowledging the Societal Cost Test has not been approved for use in other proceedings, PCF contends the Commission cannot ignore these benefits since the Societal Cost Test offers the Commission the means to comply with the requirement to take into account the total benefits of customer-sited generation.¹¹¹ We deny the request to use the Societal Cost Test in our analysis because, as Joint Utilities note, application of this test is premature because the evaluation to determine the final details of the test has not been completed.¹¹²

PCF also recommends, in lieu of the Societal Cost Test, the Commission consider the societal benefits of resiliency¹¹³ and avoided out-of-state methane leakage.¹¹⁴ Other parties also recommend the consideration of benefits they state are not included in the Avoided Cost Calculator: SEIA/Vote Solar advocates for

¹⁰⁹ In D.19-05-019, the Commission adopted three elements of the Societal Cost Test (societal discount rate, social cost of carbon, and air quality co-benefits) for informational purposes and to test and evaluate the details of the three elements. The test is being piloted in the Integrated Resources Planning proceeding. A final review of the three elements will be reviewed in R.14-10-003 or a successor proceeding.

¹¹⁰ PCF Opening Brief at 26.

¹¹¹ PCF Opening Brief at 27.

¹¹² Joint Utilities Opening Brief at 57. *See also* D.19-05-019.

¹¹³ PCF Opening Brief at 22-23.

¹¹⁴ PCF Opening Brief at 24.

a resiliency adder,¹¹⁵ an updated social cost of carbon metric,¹¹⁶ and a reduced methane leakage multiplier;¹¹⁷ and CALSSA advocates for recognition of the land conservation benefits,¹¹⁸ avoided future transmission costs,¹¹⁹ and community resilience benefits.¹²⁰ CALSSA acknowledges that its recommended societal benefits are difficult to measure and recommends the Commission consider these benefits when reviewing proposals with TRC and RIM test scores well below 1.0 and find these proposals to be cost-effective.¹²¹

In D.20-04-010, the Commission concluded that consideration of the benefits of grid services provided by specific distributed energy resources should be addressed in resource-specific proceedings. Hence, we review party recommendations to consider proposed additional benefits.

In D.20-04-010, the Commission considered SEIA/Vote Solar's proposals for avoided reliability and resiliency costs and found the benefits described could only be attributable to storage and storage plus solar. Further, D.20-04-010 found that SEIA/Vote Solar proposal "has not shown any deferred or avoided costs to utility ratepayers, but rather has shown only that ratepayers who use these technologies receive additional participant benefits."¹²² In this proceeding, SEIA/Vote Solar refined its advocacy for considering the benefits of resiliency,

¹¹⁵ SEIA/Vote Solar Opening Brief at 26-28.

¹¹⁶ SEIA/Vote Solar Opening Brief at 30.

¹¹⁷ SEIA/Vote Solar Opening Brief at 31.

¹¹⁸ CALSSA Opening Brief at 51.

¹¹⁹ CALSSA Opening Brief at 51.

¹²⁰ CALSSA Opening Brief at 52.

¹²¹ CALSSA Opening Brief at 52.

¹²² D.20-04-010 at 69-70.

recommending a resiliency adder of \$104 per kilowatt each year for residential net energy metering and \$106 per kilowatt each year for nonresidential.¹²³

SEIA/Vote Solar contends this adder is not an avoided cost to the utility that would otherwise be included in the Avoided Cost Calculator. Rather, SEIA/Vote Solar proposes the adder as a quantification of the resiliency benefits that accrue when the grid is not operating for a lengthy period, (*i.e.*, dark sky events), which SEIA/Vote Solar contends results in individual customers reaching out and assisting one another, thus benefiting all ratepayers.¹²⁴

While not proposing a particular value, PCF also supports the adoption of resiliency benefits for solar systems paired with energy storage. PCF submits paired storage offers “resiliency-related benefits that accrue to society as a whole,” such as the ability to generate onsite power during a heat wave, the ability to prevent increased emergency room visits during heat waves; the ability to prevent food spoilage and waste due to loss of refrigeration; and the ability to continue educational classes during remote learning.¹²⁵

TURN contends these societal benefits “are either private or highly speculative and limited to very unique circumstances.”¹²⁶ TURN concludes that if the Commission finds societal value in these circumstances, calculations of such value should address granular specifics such as probabilities and duration

¹²³ SEIA/Vote Solar Opening Brief at 26-27 citing SVS-03 at 18, line 2. *See also* SVS-3 at Attachment B. SEIA/Vote Solar proposes the value of the residential resiliency calculator to be based on the average cost of a portable inverter electric generator, plus sales tax, fuel storage costs, and the installation of a manual transfer switch to feed circuits in the home. SEIA/Vote Solar estimates this cost to be \$3,605 and assumes availability of this generator for seven days of interruption in a 10-year period.

¹²⁴ SEIA/Vote Solar Opening Brief at 28.

¹²⁵ PCF Opening Brief at 22-23.

¹²⁶ TURN Reply Brief at 18.

of outages.¹²⁷ Joint Utilities argue that the adoption of the 2021 Avoided Cost Calculator should account for all discernable benefits the Commission deems reasonable to incorporate into the cost-effectiveness analysis.¹²⁸ Joint Utilities contend that “no additional, unquantified benefits should be added, much less ones the Commission already has rejected.”¹²⁹

We decline to adopt SEIA/Vote Solar’s resiliency adder. Neither SEIA/Vote Solar nor PCF have provided convincing evidence that the examples of resiliency benefits offered are more than individual benefits. We agree with TURN that the examples given by PCF and SEIA/Vote Solar are either private or highly speculative and limited to unique circumstances; none of which would lead us to ascribe a resiliency adder for all net energy metering customers. While we decline to quantify resiliency benefits in this Decision, we recognize that evolving analysis and changing grid conditions may result in more persuasive arguments in favor of quantifying resiliency benefits in the future, especially locational ones; the Commission may consider this issue at a future time.

We also decline to adopt the proposed societal benefits of an updated social cost of carbon metric, land conservation, a reduced methane leakage multiplier; and avoided future transmission costs. We find these benefits are not solely applicable to net energy metering; other distributed energy resources could reduce methane leakage and avoid future transmission cost. The Commission stated in D.20-04-010, that the consideration of the benefits of grid services provided by specific distributed energy resources should be addressed in resource-specific proceedings. Because some of these benefits (methane

¹²⁷ TURN Reply Brief at 18.

¹²⁸ Joint Utilities Reply Brief at 13.

¹²⁹ Joint Utilities Reply Brief at 13.

leakage and updated cost of carbon) can be attributable to resources other than net energy metering, it is not appropriate to determine values only for net energy metering resources. Furthermore, most of these benefits (out-of-state methane leakage, incremental greenhouse gas reduction, and land conservation and use) are already accounted for in the Avoided Cost Calculator, as noted by Joint Utilities.¹³⁰ Thus, allowing for an additional value for these societal benefits would result in the double counting of these benefits.

8.2.3. The Number of Years to Payback Should Appropriately Balance Participant and Nonparticipant Needs

TURN defines the payback period as the length of time required for participating customer bill savings to recover the participating customer's investment in the net energy metering-eligible resource.¹³¹ Similarly, Public Advocates Office defines the payback period as "the time it takes for a customer to recoup the total installation costs of their system through their cumulative total annual bill savings."¹³² Parties agree to differing degrees that the Commission should consider the length of time for a customer's payback period when determining the reasonableness of the successor tariff. Parties' opinions diverge on the length of time for a reasonable payback period and how to calculate that period. We discuss these divergences below.

PCF asserts the Commission should evaluate the successor tariff based on whether customers receive an attractive economic value proposition.¹³³ PCF explains that while some customers may adopt solar to combat climate change,

¹³⁰ IOU-02 at 33.

¹³¹ TURN Opening Brief at 36.

¹³² Transcript at 922:6-10 (August 2, 2021).

¹³³ PCF Opening Brief at 32.

most will only invest if they recover their costs.¹³⁴ Most, if not all, parties support this proposition, including SEIA/Vote Solar, who states sustainable growth requires reasonable economics for participants;¹³⁵ Environmental Working Group, who contends sustainable growth for solar requires “a sufficiently attractive product for a large number of residents to choose to invest in it;”¹³⁶ and CALSSA, who identifies a reasonable cost recovery or payback period as the best measure of circumstances allowing consistent growth in distributed generation.¹³⁷

Further advocating for a focus on payback periods, SEIA/Vote Solar submits that net energy metering customers consider payback periods as well as bill savings when deciding whether to invest in distributed energy resources.¹³⁸ PCF also supports the use of payback periods, asserting that a reasonable payback period remains a key determinant of whether distributed generation presents a viable economic value proposition.¹³⁹ Similarly, CALSSA states “payback is by far the most important indicator of customers’ willingness to invest and, therefore, the best indicator of whether a party’s proposal will ensure ‘customer-sited renewable distributed generation continues to grow sustainably.’”¹⁴⁰

¹³⁴ PCF Opening Brief at 32.

¹³⁵ PCF Opening Brief at 34 citing SVS-03 at 27.

¹³⁶ PCF Opening Brief at 34-35 citing EWG-01 at 40.

¹³⁷ CALSSA Opening Brief at 19, citing CSA-01 at 60:15 - 61:23.

¹³⁸ SEIA/Vote Solar Opening Brief at 32.

¹³⁹ PCF Opening Brief at 40.

¹⁴⁰ CALSSA Opening Brief at 23.

Continuing the discussion of payback periods, Solar parties have varying opinions on the length of time for the payback period. CALSSA's targeted cost recovery period is seven years and is based on the collective experience of its members.¹⁴¹ SEIA/Vote Solar contends a simple payback period longer than 10 years is unlikely to attract significant customer interest.¹⁴² Further, SEIA/Vote Solar opposes payback periods of more than 15 years, stating this is far longer than the average Californian stays in their home.¹⁴³ SBUA presents an analysis asserting that increasing the payback period from five to nine years reduces solar uptake by 55 percent.¹⁴⁴ SBUA's analysis looked at state level data from several sources, and set the payback period as the average payback reported for each state by Energy Sage and Solar Nation, the installation rate as the capacity of residential behind-the-meter solar installations from December 2020, and the potential installation rate determined by a National Renewable Energy Laboratory (NREL) analysis of rooftop PV technical potential.¹⁴⁵

In further support of short payback periods, CALSSA maintains that "[c]ustomers do not invest their own capital in projects when the only expectation is to get their money back over time" and claims that seven years with a negative return is the upward bound of what should be considered acceptable for residential customers.¹⁴⁶ CALSSA cites the NREL dGen model, which assesses market demand for residential solar under different policy

¹⁴¹ CALSSA Opening Brief at 20 citing CSA-01 at 60:15 – 61:23.

¹⁴² SEIA/Vote Solar Opening Brief at 33 citing SVS-04 at 37 and SBU-01 at 24 and Figure 3.

¹⁴³ SEIA/Vote Solar Opening Brief at 34.

¹⁴⁴ SBU-01 at 24.

¹⁴⁵ SBU-01 at 24.

¹⁴⁶ CALSSA Opening Brief at 20 citing CSA-01 at 60:15 – 61:23.

assumptions,¹⁴⁷ and an NREL study published in 2013 (2013 NREL Study) to argue the portion of the eligible market base willing to adopt solar drops precipitously as the cost recovery period moves from five to ten years.¹⁴⁸ Joint Utilities argue the 2013 NREL Study does not support CALSSA's argument. Rather, Joint Utilities assert, the study indicates monthly bill savings is the most important economic factor in households' decisions whether to adopt solar.¹⁴⁹ (See Table 4 below from the 2013 NREL Study.)

Metric	Buyers	Leasers	Non-Adopters
Monthly Bill Savings	40.3%	60.5%	43.4%
Payback Time	29.5%	16.1%	41.8%
Rate of Return	17.1%	9.8%	6.3%
Net Present Value	2.2%	1.6%	3.5%
Would Not Estimate Economics	3.0%	4.6%	3.7%
Other	7.8%	7.2%	1.4%

Joint Utilities point to several statements from the study that demonstrates "lowering total electricity costs and protecting one's household from future increases in prices are now the two more important reasons."¹⁵¹ Joint Utilities also reference the study's statement that "[c]oncerns over high electricity bills, in

¹⁴⁷ CALSSA Opening Brief at 21 citing CSA-01 at 61:24-62:3, which cites to the Distributed Generation Market Demand Model, NREL, <https://www.nrel.gov/analysis/dgen>.

¹⁴⁸ CALSSA Opening Brief at 21-22 and at footnote 109 citing CSA-01 at 61:24 - 62:3, which cites to Ben Sigrin, National Renewable Energy Laboratory, Diffusion into new markets: Economic returns required by households to adopt rooftop photovoltaics (January 2014) https://www.researchgate.net/publication/282888559_Diffusion_into_new_markets_Economic_returns_required_by_households_to_adopt_rooftop_photovoltaics) (2013 NREL Study).

¹⁴⁹ Joint Utilities Reply Brief at 26, noting that the data for the 2013 NREL Study precedes AB 327 and reflects a much different market than today.

¹⁵⁰ Joint Utilities Reply Brief at 27 citing 2013 NREL Study at 6.

¹⁵¹ Joint Utilities Reply Brief at 27 citing 2013 NREL Study at abstract.

addition to concern about future rate changes is [sic] often highlighted as a motivation for adopting solar – supported by our results, particularly in California, which has some of the highest retail rates of the nation.”¹⁵² Further, Joint Utilities and Public Advocates Office reference another NREL study from 2017, which found that 72 percent of solar adopters used monthly or annual electric bill savings as their motivating metric, while only 13.3 percent used the payback period.¹⁵³

Joint Utilities and Public Advocates Office contend current payback periods are short. Joint Utilities note the Lookback Study estimates residential NEM 2.0 customer payback periods of three to five years.¹⁵⁴ Referring to these payback times, Joint Utilities maintain they are far less than the NEM 2.0 20-year legacy period and the estimated 35-year estimated useful life represented by a major solar manufacturer.¹⁵⁵ Public Advocates Office states, “[i]t speaks volumes that even SEIA’s expert witness testified that the current payback periods in California are too short.”¹⁵⁶ Joint Utilities advocate that longer payback periods are reasonable. Further, Joint Utilities reference the White Paper, which shows a payback period of 4.1 years using SDG&E’s rate, indicating that payback times may be far lower for more recent installations.¹⁵⁷

¹⁵² Joint Utilities Reply Brief at 27 citing 2013 NREL Study at 6.

¹⁵³ Joint Utilities Reply Brief at 27 citing PAO-02 at 3-16 to 3-17.

¹⁵⁴ Joint Utilities Reply Brief at 53.

¹⁵⁵ Joint Utilities Reply Brief at 25.

¹⁵⁶ Public Advocates Office Opening Brief at 27 citing Hearing Transcript, Volume 8 at 1282-1283, Testimony of Thomas R. Beach: “I think that all parties for this case, as far as I know, have agreed that paybacks should be longer in California, that they’re too short.”

¹⁵⁷ Joint Utilities Opening Brief at 25.

We reiterate our previous statement that our analysis of the successor tariff requires balancing multiple – and sometimes conflicting – legislative requirements and guiding principles, as well as balancing the needs of participants and nonparticipants. Hence, no single method of analysis will be the overriding determinant of a final successor tariff, including the length of time for the payback period.

With respect to the payback period, we agree with most parties that the Commission should consider the length of time for a customer’s payback period when determining the reasonableness of the successor tariff. However, turning to the three studies referenced by parties, we are not persuaded that payback periods are the predominant factor for customers when considering solar adoption. Ultimately, we find that both the 2013 and 2017 NREL studies show that consumers (especially in California where rates are amongst the highest in the nation) look at monthly bill savings when making an economic decision on adopting solar. In fact, the 2013 NREL Study states that:

previously, the consumer behavior literature has suggested that residential customers primarily use a simple payback time to evaluate a new technology. However, with the strong growth of third-party owned systems, we expected that leasing customers are frequently being pitched PV systems based on the monthly bill savings rather than a payback time. Surprisingly, customers who bought PV systems are also increasingly using monthly bill savings.¹⁵⁸

Despite this determination, we find it reasonable – from a customer protection perspective – to ensure that the successor tariff results in ten years to payback for solar paired storage systems. As noted by TURN, a tariff expected to produce a full discounted payback in a future year may still result in the

¹⁵⁸ 2013 NREL Study at 6.

customer realizing net savings in every year.¹⁵⁹ As we have already found monthly bill savings is the predominant factor in deciding to adopt solar, we find 10 years to payback for a paired storage system in combination with the monthly bill savings presents a balanced approach to promoting the continued adoption of solar. The increased number of years to payback, in addition to the other elements of the adopted successor tariff, will work towards alleviating a future cost shift, as was experienced in both NEM 1.0 and NEM 2.0. Our modeling results in Section 8.5.5 below indicate that the paired storage system is also closer to cost-effective as compared to stand-alone solar. We discuss this in Section 8.5.5. We do not establish a specific payback period for standalone solar, as our intention in the successor tariff is to encourage customer adoption of paired solar with storage.

Relatedly, parties also discuss the differing analyses to determine the number of years to payback. SEIA/Vote Solar cautions the Commission to understand the different payback metrics. TURN also acknowledges that parties use different payback metrics and therefore cautions the Commission to “ensure any reliance on payback periods uses consistent metrics and does not conflate the various approaches.”¹⁶⁰ TURN lists the five basic payback methods as: 1) simple payback; 2) escalated simple payback; 3) simple discounted payback; 4) E3 payback; and 5) full discounted payback.¹⁶¹

SEIA/Vote Solar explains that the simple payback method (the capital cost of a system divided by the first-year bill savings) assumes the customer pays cash for the system and does not consider ongoing maintenance costs, the time

¹⁵⁹ TURN Opening Brief at 38.

¹⁶⁰ TURN Opening Brief at 36.

¹⁶¹ TURN Opening Brief at 36.

value of money, or the need to earn a return on their investment.¹⁶² TURN describes the full discounted payback as having the ability to quantify either a stream of annual lease costs, or a scenario where a participating customer purchases a resource upfront and finances the resource over time.¹⁶³ Explaining that a 10-year discounted payback can result in a simple payback of as little as 5 years, TURN asserts the full discounted payback metric does not reveal the extent to which a customer realizes positive cash flow (which TURN defines as annual bill savings exceeding annual expenses) in any particular year.¹⁶⁴

The number of years to payback should reflect all costs of solar and solar paired storage adoption, including maintenance. We have taken this into consideration in the determination of the successor tariff we adopt in this decision. In the model used to develop the elements of the successor tariff, maintenance costs are included in the cost of the distributed generator (resulting in what TURN refers to as the “E3 payback method”). We discuss the modeling and modeling results in Section 8.5.5 below.

8.2.4. NREL Cost of Solar is Reasonable

CALSSA contends the \$2.34 per watt cost of solar used by Joint Utilities, NRDC, and TURN is an idealized cost of residential solar that does not reflect real-world pricing and results in “overly” low estimates of cost-recovery periods, especially for small companies.¹⁶⁵ CALSSA asserts the NREL Annual Technology Baseline estimated cost is a bottoms-up analysis rather than an analysis of actual market prices, and highlights that main panel upgrades,

¹⁶² SEIA/Vote Solar Opening Brief at 32-33.

¹⁶³ TURN Opening Brief at 37 citing TRN-01 at 76.

¹⁶⁴ TURN Opening Brief at 37-38.

¹⁶⁵ CALSSA Opening Brief at 29.

permitting and interconnection delays, and financing costs are not included in the NREL estimated cost.¹⁶⁶ CALSSA maintains there are more realistic sources for the actual cost of solar and recommends the Commission utilize the December 2020 edition of the “Tracking the Sun” report, which estimates the average cost of solar to residential customers in California was \$3.80 per watt in 2019.¹⁶⁷

TURN responds to CALSSA’s arguments to use the higher cost estimate from “Tracking the Sun.” TURN maintains that instead of relying on historical market prices, the Commission should estimate future installation costs and, thus, relying on the NREL data provides the best snapshot of future costs available in this proceeding.¹⁶⁸ Further, TURN disputes claims that the NREL estimate does not include costs for financing, main electrical panel upgrades, and permitting and interconnection delays. TURN replies that the impact of finance costs cannot be captured in a simple payback cost recovery calculation and thus TURN used a full discounted payback period, which captures financing costs.¹⁶⁹ With respect to the other costs CALSSA alleges is omitted from the NREL estimate, TURN contends these costs should not be included because “they are not incurred for most installations and therefore should not be assumed in base case quantifications.”¹⁷⁰ TURN points to a CALSSA survey that found only 28 percent of new installations involve main panel upgrades.¹⁷¹

¹⁶⁶ CALSSA Opening Brief at 29 citing CSA-01 at 63:7 to 67:10.

¹⁶⁷ CALSSA Opening Brief at 32 citing CSA-01 at 63:7 to 67:10.

¹⁶⁸ TURN Reply Brief at 27.

¹⁶⁹ TURN Reply Brief at 27.

¹⁷⁰ TURN Reply Brief at 27.

¹⁷¹ TURN Reply Brief at 28.

We find the use of the NREL estimate of \$2.34 per watt as the cost of solar to be reasonable. Only CALSSA disputes this value. We are persuaded by TURN's arguments that the NREL estimate is the best estimate of the cost of solar available in this proceeding.

8.3. Policies for the Successor Tariff

Parties presented recommended policies for the successor tariff. Of the recommended policies, most parties agree that the successor tariff should have a glide path from the current tariff to the successor and that the successor should encourage paired storage, ensure equity, and promote electrification. Disparity of opinions occurred in the specifics of these policies. Below we present the recommended policies, the varying opinions of the pros and cons for adoption, and our determinations.

8.3.1. The Successor Tariff Should Include a Glide Path

Several parties advocate for inclusion of a glide path in the successor tariff. Noting the White Paper's recommendation for a gradual pace of change, CALSSA proposes an eight-year transition to the future final tariff design, which CALSSA recognizes must include energy storage as a major part of the market. Underscoring multiple obstacles to reaching maturity in the paired storage market, CALSSA cautions the Commission to design a transition period that will allow the current market to remain strong until maturity in the paired storage market is attained.¹⁷² CALSSA asserts the barriers include the still relatively high price of storage, increased demand for storage resources in light of growing electric vehicle adoption, outdated building codes and standards, and limited

¹⁷² CALSSA Opening Brief at 109.

contractor expertise.¹⁷³ CALSSA recommends a glide path of decreasing export rates in five steps, where each step reflect a percentage of a utility's retail rate. CALSSA explains that the eight-year glide path would have four transitions after the initial implementation, with each step designed to take two years.¹⁷⁴ SEIA/Vote Solar propose a similar rate step down glide path, which it contends is similar to a Market Transition Credit in that it gradually decreases over time thus reducing any existing cost shift.¹⁷⁵ Pointing to net energy metering tariff experience in Nevada and Hawaii, SEIA/Vote Solar asserts a glide path would alleviate downturns in the solar market, along with related job losses.¹⁷⁶

Sierra Club supports a glide path with step-downs as well, but different from CALSSA and SEIA/Vote Solar. Sierra Club proposes setting export compensation at the qualifying electrification retail rate with 1 gigawatt step-downs reducing export compensation ten percent from the 2021 rate to short-run avoided cost, where avoided cost is reached after 10 gigawatts of total deployment.¹⁷⁷ Maintaining that a glide path is necessary to avoid market shock and ensure customer-sited renewable generation continues to grow sustainably,¹⁷⁸ Sierra Club cautions that absent a glide path the Commission could experience “an immediate disruption in installations as the economics to install solar would drop, followed by an uncertain recovery dependent on future

¹⁷³ CALSSA Opening Brief at 109-112.

¹⁷⁴ CALSSA Opening Brief at 87.

¹⁷⁵ SEIA/Vote Solar Opening Brief at 38.

¹⁷⁶ SEIA/Vote Solar Opening Brief at 38-39.

¹⁷⁷ Sierra Club Opening Brief at 14-16.

¹⁷⁸ Sierra Club Opening Brief at 16.

changes to the Avoided Cost Calculator.”¹⁷⁹ Referencing the experience of other states implementing net energy metering tariff changes, Sierra Club asserts the record demonstrates that a stepdown approach allows solar installations to remain stable.¹⁸⁰

Public Advocates Office contends the magnitude and severity of the cost shift requires the acceleration of net energy metering reform but if the Commission finds a glide path necessary, it recommends a one- to two-year interim rate whereby “the export compensation rate is set at a defined percentage reduction to the non-CARE ‘net’ electrification retail rate at the time the interim successor tariff is enacted in 2022. The ‘net’ electrification retail rate is the residential electrification retail rate net of the four nonbypassable charges recognized under NEM 2.0 and the Power Charge Indifference Adjustment.”¹⁸¹ Others supporting this interim rate as a glide path include TURN,¹⁸² NRDC,¹⁸³ CUE,¹⁸⁴ CalWEA,¹⁸⁵ and IEPA.¹⁸⁶

Opposing the “gradualism” advocated for by CALSSA and SEIA/Vote Solar, Joint Utilities argue this is “not a plan to avoid abrupt or overnight change, but rather a request to perpetuate the inequity caused by the current net energy

¹⁷⁹ Sierra Club Opening Brief at 16 citing ASO-01 at 14.

¹⁸⁰ Sierra Club Opening Brief at 16 citing ASO-02 at 8-9.

¹⁸¹ Public Advocates Office Opening Brief at 42 and A-11 to A-12.

¹⁸² TURN Reply Brief at 92-93.

¹⁸³ NRDC Opening Brief at 38-41.

¹⁸⁴ CUE Opening Brief at 19-20.

¹⁸⁵ See Public Advocates Office Opening Brief at Appendix A listing CalWEA as one of the groups supporting the recommendation for an interim rate (*i.e.*, glide path).

¹⁸⁶ IEPA Opening Brief at 24-25.

metering program.¹⁸⁷ Further, Joint Utilities contend its proposal offers a natural glide path for transition from NEM 2.0 to the successor tariff.

As explained in the White Paper, “[p]reservation of a viable market is likely to require a ‘glide path’ including both a gradual rate reform and an external transitional support mechanism designed specifically to enable a reasonable payback period for customers investing in onsite renewable generation.”¹⁸⁸ Previously in this decision, we stated that any proposed change to the tariff should consider the impact on the growth of the customer-sited renewable distributed generation market. We find that inclusion of a glide path is essential to balance the multiple requirements the tariff is required to meet. However, we agree with Public Advocates Office that the magnitude and severity of the cost shift requires immediate action by the Commission. Hence, we find the glide path proposal by CALSSA and SEIA/Vote Solar inadequate. While we adopt a glide path in the successor tariff, we do so in a balanced approach that minimizes any cost shift to ensure equity among all customers, but also encourages market growth that does not occur at the undue and burdensome financial expense of nonparticipant ratepayers. We address the design of the glide path in Sections 8.4 and 8.5 below.

8.3.2. The Successor Should Promote Equity and Inclusion

AB 327 mandates the Commission to adopt a successor to the existing net energy metering tariff that includes “specific alternatives designed for growth among residential customers in disadvantaged communities.” Further, in D.21-02-007, the Commission adopted guiding principles to assist in the

¹⁸⁷ Joint Utilities Opening Brief at 3-4.

¹⁸⁸ White Paper at Executive Summary.

development and evaluation of a successor, one of which requires the successor to ensure equity among customers. Hence, parties addressed the issues of equity and inclusion in testimony and briefs. The discussion included general policies and, in some cases, specific tariff elements. We address the general policy aspects of equity here; proposals for equity tariff elements are discussed in Section 8.4 below.

Many parties advocated that the successor tariff should promote equity and inclusion both with respect to the costs of net energy metering as well as direct and indirect benefits. PCF states the Commission should address equity concerns by expanding access to net energy metering to more low-income customers, renters, and multi-unit building residents.¹⁸⁹ While noting a tenfold growth in low-income solar adoption rate between 2010 and 2019,¹⁹⁰ CALSSA contends the successor tariff must increase adoption of solar and other distributed generation by customers in disadvantaged communities, as intended by the Legislature.¹⁹¹ GRID emphasizes that the equity issue has two sides: 1) disproportionate impacts on ESJ communities from burning fossil fuels; and 2) ensuring access to electrification technologies.¹⁹² GRID contends that any equity program should include adoption of the following policies: 1) increased net energy metering deployment in ESJ communities; 2) payback periods and bill savings for ESJ customers greater than or equal to those in NEM 2.0; 3) allowing third-party ownership; and 4) encouraging storage adoption by ESJ customers.¹⁹³

¹⁸⁹ PCF Opening Brief at 58.

¹⁹⁰ CALSSA Opening Brief at 56.

¹⁹¹ CALSSA Opening Brief at 55.

¹⁹² GRID Opening Brief at 1.

¹⁹³ GRID Opening Brief at 15-19.

Joint Utilities approach the equity issue differently, contending that to do the greatest good for lower-income customers, the Commission should focus “first and foremost on ending the cost shift.”¹⁹⁴ However, Joint Utilities submit their equity proposal will narrow the adoption gap; we discuss this and other equity proposals in Section 8.4 below. Similarly, CalWEA, CUE, IEPA, NRDC, Public Advocates Office, and TURN recommend that a net energy metering successor tariff should help low-income customers by first reforming net energy metering rates and export compensation to reduce the cost shift.¹⁹⁵ However, this group of parties also recommends the successor help low-income customers participate in net energy metering by prioritizing incentives and reducing initial system costs.¹⁹⁶

Relatedly, parties discuss eligibility requirements for low-income net energy metering opportunities. Currently, customers eligible for the CARE and FERA programs are eligible for low-income solar and storage programs that utilize the net energy metering tariff. Proposing to set the income eligibility at 80 percent of the AMI, Grid Alternatives and CALSSA contend this is a well-accepted benchmark for low-income customers and it has been adopted in the Commission’s ESJ Action Plan.¹⁹⁷ CALSSA further asserts revising the eligibility requirements for equity net energy metering programs to be based on

¹⁹⁴ Joint Utilities Opening Brief at 73-74.

¹⁹⁵ IEPA Opening Brief at 20-21 and Public Advocates Office Opening Brief at A-1.

¹⁹⁶ IEPA Opening Brief at 20-21 and Public Advocates Office Opening Brief at A-1.

¹⁹⁷ CALSSA Opening Brief at 73 and GRID Opening Brief at 14 citing the ESJ Action Plan at 10. The ESJ Action Plan, adopted by the Commission in February 2019, is available at <https://www.cpuc.ca.gov/news-and-updates/newsroom/environmental-and-social-justice-action-plan>.

the AMI would further advance equity goals.¹⁹⁸ CALSSA explains that over two-thirds of four-person households in the top 25 percent disadvantaged communities have incomes at or below 80 percent of AMI and nearly one quarter of these households have incomes above the CARE eligibility threshold (200 percent of the federal poverty level).¹⁹⁹ Further, GRID notes that the 80 percent of AMI threshold is also used in the Commission's Self Generation Incentive Program (SGIP).²⁰⁰ CALSSA asserts maintaining the CARE and FERA eligibility requirements restricts the reach of equity proposals.²⁰¹

The guiding principles adopted in this proceeding confirmed that a successor will strive to both ensure equity among all ratepayers and expand net energy metering to disadvantaged communities. We disagree with Joint Utilities that the equity issue can be addressed solely by reducing the cost shift. Disadvantaged communities should not continue to be left behind with respect to clean energy options, including electrification and storage. The successor tariff will address the equity issue by working to ensure increased participation by disadvantaged communities. Accordingly, the successor tariff will include elements to both combat the cost shift and increase participation by households in disadvantaged communities.

With respect to the eligibility requirements for adopted equity elements, we define low-income customers as residential customers eligible for CARE or

¹⁹⁸ CALSSA Opening Brief at 72.

¹⁹⁹ CALSSA Opening Brief at 73 citing GRD-01 at 16-17, GRD-01 at Table 3, and CSA-02 at Table 3.

²⁰⁰ GRID Opening Brief at 14 and Tr. Vol. 12 at 2137:11-22 where Public Advocates Office Witness Buchholz agrees the 80 percent AMI definition is an eligibility requirement for the SGIP.

²⁰¹ CALSSA Opening Brief at 73.

FERA, resident-owners of single-family homes in disadvantaged communities (as defined in D.18-06-0127), or residential customers who live in California Indian Country (as defined in D.20-12-003) and take service on either the standard successor tariff or aggregated net energy metering subtariff (NEMA). We clarify that this definition of low-income eligibility is only for use in the successor tariff adopted in this decision.²⁰² We disagree with Joint Utilities that the record is insufficient to establish a different low-income eligibility definition.²⁰³ However, establishing a different metric is premature at this time. For this reason, the Commission will conduct an evaluation of the equity elements we adopt in this decision to determine whether to require future changes to these policies for both low- and moderate-income customers.

The evaluation will collect five years of data from the successor tariff to focus on both affordability and equity matters. As part of the evaluation process, the term “moderate-income” should be defined through a stakeholder process. To assist the Commission in this effort, Joint Utilities shall add an optional interconnection application form field to gather income data from customers who interconnect during the first five years of the successor tariff to inform the equity element evaluation. Potential changes in eligibility metrics and/or benefits for low- and moderate-income customers will be reviewed after more information is made available in the affordability proceeding and after the 5-year evaluation. We anticipate potential future eligibility metrics could include expanding to a certain affordability ratio, maintaining the CARE, FERA, and disadvantaged communities’ eligibility, or a combination of these metrics (*e.g.*,

²⁰² Other Commission-adopted programs or tariffs may utilize other eligibility requirements.

²⁰³ Joint Utilities Opening Brief at 79.

CARE customers who live in disadvantaged communities), or other metrics. Following the issuance of the evaluation, parties will have an opportunity to provide comment and the Commission will consider the contents of the evaluation and associated party comments in a future decision.

The record of this decision does not contain the specifics of the evaluation. As such, a ruling will be issued following the adoption of this decision to assist the Commission in better defining the parameters and implementation of the five-year evaluation. A future decision will consider these details.

8.3.3. The Successor Should Promote Electrification

No party opposes the promotion of electrification by a successor tariff, but there is disparity regarding the approach. We agree with NRDC that the successor tariff should encourage net energy metering customers to consume electricity when carbon-free energy is abundant, and to export electricity onto the grid when carbon-intensive electricity is at the margin; both of these actions should incentivize beneficial electrification.²⁰⁴ We discuss the pros and cons of the varying approaches in Section 8.4 below. In this section, we discuss general policies regarding the relationship between net energy metering and electrification.

We begin with a discussion of how the structure of the net energy metering tariff influences customer decisions on electrification. Several parties contend the current structure of the tariff and its cost shift discourage electrification. Joint Utilities assert the cost shift makes electricity more

²⁰⁴ NRDC Opening Brief at 23.

expensive for everyone and makes electrification less attractive.²⁰⁵ PCF disagrees that the cost shift is responsible for high electricity prices, stating that transmission and distribution charges remain by far the largest contributors to electricity prices, as well as the restructuring of residential tariffs.²⁰⁶ Pointing to the transmission charges, PCF contends these charges have risen by \$2.3 billion a year since 2007.²⁰⁷ While supporting PCF's contentions regarding transmission charges, SEIA/Vote Solar asserts there are a number of reasons that electric rates are high. We agree that the net energy metering cost shift alone is not responsible for the entirety of high rates in California. But a cost shift exists, and continuation of the cost shift feeds into higher electricity rates, which discourages electrification. Accordingly, the successor tariff should address the cost shift not only to ensure equity but also to encourage electrification to ensure California can meet its climate and clean energy objectives.

Supporting the status quo, PCF argues that the current structure of the tariff promotes electrification goals.²⁰⁸ Pointing to the results of the Lookback Study, PCF asserts that net energy metering customers are more likely to adopt an electric vehicle than an individual who does not have such a system.²⁰⁹ SEIA/Vote Solar supports this assertion, concluding from the Lookback Study that "a customer's investment in a solar system is often the precursor and

²⁰⁵ Joint Utilities Opening Brief at 89 citing IOU-01 at 1:3-14, 15:32-16:3. *See also* IEPA Opening Brief at 26 and Public Advocates Office Opening Brief at 35.

²⁰⁶ PCF Opening Brief at 52 citing PCF-01 at 14 and PCF-24 at 15.

²⁰⁷ PCF-24 at 15.

²⁰⁸ PCF Opening Brief at 52-55.

²⁰⁹ PCF Opening Brief at 54-55 citing PCF-15 at 4 and 30 (Lookback Study).

catalyst for other types of [distributed energy resources] such as electric vehicles and electric appliances.”²¹⁰

We do not necessarily disagree with either of these statements, but these statements are about net energy metering customers and not the current tariff structure. We disagree that the Lookback Study shows that the current tariff structure promotes electrification goals. The objectives of the study were to “examine the impacts of NEM 2.0 and to compare how different metrics have changed following the transition from NEM 1.0 to NEM 2.0;”²¹¹ electricity consumption patterns are not even discussed in the key takeaways. Further, energy consumption patterns included in the study contain insufficient data to make the assertion that the current tariff structure promotes electrification; there was incomplete data regarding change in consumption for SCE customers.²¹² Without complete data and more in-depth analysis on electricity consumption patterns, assertions regarding the promotion of electrification cannot be made nor relied upon in this decision.

We address one additional policy consideration with respect to net energy metering and electrification. First, SEIA/Vote Solar submits the successor tariff should advance California’s electrification goals by allowing new customers to oversize their systems by 50 percent, as this would allow solar customers to grow their loads through the purchase of electric vehicles and electric appliances over time.²¹³ SEIA/Vote Solar proposes the net surplus compensation rate be set

²¹⁰ SEIA/Vote Solar Reply Brief at 40 citing Lookback Study at 62. *See also* Lookback Study at Table 3-1 indicating 30 percent increased electric usage after adding solar.

²¹¹ Lookback Study at 2.

²¹² Lookback Study at Table 1-1.

²¹³ SEIA/Vote Solar Opening Brief at 41 and 46.

equal to current avoided costs for distributed energy resources.²¹⁴ Contending this expands upon existing opportunities, SEIA/Vote Solar points to the SCE document: *Net Energy Metering System Residential Customer System Size Acknowledgement 30 kW or Less*, which SEIA/Vote Solar states “allows for the customer to attest to oversizing their system provided that the customers also attests that it expects to increase its usage accordingly in the next year.”²¹⁵ Sierra Club supports a similar proposal, recommending systems be sized to meet a household’s project load if fully electrified with two electric vehicles.²¹⁶

SEIA/Vote Solar highlights that Public Advocates Office supports oversizing, with exports and annual net surplus generation compensated at avoided costs and with the requirement that, after five years, the net surplus generation compensation would decrease from avoided costs to wholesale rates to incentivize the customer toward more rapid electrification.²¹⁷ Public Advocates Office explains this would address a serious flaw in SEIA/Vote Solar’s proposal, in that it does not encourage consumption of the solar system generation.²¹⁸ Sierra Club supports a similar proposal, recommending systems be sized to meet a household’s projected load if fully electrified with two electric vehicles.²¹⁹

²¹⁴ SVS-03 at 40.

²¹⁵ SEIA/Vote Solar Opening Brief at 47 citing <https://www.sce.com/sites/default/files/inline-files/FINAL%2BNET%2BENERGY%2BMETERING%2B%28NEM%29%2BRESIDENTIAL%2BCUSTOMER%2BSYSTEM%2BSIZE%2BACKNOWLEDGEMENT%2B30%2BKW%2BOR%2BLESS.pdf>.

²¹⁶ Sierra Club Opening Brief at vi.

²¹⁷ SEIA/Vote Solar Opening Brief at 46-47 citing PAO-02 at 5-16, lines 21-26.

²¹⁸ Public Advocates Office-02 at 5-16 to 5-17.

²¹⁹ Sierra Club Opening Brief at vi.

SEIA/Vote Solar notes that in testimony, Joint Utilities “suggest that the Commission exercise ‘extreme caution’ when considering whether to allow the oversizing of systems by [net energy metering] customers.”²²⁰ While not specifically opposing this proposal, Joint Utilities argue that Commission policy has consistently been to require that generation systems are sized to meet but not exceed a customer’s annual onsite load.²²¹

While we agree that the Commission has consistently sent a message that net energy metering systems should be sized to load, these messages were conveyed prior to the contemplation of the electrification policy. None of the decisions cited by Joint Utilities address the policy of electrification. We find SEIA/Vote Solar’s proposal, will further promote electrification and should be adopted. We make one modification; net surplus generation will be compensated at the current net surplus compensation rates, as described in Section 8.5.3 below. As Joint Utilities described, the Commission require utilities to compensate customer qualifying facilities for net surplus generation for “random, modest, inadvertent net exports” at the Default Load Aggregation Point (DLAP) price.²²² We find no reason to revise this standard. Following the SCE current practice, customers across all three Joint Utilities’ territories who oversize their systems shall attest that they expect to increase their usage accordingly in the next year. This will prevent oversizing that is not designed to meet a future increase in onsite annual load.

²²⁰ SEIA/Vote Solar Opening Brief at 47 citing IOU-02 at 69-71.

²²¹ Joint Utilities Opening Brief at 10 – 14 citing D.06-01-024 at 15, D.06-07-028 at 2-6, D.11-06-016 at 34, and D.14-11-001 at 17.

²²² Joint Utilities Opening Brief at 17 citing D.11-06-016 at 53, 65, and Conclusion of Law 25.

8.3.4. The Successor Should Transition the Solar Market to a Solar Paired with Storage Market

SEIA/Vote Solar observes party agreement that the solar industry in California must transition to paired storage.²²³ PCF points out that most parties also agree that “storage resources have the ability to increase the benefits of net energy metering solar to the grid.”²²⁴ To explain this assertion, PCF submits that storage paired with renewable generation can help flatten the demand curve and reduce strain on the grid by shifting the time renewable energy is consumed to later in the day.²²⁵ Joint Utilities agree the Commission should promote storage, stating that storage-paired solar systems can provide better alignment between grid and customer benefits.²²⁶ However, CALSSA asserts that storage will come on the back of the solar market, contending that limited battery availability and high soft costs for storage projects remain barriers to full-scale storage deployment.²²⁷ CALSSA cautions the Commission to allow time for the storage market to mature before relying primarily on paired storage.

PCF recommends the Commission encourage customers to maximize the value of their behind-the-meter systems to the grid by increasing incentives to pair solar with storage.²²⁸ Noting the small differentials between peak- and off-peak pricing weaken the price signals to customers, PCF submits time-of-use rates should be revised to provide greater differentials between peak- and

²²³ SEIA/Vote Solar Opening Brief at 47.

²²⁴ PCF Opening Brief at 57 citing IOU-01 at 103.

²²⁵ PCF Opening Brief at 57 citing PCF-01 at 10 and 12-13.

²²⁶ Joint Utilities Opening Brief at 59.

²²⁷ CALSSA Opening Brief at 2-3, citing CSA-01 at 6:10.

²²⁸ PCF Opening Brief at 55.

off-peak pricing.²²⁹ PCF contends paired storage would then be encouraged to discharge batteries during peak periods.²³⁰

We agree that the addition of storage provides greater benefits to both the customer and the grid. For example, Joint Utilities highlight that “paired storage can help manage the problems created by generation (since behind-the-meter solar cannot be curtailed), in that such excess energy can be stored...to meet load at its peak later in the day.”²³¹ Joint Utilities contend “paired storage will reduce our dependency upon carbon emitting resources.”²³² Joint Utilities also assert financial benefits to customers, maintaining that, “storage allows the customer to use energy generated by their panels during low-value midday hours later in the day when the sun is not shining and energy prices are at their highest, shortening the system payback period.”²³³ Some parties also note the importance of virtual power plant pilots underway that aggregate behind-the-meter storage projects to drive down peak demand when the grid is stressed and count toward local capacity requirements, creating a potential new value stream for storage customers.²³⁴

While we acknowledge the benefits of storage, we also recognize that the current cost of storage creates cost-effectiveness concerns as noted by the Lookback Study. The Lookback Study found that the TRC test’s benefit-cost ratio is consistently higher for solar PV systems when compared to paired

²²⁹ PCF Opening Brief at 56.

²³⁰ PCF Opening Brief at 56.

²³¹ Joint Utilities Opening Brief at 64-65 citing IOU-02 at 103:13 to 104:6.

²³² Joint Utilities Opening Brief at 65.

²³³ Joint Utilities Opening Brief at 65.

²³⁴ CSA-01 at 88 and CLC-01 at 5.

storage systems. The study surmised that this “suggests that while energy storage systems can achieve higher avoided cost benefits, the incremental costs of energy storage are greater than the avoided cost benefits they currently provide” but “future energy storage cost reductions would tend to improve the TRC for [paired storage] systems.”²³⁵ The current cost of storage also presents a barrier to widespread adoption in the near-term, as underscored by CALSSA and PCF. PCF references an analysis performed by E3, where E3 estimated that the addition of a battery increased the length of a NEM 2.0 customer’s payback period by 14 to 25 percent, depending on the utility.²³⁶ We note, however, this same analysis indicates a higher TRC test results for NEM 2.0 solar paired with storage and NEM 2.0 solar. With these facts in mind, it is and will continue to be Commission policy to encourage paired solar. We do so with both costs and benefits in mind. As discussed in Section 8.4 and 8.5 below, we adopt a successor tariff with this balance at the forefront.

8.4. Elements to Include in the Successor Tariff

Parties presented recommended policies for the successor tariff. Of the recommended policies, we find the structure of the successor tariff should be revised to be a better version of net billing, with an export compensation rate better aligned with the value exported energy provides to the grid based on when the value in terms of energy is provided. Hence, export compensation should be based on avoided cost values and successor tariff customers should pay for their usage of the grid. Further, the import rate should align with our

²³⁵ Lookback Study at 7.

²³⁶ PCF Opening Brief at 57 citing CSA-32 at 34-35 (E3, Cost-effectiveness of net energy metering Successor Rate Proposals under Rulemaking 20-08-020, a Comparative Analysis (June 15, 2021). *See also* CALSSA Opening Brief at 23-24 and Tables 1 and 2.

prior determination of promoting paired storage and electrification. Finally, in order to ensure that customer-sited renewable distributed generation continues to grow sustainably, we find a glide path in the form of a Market Transition Credit offers a better option for balancing the needs of participants and all other ratepayers. We discuss each of the elements below.

8.4.1. Compensation Structure and Export Rate

Net billing allows the dollar value of credits to be set at a different level than the energy's import price. With the exception of Clean Coalition and PCF, most parties support the use of net billing as the compensation structure for the successor tariff. Public Advocates Office points out that net billing will disassociate export compensation from the retail rate, thus providing a more objective and transparent approach.²³⁷ SEIA/Vote Solar explains that the use of a net billing structure is key to its proposed successor tariff.²³⁸ Joint Utilities assert their proposal reforms the net energy metering program through adoption of a net billing structure.²³⁹ Also supporting net billing, IEPA emphasizes that net billing allows the Commission to set compensation for exports that more closely reflects the value of exports to the electrical system.²⁴⁰ Likewise, NRDC highlights that there is widespread support that the current net energy metering tariff needs to evolve to a net billing structure that compensates customers for

²³⁷ Public Advocates Office Opening Brief at 14.

²³⁸ SEIA/Vote Solar Opening Brief at 4.

²³⁹ Joint Utilities Opening Brief at xii.

²⁴⁰ IEPA Opening Brief at 1.

the value they provide to the grid.²⁴¹ The compensation value is where parties' opinions diverge.

Generally, recommendations for the export compensation structure fall into two categories: export compensation based on the retail rate (as is the structure of NEM 1.0 and NEM 2.0) and export compensation based on values from the Avoided Cost Calculator.

CUE, IEPA, Joint Utilities, NRDC, Public Advocates Office, and TURN recommend energy exported to the grid be compensated at a rate based on the Avoided Cost Calculator. Each one approaches the concept differently. However, they all agree the basic concept to this approach is to align export compensation with the value it provides to the grid based on when the value is provided.²⁴²

Opposing the direct use of the Avoided Cost Calculator for setting export compensation, CALSSA contends this undervalues exports and would result in reduced compensation and significantly lengthier payback periods.²⁴³ CALSSA provides analysis asserting this would result in payback periods of 9-18 years. Noting the admittance by Joint Utilities that the Avoided Cost Calculator "was not designed to directly inform rate design," CALSSA argues this approach exceeds the tool's capabilities.²⁴⁴ Agreeing the Avoided Cost Calculator has never been used to design rates, SEIA/Vote Solar also highlights the tool does not capture the total benefits referenced in Public Utilities Code

²⁴¹ NRDC Opening Brief at 26.

²⁴² Joint Utilities Opening Brief at 63. *See also* NRDC Opening Brief at 27, "exports should be valued at the total hourly benefit as estimated by the Avoided Cost Calculator."

²⁴³ CALSSA Opening Brief at 23 and 94.

²⁴⁴ CALSSA Opening Brief at 90-91 citing IOU-01 at 125:3-4.

Section 2827.1(b)(4).²⁴⁵ Further, CALSSA alleges that the Avoided Cost Calculator is volatile and controversial, pointing to the 2021 update process, and should only be used as a guide.²⁴⁶ In addition, SEIA/Vote Solar asserts the export compensation rate should be easily understood, explaining that “a customer’s willingness to invest in solar or solar+storage is ultimately tied to their ability to understand” their compensation.²⁴⁷ SEIA/Vote Solar concludes use of the Avoided Cost Calculator for setting export compensation rates is “far from understandable,” thus conflicting with rate design principles.²⁴⁸ SEIA/Vote Solar disputes Joint Utilities’ assertion that this approach is neither novel nor untested, maintaining that there is no evidence on whether such an approach has resulted in continued sustainable growth of the solar industry.²⁴⁹

Although CALSSA contends its proposal utilizes the Avoided Cost Calculator as a key component in ensuring export compensation rates are just and reasonable,²⁵⁰ CALSSA as well as SEIA/Vote Solar and Sierra Club urge the Commission to continue basing compensation on the retail rate but with steps that would decrease compensation over time. CALSSA proposes each subsequent step would occur when cumulative installed residential capacity reached certain designated megawatt thresholds and range from an initial 20 percent decrease in the initial step to a to 50 percent decrease in the final

²⁴⁵ SEIA/Vote Solar Opening Brief at 7.

²⁴⁶ CALSSA Opening Brief at 91-92.

²⁴⁷ SEIA/Vote Solar Opening Brief at 39.

²⁴⁸ SEIA/Vote Solar Opening Brief at 40.

²⁴⁹ SEIA/Vote Solar Reply Brief at 42.

²⁵⁰ CALSSA Opening Brief at 86.

step.²⁵¹ CALSSSA warns that the depth of change is based on what CALSSA believes the market can bear.²⁵² Similarly SEIA/Vote Solar recommends a step-down approach, which would reduce export compensation by 50 percent by the year 2030.²⁵³ SEIA/Vote Solar explains its step-down approach, in combination with the requirement for customers to take service under current time-of-use or electrification rates, would bring bill savings for residential customers into alignment with the benefits of their renewable generation as measured by the Avoided Cost Calculator. SEIA/Vote Solar underscores its step-down approach provides a glide path, which results in a reasonable payback for customers as the market transitions.²⁵⁴ Instead of creating a new rate with complex features or fixed charges, Sierra Club proposes maintaining the current structure and for each gigawatt of total solar deployment, compensation for each successor “tranche” of net energy metering customers would decrease by ten percent toward avoided cost as determined by that year’s Avoided Cost Calculator. Sierra Club estimates that once the three utilities reach ten gigawatts of total rooftop solar deployment, compensation would reach avoided cost.

Continuing to base export compensation on retail rates does not comply with Public Utilities Code Section 2827.1, thereby conflicting with one of our guiding principles. Retail rates do not reflect the actual costs of the exports or the benefits the exports provide to the utilities and the grid, both of which we need to ensure are approximately equal pursuant to Section 2827.1. We acknowledge Public Advocates Office’s analysis that basing export rates on retail

²⁵¹ CALSSA Opening Brief at vii.

²⁵² CALSSA Opening Brief at vii.

²⁵³ SEIA/Vote Solar Opening Brief at 5.

²⁵⁴ SEIA/Vote Solar Opening Brief at 38.

rates has resulted in compensation levels 3.8 to 5.4 times higher than the benefits they provide to the electrical systems in the form of avoided costs.²⁵⁵ We conclude that export compensation should be based on values derived from the Avoided Cost Calculator. Using avoided cost values instead of the retail rate brings the cost of the successor tariff for utilities closer to its value, thus complying with two other guiding principles: ensuring equity among customers; and maximizing the value of the resource to all customers and to the electrical system. For these reasons, we also decline to adopt the SEIA/Vote Solar or CALSSSA stepped-down approach that continues to use the retail rate export compensation. Export compensation based on the Avoided Cost Calculator sends more accurate price signals and promotes paired storage, another objective of the successor tariff.

In arguing against use of the Avoided Cost Calculator, SEIA/Vote Solar asserts a lack of evidence on whether such an approach has resulted in continued sustainable growth of the solar industry. While the record contains only a few examples of its use, we remind SEIA/Vote Solar that ensuring growth is not our only concern. However, using this approach to ensure the costs and benefits are approximately equal, as instructed by the Legislature, should lead to positive outcomes for customers and nonparticipating ratepayers. We are not swayed by the arguments that the Avoided Cost Calculator is volatile and inconsistent. Except for the 2020 version, the Avoided Cost Calculator has consistently reflected the value of exported energy, year after year. We agree that the Avoided Cost Calculator values will ensure export compensation is based on the benefits they provide to the system and will, therefore, reduce the previously

²⁵⁵ Public Advocates Office Opening Brief at 14 citing Public Advocates Office-03 at 2-21, Table 2-3 and ln. 10-12.

confirmed cost shift. While we recognize the warning by CALSSA and SEIA/Vote Solar to proceed in a measured fashion, we have other elements and tools that we can use to produce such a measured approach, as we explain in Section 8.5 below.

Lastly, we acknowledge SEIA/Vote Solar's position that export compensation rates should be easily understood. SEIA/Vote Solar concludes that use of the Avoided Cost Calculator for setting export compensation rates is "far from understandable," and conflicts with rate design principles. We disagree. As noted by Public Advocates Office, these claims ignore the reality that the mechanics behind any retail rate design are complex.²⁵⁶ We agree with Public Advocates Office that customers will be able to understand that their exports are compensated on a per kilowatt-hour basis without having to understand the avoided cost components.²⁵⁷

However, we also recognize there are multiple pieces to the export compensation rate, which can lead to confusion for customers. We agree that we should ensure customers can understand the export compensation rate to be able to make an informed decision on whether to purchase solar. Hence, we look to simplify while balancing all other requirements and principles. We discuss this and the specifics of the export compensation rate in Section 8.5 below.

8.4.2. Nonresidential Successor Tariff

Noting the TRC and PCT scores from the Lookback Study, CALSSA, SEIA/Vote Solar, Foundation Wind, and SBUA all contend that nonresidential NEM 2.0 is cost-effective, and, therefore, the Commission should retain the same

²⁵⁶ Public Advocates Office Opening Brief at 18.

²⁵⁷ Public Advocates Office Opening Brief at 18.

structure for the successor tariff. However, as discussed below, the Commission should look broadly at the objective of our review of the current net energy metering tariff and ensure that all retail rates are aligned with the true costs of the exports and the benefits the exports provide to the utilities and the grid.

Foundation argues that the Lookback Study's data and analysis regarding the cost-effectiveness of medium and large commercial, industrial and agricultural customers deploying wind energy facilities must not be overlooked.²⁵⁸ Foundation further contends the Guiding Principle instructing the successor to fairly consider all technologies should allow the Commission to treat one technology differently from others, thus creating a carve-out.²⁵⁹

Arguing against making any changes to the nonresidential net energy metering tariff, CALSSA contends that as of December 2019 commercial and agricultural NEM 2.0 customers pay \$117 million more per year than the cost to serve them.²⁶⁰ SEIA/Vote Solar asserts that there has already been a significant drop in installations in the commercial market segment, thus decreasing export rates could endanger its sustainability.²⁶¹

In testimony, Joint Utilities dispute these assertions of CALSSA and SEIA/Vote Solar. Joint Utilities contend the cost-of-service analysis performed in the Lookback Study is of limited use in developing the successor tariff, as the methodology is not as vetted as the standard practice manual tests.²⁶² Joint Utilities also argue that looking at the results of the RIM test, nonresidential

²⁵⁸ Foundation Windpower Opening Brief at 3.

²⁵⁹ Foundation Windpower Opening Brief at 4.

²⁶⁰ CALSSA Opening Brief at 104 citing CSA-01 at 18:7-9.

²⁶¹ SEIA/Vote Solar Opening Brief at 6.

²⁶² IOU-02 at 86.

NEM 2.0 generation is only slightly less burdensome than residential NEM 2.0 generation.²⁶³ Further, as noted in Section 8.1.3, Joint Utilities assert that the RIM scores would be lower if updated to use the 2021 Avoided Cost Calculator.

We have found that while the TRC and PCT scores for the nonresidential sector are above 1.0, in looking at the RIM and other factors, the nonresidential sector of NEM 2.0 is not cost-effective. We have also found that the structure of NEM 2.0 is not compliant with the guiding principles. In Section 8.4.1 above, we conclude that retail rates have no connection to the actual costs of the exports or the benefits the exports provide to the utilities and the grid, both of which we need to ensure they are approximately equal, pursuant to Section 2827.1. As such, we find adopting similar export rates for new nonresidential net energy metering customers is reasonable. Furthermore, requiring the same export compensation rate for all net energy metering customers will maintain equal treatment between nonresidential and residential customers, thus complying with guiding principle b, ensuring equity among customers.

While the Lookback Study found the TRC and PCT scores for the nonresidential sector to be above 1.0, the study also pointed out that this was most likely due to the federal Investment Tax Credit. Without the federal tax credit, most TRC test values dipped well below 1.0.²⁶⁴ At this point, there is nothing in the record that would lead us to know whether the Investment Tax Credit will be extended beyond the current expected sunset date of December 31, 2023.²⁶⁵

²⁶³ IOU-02 at 86-87.

²⁶⁴ Lookback Study at Table 5-7.

²⁶⁵ Lookback Study at 8 ad 89.

The Lookback Study also highlighted that most nonresidential NEM 2.0 customers have high fixed charges, minimum bills, and demand charges, which tend to lower the potential savings associated with investing in solar systems.²⁶⁶ Hence, if we determined the NEM 2.0 structure compliant with our guiding principles, a change in demand charges or fixed charges in another proceeding could lead to furthering a cost shift in net energy metering that could be challenging to unwind. We keep this Lookback Study finding in mind as we continue the discussion of nonresidential fixed charges in our discussion below regarding the grid benefits charge.

8.4.3. Import Rate

There is considerably more consensus amongst parties with respect to import rates. With a few exceptions, many parties agree that moving toward highly differentiated time-of-use rates will address several objectives.

PCF asserts the current time-of-use rates, for PG&E and SDG&E, do not send a strong signal to customers to divert energy usage to lower-priced hours when the solar system is producing.²⁶⁷ To maximize benefits, PCF recommends revising time-of-use rates to have greater differentials between peak and off-peak pricing and be seasonally adjusted.²⁶⁸ PCF contends making these revisions would also decrease the cost shift.²⁶⁹ SBUA surmises that even without any other reform, a shift toward more fully-differentiated rates will increase bills for successor net energy metering customers.²⁷⁰ Others supporting new non-tiered,

²⁶⁶ Lookback Study at 7.

²⁶⁷ PCF Opening Brief at 55.

²⁶⁸ PCF Opening Brief at 56.

²⁶⁹ PCF Opening Brief at 56.

²⁷⁰ SBUA Opening Brief at 13,

highly differentiated time-of-use rates include CalWEA, CUE, IEPA, NRDC, Public Advocates Office, Sierra Club, and TURN.²⁷¹ However, TURN cautions that certain customers may experience adverse bill impacts when switching from a baseline rate to a non-tiered time-of-use rate.²⁷²

Sierra Club states that the foundational element of the successor tariff should be requiring customers to take service on an electrification rate with a fixed charge component. Sierra Club submits that electrification rates would reduce the cost shift through more appropriate time-variant pricing and discourage energy use during peak periods when carbon intensity is the highest.²⁷³ SEIA/Vote Solar agree that successor tariff customers should move to electrification rates, which will encourage electrification and help California reach its greenhouse gas reduction goal.²⁷⁴ Contending the existence of a link between solar installation and electric vehicle purchases, SEIA/Vote Solar maintains the link would be strengthened by the requirement of an existing electrification rate.²⁷⁵ Further, SEIA/Vote Solar asserts requiring electrification rates would help mitigate any cost shift between participants and non-participants.²⁷⁶ However, SEIA/Vote Solar underscores that the electrification rates adopted in this decision should be existing rates that are available to all customers.²⁷⁷

²⁷¹ Public Advocates Office Opening Brief at Appendix A.

²⁷² TURN Opening Brief at 55.

²⁷³ Sierra Club Opening Brief at 8.

²⁷⁴ SEIA/Vote Solar Opening Brief at 41-42.

²⁷⁵ SEIA/Vote Solar Opening Brief at 42 citing SVS-04 at 57.

²⁷⁶ SEIA/Vote Solar Opening Brief at 43-44.

²⁷⁷ SEIA/Vote Solar Opening Brief at 44.

Joint Utilities approach the import rate reform more acutely, recommending a new set of rates for net energy metering successor tariff customers. Joint Utilities propose cost-based residential default rates for residential customers, including on-peak, off-peak and super off-peak time-of-use rates for both summer and winter.²⁷⁸ Joint Utilities assert that, in combination with fixed charges, these cost-based, non-tiered time-of-use differentials will result in ratepayer indifference and bring net energy metering into alignment with rate design principles, rectify the cost shift, provide subsidy transparency, and reflect accurate pricing.²⁷⁹

SEIA/Vote Solar oppose Joint Utilities' new rate schedules for net energy metering customers (PG&E and SDG&E rates) contending that while available to other customers, "the reality is that given its structure, with a fixed charge significantly higher than is imposed under any other currently operable PG&E tariff, it is highly unlikely that other customers will opt in to it."²⁸⁰ SEIA/Vote Solar cautions adoption of these rates could lead to segregation of customers into groups based on whether they adopt a single type of distributed energy resource. SEIA/Vote Solar submits that because the goal of the Commission is for customers to adopt multiple types of distributed energy resources in multiple combinations of technologies, having rate schedules geared toward a single distributed energy resources does not facilitate reaching this goal. Further, SEIA/Vote Solar asserts it would be difficult for a customer to ascertain which rate schedule works best.²⁸¹

²⁷⁸ Joint Utilities Opening Brief at xii.

²⁷⁹ Joint Utilities Opening Brief at 62.

²⁸⁰ SEIA/Vote Solar Reply Brief at 45.

²⁸¹ SEIA/Vote Solar Reply Brief at 45.

Requiring the successor tariff customers to take service on time-of-use rates with a high off-peak/on peak price differentiation (*i.e.*, highly differentiated time-of-use rates) will meet several guiding principles in this proceeding. Most importantly, we agree that highly differentiated time-of-use rates will vastly improve the pricing signal to customers. These rates will incentivize them to divert energy usage to lower-priced hours when the solar system is producing and/or when charging storage, rather than using this energy at expensive times when the grid's energy supply is constrained. As a result, rates are closer to the cost of service. This maximizes the value of the generation to all customers and to the electrical system and ensures equity among all customers. Adoption of these import rates will also encourage electrification and help California reach its greenhouse gas reduction goal, thus coordinating the successor tariff with our energy policies. We agree with SEIA/Vote Solar that the rates should be available to all customers and should not be focused solely on net energy metering customers. We note that SEIA/Vote Solar provided no evidence to support its claim that this could discourage the adoption of multiple distributed energy resources. Accordingly, in the successor tariff, customers shall be required to take service on the rates that are available to all customers and have high time-of-use price differential between summer weekday peak and summer weekday off-peak periods. We discuss this in more detail in Section 8.5 below.

8.4.4. Grid Benefits Charges

Contending grid benefits charges are largely designed to recover lost utility revenues due to net energy metering customers' self-generation, PCF asserts the grid benefits charge results in the assessment of "charges to net energy metering customers for services the utility provides to non-net energy metering customers." PCF surmises these charges penalize net energy metering

customers for decreasing their use of energy from the grid, comparing it to charging non-net energy metering customers for hanging clothes instead of using an electric dryer.²⁸²

In support of the adoption of grid benefits charges in this proceeding, Joint Utilities, NRDC, Public Advocates Office, and TURN consider the grid benefits charge essential to ensuring net energy metering customers pay for the costs they impose on the system. Joint Utilities explain that when net energy metering customers avoid paying volumetric rates when self-generating, they avoid paying certain aspects of the bill for which all customers are responsible including grid services such as transmission, distribution, and cost allocation mechanism; policy mandates such as CARE, program subsidies for energy efficiency programs, public purpose programs, the Wildfire Fund, and Nuclear Decommissioning; and the costs of utility-provided customer services. These costs (which are currently only assessed via the volumetric rate) are thus shifted to non-net energy metering customers in addition to their own costs for these items.²⁸³ Joint Utilities further explain that behind-the-meter solar without paired storage, “does not decrease the need for the distribution or transmission system and resiliency, reliability, and safety upgrades to that infrastructure.”²⁸⁴ Joint Utilities assert utilities through ratepayers “continue to pay generation legacy costs, as well as procure new generation to instantly meet net energy metering customer demand should their systems be, for whatever reason, unavailable to serve all or part of their load.”²⁸⁵

²⁸² PCF Opening Brief at 59.

²⁸³ Joint Utilities Opening Brief at 70.

²⁸⁴ Joint Utilities Opening Brief at 70.

²⁸⁵ Joint Utilities Opening Brief at 71.

Regarding the comparison that the grid benefits charge for net energy metering customers is like penalizing a residential customer for hanging laundry instead of using an electric dryer, NRDC counters that hanging laundry (*i.e.*, conservation) and self-consumption (*i.e.*, distribution) have different grid impacts.²⁸⁶ NRDC explains that in conservation the customer permanently reduces their load, but net energy metering customers intermittently reduce their load depending upon the performance of the solar system.²⁸⁷ NRDC also notes the two are different in that unplanned solar adoption can lead to increased distribution system investments, whereas conservation does not have this negative impact.²⁸⁸

Turning to legal considerations, CALSSA asserts grid benefits charges violate state and federal law in that they are not just and reasonable. CALSSA explains that the determination of just and reasonable has emphasized cost causation with the fair allocation of costs among different groups of ratepayers determined by cost-of-service studies.²⁸⁹ Referencing D.15-07-001, which states that the determination of just and reasonable has emphasized cost causation,²⁹⁰ CALSSA concludes that because the grid benefits charges proposed in this proceeding “are not designed to account for any incremental cost to the utility of providing service to net energy metering customers,” they are not just and reasonable.²⁹¹

²⁸⁶ NRC-02 at 27.

²⁸⁷ NRD-02 at 27.

²⁸⁸ NRD-02 at 27-28

²⁸⁹ CALSSA Opening Brief at 125 citing Public Utilities Code Section 451.

²⁹⁰ CALSSA Opening Brief at 125 citing D.15-07-001 at 2.

²⁹¹ CALSSA Opening Brief at 125.

Public Advocates Office responds that residential rates were not designed to produce accurate compensation at full retail rates for customers installing solar systems, highlighting that the design flaw shifts costs from net energy metering to non-net energy metering customers.²⁹² Joint Utilities explain that the volumetric rate approach was a practical approach when one-way grid imports were the default supply option. Now, with a system of imports and exports using the grid, Joint Utilities contend the volumetric rate approach is no longer practical.²⁹³

We agree that the current design of the retail rates no longer provides the ability to accurately calculate all of a customer's energy and grid usage, with respect to net energy metering customers. As noted by Joint Utilities, retail rates were created before the emergence of the two-way street of imports and exports. Hence, we find a grid benefits charge in combination with the retail rate will provide improved accuracy, in the case of net energy metering customers. The addition of the grid benefits charge will lead to just and reasonable rates for all customers, decreasing the cost shift currently created by the inaccuracies related to the two-way street of imports and exports. Further, we agree that net energy metering customers cause costs even when not directly importing energy from the grid. As NRDC described, net energy metering customers intermittently reduce usage depending upon the performance of the solar system. Thus, the grid must be always prepared for the intermittent decrease and increase of usage. The grid benefits charge will enable the Commission to create a successor

²⁹² Public Advocates Office Reply Brief at 21.

²⁹³ Joint Utilities Reply Brief at 37.

tariff that ensures equity among customers and is accurately based on the generator's costs and benefits to the system as a whole.

We discuss the specifics of the adopted grid benefits charge in Section 8.5 below.

8.4.5. Nonbypassable Charges

The Commission previously determined that those taking service on the NEM 2.0 tariff would be required to pay nonbypassable charges on each kWh of electricity they consume from the grid in each metered interval.²⁹⁴ D.16-01-044 determined the nonbypassable charges to be assessed on NEM 2.0 customers are the public purpose program charge, nuclear decommissioning charge, competition transition charge, and Department of Water Resources bond charge.²⁹⁵

In this proceeding, several parties discuss nonbypassable charges within the discussion of grid benefits charges, and many recommend including these charges within a grid benefit charge. For purposes of the discussion in this section, we focus solely on nonbypassable charges. The disagreement in this proceeding is whether the list of charges should be expanded.

CALSSA and SEIA/Vote Solar assert the nonbypassable charges should remain as in the current tariff. TURN, in addition to CalWEA, CUE, IEPA, NRDC, and Public Advocates Office recommend the list of nonbypassable charges should be expanded to also include the Wildfire Fund Charge, Reliability Services, New System Generation Costs, Investor-Owned Utility securitization costs relating to wildfires or other undercollections, Energy Cost Recovery

²⁹⁴ D.16-01-044 at Conclusion of Law 113.

²⁹⁵ D.16-01-044 at Finding of Fact 42.

Account (for PG&E) and PUC Reimbursement Surcharge.²⁹⁶ These parties provided no evidence as to why the list of nonbypassable charges should be expanded to include these charges.

8.4.6. Market Transition Credit

The Market Transition Credit, as proposed in the White Paper, is meant to provide a glide path for the successor tariff, creating both a gradual rate reform and an external transitional support mechanism designed specifically to enable a reasonable payback period for customers investing in onsite renewable generation. Explaining the credit would be flexible, the White Paper suggests the credit would also be sensitive to cost declines.²⁹⁷ The White Paper proposes the credit would be fixed over a defined payback period for each net energy metering customer vintage and could be based on time, number of subscribed customers, or the volume of net energy metering generator adoption.²⁹⁸

Only NRDC and TURN recommend a Market Transition Credit as part of their tariff proposals.²⁹⁹ TURN proposes structuring the credit as a one-time upfront rebate to reduce the costs of the new investment and eliminate the subsidy from retail rates.³⁰⁰ TURN contends its proposal presents a transparent upfront subsidy that could be used to target adoptions and eliminate cost shifts.³⁰¹ TURN further proposes the Market Transition Credit be administered

²⁹⁶ TURN Opening Brief at Appendix A at 6-7.

²⁹⁷ White Paper at 3.

²⁹⁸ White Paper at 3.

²⁹⁹ We note that CCSA and GRID/Vote Solar/Sierra Club recommend a Market Transition Credit as part of their proposals that are focused on income-challenged customers. We address these proposals and the recommended elements in Section 8.6 below.

³⁰⁰ TURN Opening Brief at 85.

³⁰¹ TURN Opening Brief at 84-85.

by either the Commission or a third-party entity. TURN's and NRDC's proposals for the credit are identical except that in TURN's proposal only low-income customers would qualify for the credit, while NRDC recommends the credit be available to all customers to ensure the market continues to grow sustainably.³⁰²

CALSSA and SEIA/Vote Solar oppose the TURN and NRDC proposals for the Market Transition Credit. Turning first to NRDC's proposal, both CALSSA and SEIA/Vote Solar consider NRDC's proposal to be incomplete because NRDC does not provide the value of the credit but rather describes the credit as the amount necessary for a customer to achieve a 10-year payback period.³⁰³ With respect to TURN's proposal, CALSSA contends the TURN proposal for the credit would result in a substantial credit for customers, up to \$2,331 per kilowatt in SDG&E's territory.³⁰⁴ CALSSA blames the high incentive on the high solar fee and low export compensation rate contained in TURN's proposal.³⁰⁵ CALSSA also contends that the modeling TURN provided to calculate the credit is a black box. While the Commission has not adopted the TURN model, we do not consider it a black box, as TURN provided it to all parties and, as they stated, the model is fully transparent, runs on Microsoft Excel and has no confidential material.³⁰⁶ SEIA/Vote Solar assert the TURN proposal is unclear on what is

³⁰² NRDC Opening Brief at 34.

³⁰³ CALSSA Opening Brief at 119 and SEIA/Vote Solar at 68.

³⁰⁴ CALSSA Opening Brief at 117 citing SVS-04 at 49.

³⁰⁵ CALSSA Opening Brief at 117 citing SVS -04 at 50:8-11.

³⁰⁶ TURN Reply Brief at 29.

being offered and that several key elements are “left up for grabs in the implementation phase.”³⁰⁷

Ultimately, CALSSA opposes any use of a Market Transition Credit, contending such credits are difficult to administer and providing the examples of the Solar on Multifamily Affordable Housing (SOMAH) program and SGIP.³⁰⁸ With respect to administration of the SOMAH program, CALSSA bases its opposition on a delay (15 months) for the Commission to issue a decision on the SOMAH incentive levels. The lengthy amount of time to determine incentives does not justify CALSSA’s claim of administrative difficulties. CALSSA also contends program performance has been disappointing due to incentive levels being misaligned with program economics but provides no evidence that this is due to administrative difficulty. CALSSA contends the commercial storage budget in SGIP lingered for years with minimal activity before finally gaining momentum but again provides no evidence this is due to administrative difficulty. Finally, CALSSA concludes that the Commission is not positioned to understand market pricing or the level of granularity necessary to create and accurate, current, and evolving credit amount on day one.

We have already determined that the inclusion of a glide path is essential to balance the multiple tariff requirements but the lengthy glide paths proposals by SEIA/Vote Solar and CALSSA are inadequate. Thus, we find the Market Transition Credit provides the best approach to the glide path. We disagree with CALSSA that a Market Transition Credit is too difficult to administer; CALSSA’s examples have not proven this. While we agree that the TURN and NRDC

³⁰⁷ SEIA/Vote Solar Opening Brief at 66-67.

³⁰⁸ CALSSA Opening Brief at 116 citing to CSA-01 at 46:17 to 47:19.

proposals are incomplete, they offer options to the Commission. In the White Paper, much like TURN and NRDC, E3 also describes options the Commission could adopt to use the Market Transition Credit as a glide path, providing the flexibility to ensure ratepayer equity while also ensuring that customer-sited renewable distributed generation continues to grow sustainably. As we discuss in Section 8.5 below, we have reviewed these options and created a Market Transition Credit that meets all these needs.

8.4.7. Minimum Bill

Parties did not indicate whether a minimum bill should be one of the elements of the successor tariff. NRDC and Public Advocates Office contend the grid benefits charge is preferable over the minimum bill, calling the minimum bill regressive.³⁰⁹

In D.15-07-001, the Commission adopted a minimum bill standard for residential customers on the non-generation portion of their monthly electric bill, which included a minimum bill rate of \$5 for CARE customers and \$10 for non-CARE customers. Because we are adopting a grid benefits charge in this decision, a minimum bill is no longer necessary and will not be adopted as an element of the successor tariff.

8.4.8. Netting

Currently, NEM 2.0 nonresidential customers have a 15-minute netting interval and residential customers have a one-hour netting interval. Joint Utilities explain that the current netting policy – to net imports and exports within each metered interval – is a billing construct to measure the kilowatt-hour

³⁰⁹ Public Advocates Office Opening Brief at 22. *See also* CUE Opening Brief at 17 citing Transcript pp. 1864:10 – 1865:11 (Chhabra) and Transcript p. 1663: 8-21 (Chait).

consumption to which nonbypassable charges should be applied.³¹⁰ Joint Utilities contend this does not have to continue. Joint Utilities recommend implementation of instantaneous netting where the meter automatically performs the netting of customers' exports and consumption.³¹¹ Joint Utilities further recommend the Commission implement the process where all recorded imports on the first meter channel are charged the retail rate, and all recorded exports on the second meter channel are charged the export compensation rate. Joint Utilities contend this is a very easy process.³¹² CalWEA, CUE, IEPA, NRDC, Public Advocates Office and TURN concur, making the same recommendation.³¹³

In support of hourly billing intervals, SEIA/Vote Solar argues the instantaneous netting approach creates significant consumer protection concerns, stating the customer does not have access to instantaneous metered data.³¹⁴ Agreeing with this concern, CALSSA notes that contractors also do not have access to this data and SBUA asserts that instantaneous netting creates unreasonable challenges for solar installers and customers in terms of accessing and analyzing data to forecast project economics.³¹⁵ SEIA/Vote Solar contends if billing were calculated with instantaneous netting and data is only available on an interval basis, developers could not provide prospective customers with solar savings estimates, as required by the Commission. SEIA/Vote Solar points out

³¹⁰ Joint Utilities Reply Brief at 31.

³¹¹ Joint Utilities Reply Brief at 32.

³¹² Joint Utilities Reply Brief at 32.

³¹³ Public Advocates Office Opening Brief at i.

³¹⁴ SEIA/Vote Solar Opening Brief at 71.

³¹⁵ CSA-01 at 117:3 and SBUA Opening Brief at 14.

that during evidentiary hearing, when queried about this concern, the PG&E witness stated that the utilities have the capability to allow customers to see this data.³¹⁶ SEIA/Vote Solar adds that the witness conceded he had no knowledge of the workings of this capability. SEIA/Vote Solar concludes the witness has no idea whether these utility capabilities would address the concerns raised.³¹⁷ Joint Utilities contend “all three utilities either already or will soon have the capability for solar customers to see and share both channels of data.”³¹⁸

Reducing the netting interval exposes more of the customers’ imports and exports to net billing, which we have found is more aligned with system costs. As one of our principles is to adopt a tariff that maximizes the value of customer-sited renewable generation to all customers and to the grid, we find instantaneous netting is more consistent with cost-based compensation and should be adopted as part of the successor tariff. To allow customers to have the most accurate data possible, the utilities shall include both channels of data in their customer-authorized energy usage data portals.

8.4.9. True-Up Period

Currently, net energy metering customers receive a monthly bill and, if the customer generates more bill credits than they use during that month, they can carry forward the excess credits to the following months, within a 12-month period. This is considered the annual true-up. If the net energy metering customer incurs a bill greater than zero, they can carry forward the amount due to the next month, within a 12-month period. This is referred to as annual billing. On an annual basis, based on the customer’s interconnection date, each

³¹⁶ SEIA/Vote Solar Opening Brief at 72 citing Transcript Vol 5 at 765, lines 6-24.

³¹⁷ SEIA/Vote Solar Opening Brief at 72.

³¹⁸ Joint Utilities Reply Brief at 31 citing IOU-02 at 55:3-9.

net energy metering customer's bill is true-up and the customer either pays the amount owed or receives compensation for any credits at the Net Surplus Compensation rate.³¹⁹

Joint Utilities propose that the annual true-up be converted to a monthly true-up. Joint Utilities contend the current annual true-up undermines greenhouse gas goals because it does not incentivize customers to shift load out of the on-peak period and it results in non-participating customers paying more for energy exports than they are worth.³²⁰ Further, Joint Utilities assert requiring monthly true-ups is consistent with federal law.³²¹

SEIA/Vote Solar and CALSSA oppose requiring a monthly true-up. CALSSA disputes Joint Utilities claim that non-participating customers are paying more for energy exports than they are worth if credits are generated at one time to offset consumption at another time. CALSSA argues that the generation is credited for exactly what it is valued based upon the rate at that hour.³²² CALSSA explains that net energy metering credits are not a one-for-one exchange in kilowatt hours and provides the following example: monthly net generation during mid-days hours in the spring are valued at winter off-peak rates and export credits during off-peak hours are lower value than the rates for on-peak energy consumed from the grid.³²³

Further, CALSSA contends that annual true-ups allow for the natural cycle of solar conditions, with systems producing two or three times more electricity in

³¹⁹ PAO-01 at 3-7.

³²⁰ Joint Utilities Opening Brief at 67-68

³²¹ Joint Utilities Opening Brief at 67

³²² CALSSA Opening Brief at 179.

³²³ CALSSA Opening Brief at 179.

the summer than in the winter.³²⁴ CALSSA notes that, with monthly true-ups, if more generation than consumption occurs during a month, the customer is reimbursed at the net compensation rate rather than carrying forward credits to the following month.³²⁵ CALSSA underscores this would hurt agricultural customers and schools most because their load is seasonal.³²⁶

We maintain annual true-ups for both residential and nonresidential customers, meaning credits can be carried forward to future months within a 12-month billing period. Further, we require residential customers and nonresidential customers to pay their bills monthly, meaning customers must pay all incurred charges every month. We agree with CALSSA that annual true-up allows generation to be credited for exactly what it is valued based upon the rate at that hour. Further, we disagree with Joint Utilities that annual true-ups undermine California's greenhouse gas emissions goals. Joint Utilities argue that currently a net energy metering customer can carry over credits during less costly month to more costly months.³²⁷ However, as noted by CALSSA, those earned credits are valued at the appropriate prices.³²⁸ Our purpose in maintaining annual true ups is to create a successor tariff that balances the various requirements of the statute.

8.5. The Successor Tariff

In our review of the proposals filed in this proceeding, we find that no one proposal meets all the requirements of a successor tariff. Many proposals

³²⁴ CALSSA Opening Brief at 175.

³²⁵ CALSSA Opening Brief at 176. *See also* SEIA/Vote Solar Opening Brief at 69-71.

³²⁶ CALSSA Opening Brief at 176.

³²⁷ IOU-01 at 132.

³²⁸ CALSSA Opening Brief at 179.

focused solely on meeting the cost-effectiveness thresholds and eliminating the cost-shift without any true deference to attempting to ensure customer-sited renewable generation continues to grow sustainably. Other proposals make a less valiant effort at addressing the cost shift and focused primarily on maintaining the status quo. However, as previously determined in this decision, many elements recommended by the proposals are appropriate for a successor tariff and selecting these elements at an appropriate size or amount can help us achieve a successful successor tariff. Accordingly, we do not adopt any proposed tariff but, rather, have developed a successor net billing tariff that balances the multiple guiding principles adopted in D.21-02-007.

To distinguish this tariff from the two prior net energy metering tariffs, we break from the previous nomenclature and do not refer to this tariff as NEM 3.0 but rather refer to it as the Net Billing tariff. In the successor tariff, the adopted elements are rationalized and balanced to meet the needs of the grid, participating customers, and all other customers, as well as the environment. We discuss each of the elements of the new tariff below and describe how it meets the multiple requirements of the guiding principles. To illustrate an example of how to ensure customer understanding of the successor tariff, we provide a description of the net billing tariff developed for customers in Appendix A. Such a description can be used in customer education materials such as the California Solar Consumer Protection Guide.

8.5.1. Export Compensation Based on Avoided Cost Calculator Values

In Section 8.4.1, we determined that export compensation should be based on values derived from the Avoided Cost Calculator. While several parties (Joint Utilities, NRDC, Public Advocates Office, and TURN) advocate for use of the

Avoided Cost Calculator, there are differences in the specifics of the proposals. We discuss the pros and cons for these differences and our adopted export compensation structure.

We begin with Joint Utilities proposal, which is to aggregate the 8,760 hourly avoided cost values produced by the Avoided Cost Calculator into export compensation rates, weighting the 1-year levelized avoided costs by metered customers' exports, using time-of-export periods that match the time-of-use periods of the underlying tariff, and capping rates at no more than the corresponding retail rate in each time period. The resulting rates would be updated once a year following the annual adoption of the Avoided Cost Calculator. CALSSA surmises this approach would require customers and developers to predict the values for thirteen separate rates (six export rates, six retail rates and the net surplus compensation rate) in order to predict the benefits of installing solar.³²⁹ CALSSA also contends capping the export rate at the retail rate creates a double standard in that Joint Utilities only rely on the Avoided Cost Calculator to a point.³³⁰ Further, CALSSA underscores this approach provides no glide path for the industry and declares these aspects of the proposal will leave customers with excessive uncertainty about their investments. Asserting these aspects of the proposal will result in an export rate decline of 64 to 84 percent, CALSSA contends this is in opposition to the requirement for sustainable growth.³³¹

³²⁹ CALSSA Opening Brief at 101.

³³⁰ CALSSA Opening Brief at 101.

³³¹ CALSSA Opening Brief at 187.

With respect to the correct levelization period, CALSSA and SEIA/Vote Solar support a period of 25 years since systems are a 25-year resource.³³² Joint Utilities contend one-year forward time-differentiated avoided costs, updated annually, more closely align with the value of exports to the system over the course of a day and a season as well as the character of system benefits as they evolve annually.³³³ Joint Utilities highlight that several parties agree forecasts are not an exact science and are more accurate the closer they are to the present.³³⁴ However, NRDC and Public Advocates Office take a different approach, looking at three and four years of avoided costs to “maintain current information but provide customers with more certainty on net energy metering earnings.”³³⁵

Very similar to Joint Utilities’ proposal, Public Advocates Office proposes the export compensation rate would be based on avoided costs and vary by time-of-use period to reflect the time-varying nature of marginal costs, which Public Advocates Office contends will improve rate stability and minimize confusion.³³⁶ However, Public Advocates Office also recommends the avoided costs be weighted by solar production for each period during non-evening time-of-use periods so that exports are properly compensated for the value they provide.³³⁷ Public Advocates Office further recommends compensation for any time-of-use period, that begins at 4 p.m. or later and ends at midnight or earlier, be based on a simple average of avoided costs to encourage adoption of battery

³³² Joint Utilities Reply Brief at 29 citing CALSSA Opening Brief at 93 and SEIA/Vote Solar Brief at 20.

³³³ Joint Utilities Opening Brief at 29.

³³⁴ See CUE-01 at 14, TRN-01 at 9, PAO-01 at 3-17 to 4-7 and NRD-01 at 15:10 to 16:12.

³³⁵ NRD-01 at 15-16.

³³⁶ Public Advocates Office Opening Brief at 15.

³³⁷ Public Advocates Office Opening Brief at 16.

storage.³³⁸ Further, like Joint Utilities, Public Advocates Office proposes to cap export rates at less than the time-of-use retail rate to avoid reducing the generator's value to the system and other customers.³³⁹ To provide stability to customers, Public Advocates Office proposes avoided cost values be averaged based on a going forward four-year average of the two-most recent approved Avoided Cost Calculators.³⁴⁰

NRDC's export compensation rate proposal would require customers be paid for the total value that their panels provide at near-term hourly avoided costs. NRDC proposes this export value would vary hourly, which would encourage customers to export electricity when it is most valuable to the grid and provide incentives to install battery storage.

Lastly, TURN proposes setting export rates based on actual hourly exports by the customer's system and relying on hourly values from the Avoided Cost Calculator that are modified by actual recorded CAISO market prices. CCSA also supports using CAISO market or day ahead prices. The modification would replace forecasted values for energy, ancillary services, losses, and greenhouse gas cap-and-trade with actual market prices. TURN proposes that after 12 months, the balance would be adjusted based on the net surplus compensation formula.

We previously stated that we would balance all requirements and principles. Accordingly, we set the export compensation rate at averaged monthly values for each hour, differentiated between weekday and weekend. For example, the hour of 3 p.m. to 4 p.m. on weekdays in July 2023 will have the

³³⁸ Public Advocates Office Opening Brief at 16.

³³⁹ PAO-01 at 3-21.

³⁴⁰ Public Advocates Office Opening Brief at 16.

same export compensation rate. While we agree with Joint Utilities that hourly values complicate the bill structure, we find that averaging the values across days in a month acknowledges the general trends in differences between hours and months and results in accurate values. We agree with CALSSA that setting export values at an hourly interval instead of a time-of-use interval results in one set of export values across all rates, which is more transparent for developers and customers. This approach also yields more accurate signals for customer generators to reduce imports from the grid and for battery storage to dispatch during the hours most valuable to the grid.

Further, this approach does not add the false precision of potentially inaccurate forecasts of a specific hour's weather and other conditions, as recommended by NRDC and TURN. We have already found that basing export compensation on Avoided Cost Calculator values brings the cost of the successor tariff closer to its value. We find using averaged monthly values for export compensation also ensures the tariff is based on the generator's true costs and benefits to the grid, thus leading to equity among all ratepayers while maximizing the value of the generation to all customers and to the grid.

To enable solar providers to predict customer savings, the values for the first five years following a customer's interconnection date will be based on a five-year schedule of values for each hour from the Avoided Cost Calculator. The Avoided Cost Calculator used will be the most recent calculator, adopted as of January 1 of the calendar year of the customer's interconnection date. Parties recommend options for locking in the values: one year (Joint Utilities), 10 years (NRDC) and 20 years (SEIA/Vote Solar). We find that five years is preferable because, like all forecasts, the Avoided Cost Calculator forecast values get increasingly uncertain as we move further away from the present. The certainty

of the adopted five-year lock-in period helps to ensure that customer-sited renewable distributed generation continues to grow sustainably and enhances consumer protection measures, while providing transparency to customers.

Following the five-year lock-in period, export compensation will be based on averaged monthly avoided cost values, as previously described, but calculated by the version of the Avoided Cost Calculator adopted as of January 1. Other parties recommend averaging multiple years of the Avoided Cost Calculator to avoid rate shock from changes in the Avoided Cost Calculator.³⁴¹ However, we have already determined that, except for the 2020 values, Avoided Cost Calculator values have consistently reflected the value of exported energy year after year. Accordingly, we adopt use of the most recently adopted Avoided Cost Calculator after the five-year lock-in period ends for each customer on the tariff. We find using single years' avoided cost values, instead of averaged costs, brings the cost of the tariff closer to its value, which aligns with the requirements of Public Utilities Code Section 2827.1(b)(3), ensuring the tariff is based on the costs and benefits of the generator, and 2827.1(b)(4), ensuring the benefits are approximately equal to the total costs.

The Avoided Cost Calculator provides avoided cost values for each climate zone. To balance our concern for the predictability of customer savings (provided for by the five-year lock-in period) with the concern for accurate representation of avoided costs relayed by parties such as NRDC, TURN, and CCSA, Joint Utilities shall calculate separate export compensation rates for each

³⁴¹ Public Advocates Office recommends using four years from the last two Avoided Cost Calculators (Public Advocates Office Reply Brief at 50). NRDC recommends adopted fixed 2021 avoided cost and to use three years of the Avoided Cost Calculator (NRD-01 at 15-16.) CalWEA suggest basing export rates on the last two Avoided Cost Calculators (CalWEA Opening Brief at 11.)

climate zone. Further, Joint Utilities shall coordinate to standardize the method of deriving export compensation rates based on the Avoided Cost Calculator values in accordance with the findings of this decision. In Section 8.7, we direct Joint Utilities to submit advice letters implementing the successor tariff; Joint Utilities shall also describe the standardized method and provide the export compensation rates in the required supplemental advice letter.

8.5.2. Market Transition Credit as a Path to Solar Paired with Storage

We recognize adoption of the revised export compensation rates will lead to less export compensation for successor tariff customers as compared to NEM 1.0 and NEM 2.0 customers. This will enable the Commission to meet the requirement that the tariff is based on the costs and benefits of the generators. However, we also recognize the need and requirement that customer-sited distributed generation continues to grow sustainably. To attain this growth, the market needs to transition to one that is solar paired with storage. Hence, as we previously determined, we find inclusion of a glide path is essential and the Market Transition Credit is the best and most transparent approach. Below we describe our adopted Market Transition Credit that will be available to all successor tariff customers for the first four years of the successor tariff and will ensure a reasonable level of annual bills savings. To assess affordability and equity concerns, the Commission will conduct an evaluation of the Market Transition Credit, along with the equity elements, to determine what changes, if any, need to be made to the Market Transition Credit. As previously described, this evaluation will be conducted in five years from the complete implementation of the successor tariff, *i.e.*, when all three of the Joint Utilities have implemented the successor tariff.

We begin with eligibility requirements. TURN recommends limiting the Market Transition Credit to low-income customers.³⁴² However, the purpose of the Market Transition Credit is to ensure customer-sited renewable distributed generation continues to grow sustainably, given the now decreased value of exports. Providing the credit to a small subset of customers would not ensure generation continues to grow sustainably. We also underscore that while the tariff described in Section 8.6.2 below is expected to increase participation by CARE-eligible customers, our intention is not to solely focus on low-income customers to grow the market. Hence, the Market Transition Credit will be available to all successor tariff customers who enroll in the successor tariff over the course of the four years starting with the initial implementation of the successor tariff. We also do not restrict eligibility by technology type, initially. However, we determined the successor should promote paired storage (*see* Section 8.3.4.); thus, the Market Transition Credit will allow for a ten-year payback period for solar paired with storage. Customers who are required to install solar pursuant to the new construction requirements of the California Energy Commission 2019 update to the Title 24 Building Energy Efficiency Standards are not eligible for the Market Transition Credit. While the purpose of this credit is to ensure the continued growth of the market, at its foundation, the credit is meant to provide an incentive to customers to install customer-sited renewable distributed generation.

We anticipate the design of the Market Transition Credit will provide a transparent and uniform incentive to successor tariff customers. As recommended by TURN, the credit is based on a customer's system expected

³⁴² TURN Opening Brief at 88-91.

generation³⁴³ but specific to each utility to ensure accuracy, as shown in Table 5 below. We find this calculation to be user-friendly. Further, for customer transparency, the monthly credit will be a discrete line item on the customer bill and will apply to all charges. If the Market Transition Credit is greater than a customer's charges in a certain month, it will be applied to future bills until the credit zeroes out. We find this prevents the unnecessary usage of energy by customers if, instead, we imposed a deadline by which to use the credit.

NRDC and TURN recommend an upfront credit to customers rather than building it into rates.³⁴⁴ TURN proposes the incentive should be a dollar amount per kilowatt payment that varies based on installation, the benefit/cost ratio, and the targeted payback period.³⁴⁵ TURN contends providing an upfront incentive serves two objectives: 1) allows the customer to apply the Market Transition Credit to reduce the costs of new investment and 2) omits ongoing subsidies embedded in rates, thus erasing any concern of a cost shift.³⁴⁶ Sierra Club opposes the upfront subsidy as it could raise implementation and consumer protection concerns that risk stifling solar deployment.³⁴⁷ We consider the Market Transition Credit to be a glide path that provides certainty for the industry during the transition. The TURN proposal does not provide that certainty. We also find TURN's proposal to be unnecessarily complicated and inconsistent in terms of the inputs. The monthly Market Transition Credit we adopt will be consistent throughout the year for a customer, easily understood

³⁴³ TURN Opening Brief at 87.

³⁴⁴ NRDC Opening Brief at 34 and TURN Opening Brief at 85.

³⁴⁵ TURN Opening Brief at 87 citing TRN-01 at 52.

³⁴⁶ TURN Opening Brief at 85.

³⁴⁷ Sierra Club Opening Brief at 22.

on the bill, with the only changes occurring on the tenth anniversary of the customer's interconnection date. The credit will be provided to customers for ten years from the date of interconnection and will be available to customers installing any type of behind-the-meter technology.

The glide path portion of the Market Transition Credit will be a stepped-down approach, as recommended by SEIA/Vote Solar, CALSSA, and Sierra Club.³⁴⁸ The Market Transition Credit level will be in effect over four years. The initial Market Transition Credit will be available to residential customers that submit interconnection applications after the NEM 2.0 sunset date and before December 31 of the year the three utilities complete implementation of the successor tariff. Each year thereafter, the Market Transition Credit will decrease by 25 percent a year, as measured from the first-year credit rate until the credit reaches zero. Customers who take service on the successor tariff after the NEM 2.0 tariff sunset date, but who are temporarily billed on the NEM 2.0 tariff, will not receive a Market Transition Credit until the successor tariff is operationalized. These customers will receive the Market Transition Credit for ten years minus the amount of time they were billed on the NEM 2.0 tariff.

Aligning the timing of the step-downs with calendar years will assist with customer understanding. Again, each customer that is eligible for the Market Transition Credit will receive the credit for a period of ten years from their interconnection date. The Market Transition Credit glide path for (residential

³⁴⁸ Sierra Club Opening Brief at 5. While CALSSA and SEIA/Vote Solar do not support the Market Transition Credit, they do support providing a stepped-down glide path. (See CALSSA Opening Brief at 109 describing its gradual step down in export rates and SEIA/Vote Solar at 5 describing the goal of its export stepdown is to align bill savings with generator benefits, as measured by the ACC.)

non-CARE participant customers of) each of the Joint Utilities is illustrated in Figure 3 through Figure 5 below.

Figure 3

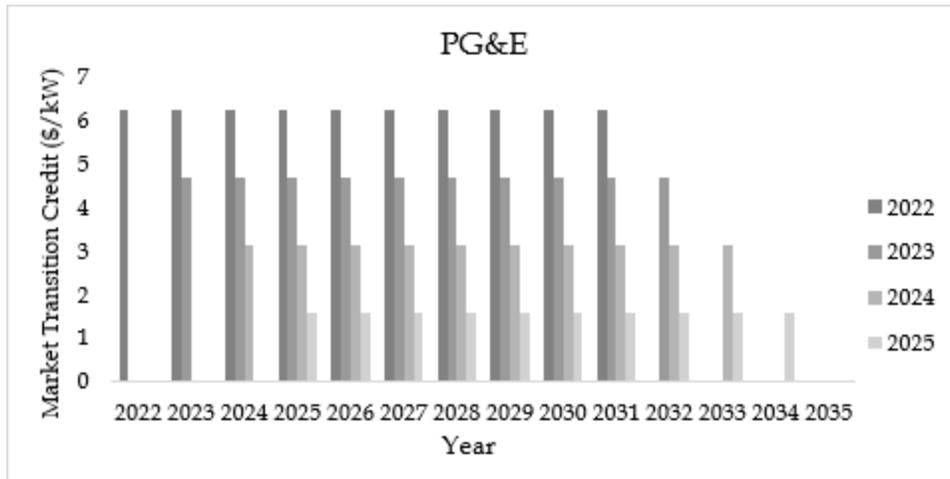


Figure 4

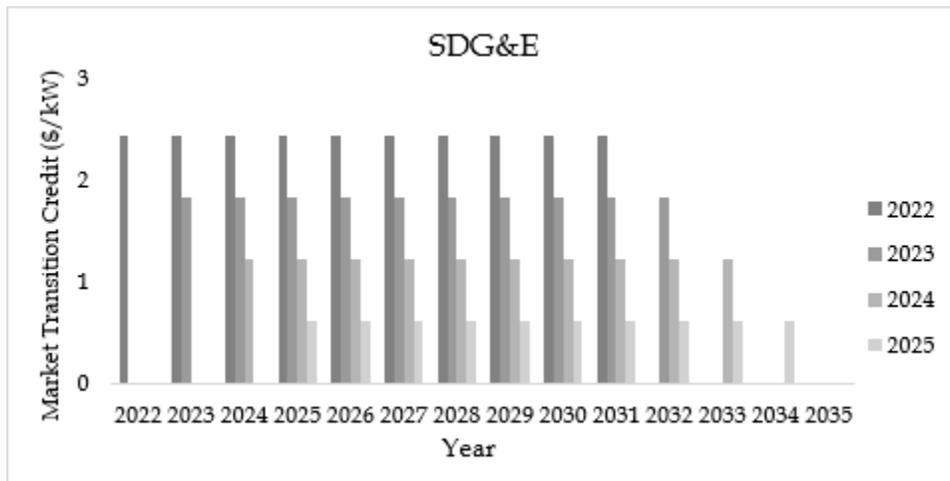
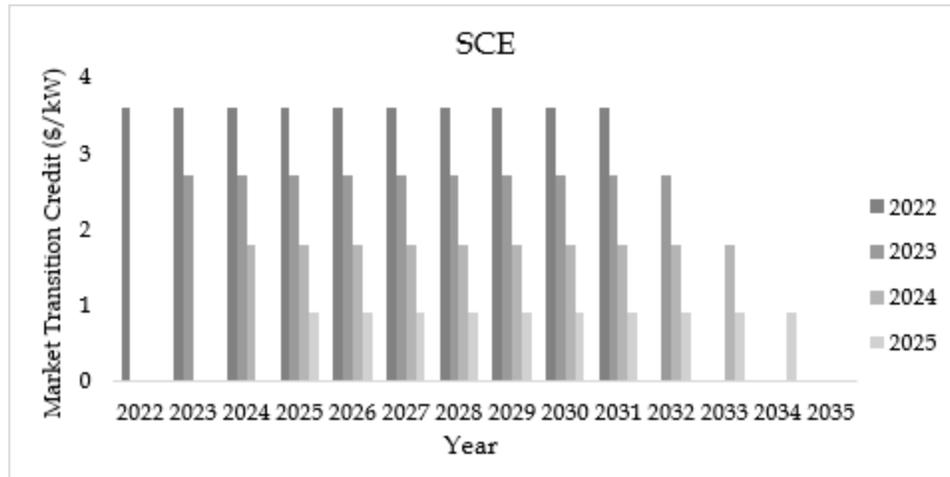


Figure 5



Lastly, the Market Transition Credit will be funded by all ratepayers. Parties have varying proposals on who should fund the Market Transition Credit. TURN recommends applying a surcharge to existing non-CARE NEM 1.0 and NEM 2.0 residential customers to fund half of the costs of the Market Transition Credit with the remaining costs recovered in rates through the Public Purpose charge.³⁴⁹ TURN submits this is justified because of the enormous financial benefits legacy net energy metering customers continue to realize under the existing tariffs.³⁵⁰ Joint Utilities recommend the credit should be funded through means other than rates.³⁵¹ Both SEIA/Vote Solar and Sierra Club oppose the recovery of the Market Transition Credit from a particular subset of ratepayers.

There are many competing requirements of the successor tariff. Specifically, the Commission must ensure that customer-sited renewable distributed generation continues to grow sustainably while simultaneously

³⁴⁹ TURN Opening Brief at 91-93.

³⁵⁰ TURN Opening Brief at 92.

³⁵¹ IOU-01 at 61.

ensuring that benefits to all customers and the electrical system are approximately equal to the total costs. We have already stated that tariff participation growth should not require nonparticipant financial burden. However, we have also stated that the net energy metering cost shift alone is not responsible for the entirety of high rates in California. Further, the tariff should also ensure California can meet its climate and clean energy objectives. We find that, in combination with other elements of the successor tariff, ratepayer funding of the stepped-down to zero dollars approach appropriately balances tariff requirements.

The adopted initial Market Transition Credits are provided in Table 5 below. The initial Market Transition Credits are designed to achieve a 10-year payback period (as defined in the Commission modeling) for a solar and storage adopter who does not receive an SGIP incentive, has a system sized to 100 percent of load on an annual basis, and takes service on one of the eligible import rates discussed in the next section.³⁵²

Table 5			
Adopted Initial Market Transition Credit By Utility			
Customer Segment	PG&E	SDG&E	SCE
Residential	\$1.62/kW ³⁵³	\$0/kW	\$3.59/kW
Low-Income	\$4.36/kW	\$0/kW	\$5.25/kW
Nonresidential	\$0/kW	\$0/kW	\$0/kW

TURN and NRDC recommend a periodic review of the Market Transition Credit to reflect the latest solar costs and avoided costs.³⁵⁴ As one of our

³⁵² See Appendix B for modeling results.

³⁵³ All kW values are kW CEC-AC.

³⁵⁴ TURN Opening Brief at 87-88.

objectives is to ensure the tariff aligns with costs, we direct Joint Utilities to track the number of successor tariff applications and submit a Tier 2 Advice Letter annually, no later than July 1, to propose maintenance of the Market Transition Credit reduction trajectory or a specific change to it. Further, to ensure affordability of the successor tariff and continued equity among customers, we will collect data on the Market Transition Credit, as well as other affordability and equity elements that will inform the five-year evaluation. A future ruling will allow parties to propose details of the evaluation, which the Commission will then consider in a subsequent decision in this proceeding.

8.5.3. Rate Structure

The rate structure of the successor tariff will include several elements, all of which we have determined, in Section 8.4 above, to be reasonable: a highly differentiated time-of-use rate and a grid benefits charge, which we rename as the Grid Participation Charge, that includes nonbypassable charges. The Grid Participation Charge will not be applicable to nonresidential customers, who will only be responsible for the nonbypassable charges discussed in Section 8.4.5. above. Other related rate elements include the interconnection fees, net surplus compensation, and the true-up period.

We begin with the time-of-use rate. As previously stated, requiring highly differentiated time-of-use rates will vastly improve the pricing signal to customers and meet several guiding principles in this proceeding. Table 6 below provides the existing electrification rates that are initially eligible for the successor tariff. As was the case with the NEM 2.0 tariff, customers of the

successor tariff will have a five-year legacy period for the time-of-use rate they take service on upon interconnection.³⁵⁵

Table 6			
Eligible Time Of Use Rates by Utility			
Utility	PG&E	SDG&E	SCE
Eligible Rate	EV2-A	EV-TOU-5	TOU-D-PRIME

PG&E and SDG&E propose a new non-tiered time-of-use rate that would be available to all residential customers, including successor tariff customers, that features a customer charge based on fully scaled customer costs and cost-based time-of-use differentials.³⁵⁶ PG&E also proposes that E-ELEC, which is under consideration in PG&E's 2020 general rate case Phase 2, should be eligible for the successor tariff.³⁵⁷ Rates such as these, which are not yet approved by the Commission, may be considered for future eligibility in the successor tariff. A utility may seek approval through submittal of a Tier 3 Advice Letter. Successor tariff customers will pay any fixed charge components of an eligible import rate, similar to a nonparticipating customer who takes service on the same rate.

We agree with SEIA/Vote Solar that customers should be provided the opportunity to elect critical peak pricing or peak day pricing rates on any rate option they select. SEIA/Vote Solar correctly states that the transition to the successor tariff will require customers to make substantial investments in storage, as well as solar, with longer payback periods.³⁵⁸ SEIA/Vote Solar

³⁵⁵ D.16-01-044 at Ordering Paragraphs 7 to 9.

³⁵⁶ IOU-01 at 106.

³⁵⁷ IOU-01 at 112.

³⁵⁸ SEIA/Vote Solar Opening Brief at 126-127.

requests the Commission enhance the value customers receive from solar and paired storage installations by requiring all three utilities to allow customers to participate in critical peak pricing; currently only SCE permits this.³⁵⁹ Noting the high level of engagement of net energy metering customers, SEIA/Vote Solar underscores that these customers are more likely than other customers to choose critical peak pricing rates, which will help the grid during critical peak days.³⁶⁰ Accordingly, critical peak pricing and peak day pricing are eligible rates for customers enrolled in the successor tariff.

As part of the rate structure, we adopt a Grid Participation Charge to enable the Commission to create a successor tariff that ensures equity among customers and is accurately based on the costs and benefits of the generator. We find the name “Grid Participation Charge” sends a clear message to the customer that they are paying to use the grid. The charge will be a fixed monthly charge based on the number of kilowatts installed in a residential customer’s system. Because most nonresidential customers already have fixed and demand charges included in rates, we find it reasonable to only apply the Grid Participation Charge to residential customers.³⁶¹

With respect to the specific charge per kilowatt, we look to the recommendations in the record of this proceeding of how to determine the amount. CalWEA, CUE, IEPA, NRDC, Public Advocates Office, and TURN recommend a grid benefits charge include transmission and distribution costs, plus nonbypassable charges.³⁶² Similarly, Joint Utilities support recovery of grid

³⁵⁹ SEIA/Vote Solar Opening Brief at 127 citing SVS-03 at 74.

³⁶⁰ SEIA/Vote Solar Opening Brief at 127 citing SVS-03 at 74.

³⁶¹ Walmart Opening Brief at 12-14.

³⁶² See Public Advocates Office Opening Brief, Appendix A at 6.

services such as transmission, distribution, and cost allocation mechanism; policy mandates; and the costs of utility-provided customer services.³⁶³ Parties offer a range of estimates to account for these services as shown in Table 7 below.

Party	PG&E Customers	SDG&E Customers	SCE Customers
Public Advocates Office ³⁶⁴	\$7.66/kW	\$6.14/kW	\$5.76/kW
Joint Utilities ³⁶⁵	\$14.13/kW	\$14.06/kW	\$10.24/kW

As discussed in Section 8.4.4., CALSSA opposes any additional charge on net energy metering customers. While acknowledging that other states have adopted grid benefits charges, CALSSA asserts that “no state has come close to the draconian measures parties have proposed here,” and contends the recommended additional fees could add \$34 to \$73 to residential monthly bills.³⁶⁶ While we find the addition of a Grid Participation Charge is reasonable, we acknowledge the concern of the expense of such a charge. We reiterate that our objective is to balance the multiple requirements of the tariff to develop a reasonable outcome for all ratepayers, participants, and nonparticipants alike.

³⁶³ Joint Utilities Opening Brief at 70.

³⁶⁴ PAO-01 at Table 3-6

³⁶⁵ IOU-01 at Table IV-28.

³⁶⁶ CALSSA Opening Brief at 122-123 citing CSA-01 at 90.

Hence, we adopt the monthly Grid Participation Charges shown below in Table 8.

Table 8			
Adopted Monthly Grid Participation Charge for Successor Tariff Customers			
Customer Segment	PG&E	SDG&E	SCE
Residential	\$8.00/kW	\$8.00 kW	\$8.00 kW
Low-Income	\$0/kW	\$0/kW	\$0/kW
Nonresidential	\$0/kW	\$0/kW	\$0/kW

Customers taking service on the successor tariff will receive this initial Grid Participation Charge on their monthly bill for 10 years. After 10 years, the Grid Participation Charge will be updated to the charge current at that time and may fluctuate. Customers who take service on the successor tariff after the NEM 2.0 tariff sunset date, but who are temporarily billed on the NEM 2.0 tariff, will not receive a Grid Participation Charge until after the successor tariff is operationalized. These customers will receive the Grid Participation Charge for at least 10 years minus the amount of the time they were billed on the NEM 2.0 tariff.

The \$8.00 per kilowatt charge for non-CARE residential customers in each Joint Utilities service territory is comparable to the charge proposed by Public Advocates Office. Given our need to balance the multiple requirements of the successor, we find Public Advocates Office's calculation method to be reasonable.³⁶⁷ However, we revised the adopted charges to be easy to understand and uniform across all utility service territories. The Commission will review the Grid Participation Charge and eligible rates, along with other

³⁶⁷ PAO-01 at 3-24.

elements of the successor tariff, during the five-year evaluation. The Grid Participation Charge shown in Table 8 will remain in effect for new customers taking service on the successor tariff until modifications, if any, are considered and adopted by the Commission following the five-year evaluation.

We have already determined in Section 8.4.9 that it is reasonable to maintain an annual true-up and require monthly billing. Other elements of the rate structure remain the same as in the NEM 2.0 tariff. Interconnection fees remain unchanged from D.16-01-044. Net Surplus Compensation will accrue at the current rate, calculated at the average DLAP prices between 7:00 a.m. to 5:00 p.m. over the past 12 months.

8.5.4. Terms of Service and Billing Rules

With the exception of the import rate itself, the adopted successor tariff elements (Sections 8.4 and 8.5) will be available to an enrolled customer for a period of ten years from interconnection date (*i.e.*, the legacy period) to allow for sufficient time for the customer to pay for their investment while protecting other ratepayers from undue financial burden.

As determined in Section 8.4.8 above, imports and exports will be calculated based on instantaneous netting of consumption and production whereby all recorded net imports on the first meter channel are charged the retail rate and all recorded net exports on the second meter channel are compensated at the export compensation rate. Bill credits will be applicable toward import charges from any time in that billing period. Joint Utilities recommend that bill credits only apply to charges in the time-of-use period as they were generated, arguing that applying credits to other time-of-use time-period would result in

inappropriate customer benefits during times the grid does not benefit.³⁶⁸ We find this requirement overly prescriptive and deny it.

8.5.5. Modeling Results of the Successor Tariff

The Commission is statutorily mandated to adopt a successor tariff that meets the requirements of Public Utilities Code Section 2827.1. As part of the analysis of the successor tariff discussed above in Sections 8.5.1 through 8.5.4, the Commission must ensure that the costs are approximately equal to the benefits. Previously, we determined that we would conduct the cost-effectiveness analysis as directed by the Commission in D.19-05-019 and review the results of the TRC test, as well as the RIM and PCT tests. Below, we describe the model used and the resulting outputs used to analyze the cost effectiveness of the elements adopted above, as part of the successor tariff.

The Commission used an Excel-based spreadsheet to model the elements contained in the successor tariff. This same model was used previously in this proceeding to analyze the proposals discussed in Section 6 of this decision. This model used five standardized output metrics. The model also calculated annual customer bills for representative customers assuming standalone solar and solar paired with storage. Additionally, bill savings were calculated relative to a counterfactual customer with no solar or battery system.

The model has several dimensions including three different utilities: PG&E, SDG&E, and SCE; three customer categories: non-CARE residential, CARE residential, and small commercial; two system types: solar only and solar paired with battery systems; two system sizes: 50 percent and 100 percent of annual load; and results with and without an incentive from the SGIP. For

³⁶⁸ IOU-02 at 55-56.

each of these dimensions, six metrics were evaluated: payback period, first-year bill savings, first-year cost-shift, PCT benefit-cost ratio, RIM benefit-cost ratio, and TRC benefit-cost ratio. We discuss each of these metrics individually. Full results from the model and descriptions of the inputs and assumptions used are in Appendix B.

We begin with the payback period. For residential customers, without a Market Transition Credit and with a system sized to 100 percent of load on an annual basis, the simple payback period ranges between a low of 7.4 years for an SDG&E non-CARE customer with standalone solar to a high of 16.5 years for a non-CARE customer in SCE territory with standalone solar. The results indicate the tariff generally provides a better economic investment for non-CARE residential customers with paired storage, where the payback period ranges between 7.8 and 11.2 years. Certainly, these results comport with our prior determination that the tariff should encourage paired storage. And it also aligns with our determination that the payback period should balance the needs of participants and nonparticipants, but that a 10-year payback period is reasonable. For nonresidential customers, with a system sized to 100 percent of load on an annual basis, the simple payback period is even shorter, with a range between 6.9 years for an SDG&E customer with stand-alone solar to 9.1 years for an SCE customer with solar paired with storage. Again, these results align with the finding that a 10-year payback period is reasonable.

Turning to the results regarding the first-year cost-shift, we find the cost shift per residential customer ranges from a low of \$134 for a non-CARE solar-only SCE customer to a high of \$1,272 for a non-CARE paired storage customer in SDG&E service territory. While the tariff does not eliminate the cost shift from residential customers, it compares favorably with a majority of

proposals in this proceeding, as shown in the E3 results.³⁶⁹ The first-year cost-shift for nonresidential customers ranges from \$930 for SCE solar only customers to \$2605 for SDG&E paired storage customers.

We turn now to the cost-effectiveness analysis of the successor tariff, beginning with the results of the TRC test for both residential and nonresidential, as shown in Table 9 below.

Table 9
TRC Results

CARE Status	System Type	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
Residential	System Size (% of Load) --->	50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0.4	0.4	0.6	0.6	0.4	0.4
Non-CARE	Solar + 2-hr Storage	0.6	0.6	0.9	0.9	0.6	0.6
CARE	Solar	0.4	0.4	0.6	0.6	0.4	0.4
CARE	Solar + 2-hr Storage	0.6	0.6	0.9	0.9	0.6	0.6
Non-Residential	System Size (% of Load) --->	50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0.38	0.38	0.62	0.62	0.42	0.42
Non-CARE	Solar + 2-hr Storage	0.63	0.64	0.92	0.92	0.68	0.71

As was the case with the payback period, the results of the TRC test indicate ratios closer to 1.00 for customers with paired storage, while standalone solar scores are low for PG&E and SDG&E customers. Further, the successor tariff cannot be considered cost-effective for any customer segment.

We recognize the cost-effectiveness tests results are not compliant with the statute, in that the costs are not approximately equal to the benefits. This is especially true with the results of the RIM and PCT, shown in Tables 10 and 11 below. However, as we have stated throughout this decision, the Commission is faced with the challenging task of balancing multiple competing requirements for the successor tariff. The successor tariff makes great strides in addressing the

³⁶⁹ CSA-32 at 34, 35, 38, 39, 53, 54, 57, and 58.

cost shift, thus addressing one element of the equity issue. Additionally, the successor adopts the Equity Fund, addressing the second equity issue, that of expanding access to low-income households and disadvantaged communities. Furthermore, the Market Transition Credit assists the Commission in addressing the equity issue while also addressing the statute's requirements that the tariff ensures that customer-sited renewable distributed generation continues to grow sustainably and include specific alternatives designed for growth among residential customers in disadvantaged communities.

We find that the successor tariff balances the multiple statutory requirements as well as the guiding principles.

Appendix B contains the complete set of inputs and outputs from the Commission's modeling of the successor tariff.

8.6. Related Subtariffs

Parties offered recommendations for subtariffs of the current net energy metering tariff including a tariff for low- and medium-income customers; a community net energy metering tariff; virtual net energy metering; and aggregated net energy metering. We also address the issue of whether and how to revise the current NEM 1.0 and NEM 2.0 tariffs. We discuss party proposals and our determinations in the subsections below.

8.6.1. Low- and Medium- Income Customer Tariffs

In Section 8.3.2. above, we determined that the successor tariff will address the equity issue by working to ensure increased participation by low-income and disadvantaged communities. We defined low-income customers as residential customers eligible for CARE or FERA, resident-owners of single-family homes in disadvantaged communities (as defined in D.18-06-027), or residential customers who live in California Indian Country (as defined in D.20-12-003) and take

service on either the standard net energy metering or aggregated net energy metering tariff. We reiterate that the Commission will conduct an evaluation of the equity elements we adopt in this decision to determine whether to expand eligibility for low- and moderate-income customers. With this as our base policy, we review the multiple proposals to increase participation by low-income and disadvantaged communities.

We begin with the energy burden reduction policy from GRID *et al.* where eligible customers would remain on their retail rate for imports but be assigned a time-varying rate for exports equal to the 2021 default resident time-of-use rate that would remain in place for 20 years, fixed to 2021 values. GRID *et al.* contend the aim of this policy is to correct the “value impact” in NEM 2.0, where these customers receive lower solar bill savings compared to wealthier customers due to their discounted rates.³⁷⁰ GRID *et al.* explains that because these customers’ exports are netted against their consumption, they functionally receive a discounted value for the energy that they provide to the grid. GRID *et al.* asserts adoption of their proposal would ensure this group of customers would receive a fair return on exported energy.³⁷¹ This proposal is supported by SEIA/Vote Solar, who did not address low-income customers in its own proposal.³⁷²

CALSSA proposes a suite of proposals for low- and moderate-income customers. As we have already defined income eligibility, we only address those proposals that will meet these criteria. CALSSA asserts that the Commission should address equity and access by encouraging solar adoption among low-income customers and addressing obstacles that have hindered solar growth

³⁷⁰ GRID *et al.* Opening Brief at 20 citing GRD-01 at 8.

³⁷¹ GRID *et al.* Opening Brief at 21.

³⁷² SEIA/Vote Solar Opening Brief at 4, footnote 7 citing GRD-01.

for renters.³⁷³ CALSSA proposes that all income qualified customers living in single-family homes be eligible for the NEM 2.0 tariff minus any nonbypassable charges and credit exports from those customers at the undiscounted applicable retail rate minus nonbypassable charges.³⁷⁴ CALSSA also proposes the Commission extend NEM 2.0 eligibility for virtual net energy metering to those apartment buildings eligible for Multifamily Affordable Solar Housing (MASH) and SOMAH programs.

We have already discounted the Joint Utilities statement that ending the cost-shift does “the greatest good for lower-income customers.” However, Joint Utilities also offer a transitional tariff discount for CARE and FERA eligible customers, which provides a discount on the proposed grid benefits charge and guarantees these customers will pay only a nominal amount toward the costs underlying this charge.³⁷⁵ This charge, which Joint Utilities contend would reduce the grid benefits charge to \$1.50 per kW-AC, would only be available for the first three years of the successor tariff, with potential extensions depending upon Commission action.³⁷⁶ Joint Utilities propose all ratepayers would fund this benefit. Additionally, Joint Utilities propose a behind-the-meter storage incentive for CARE and FERA customers, where these customers would receive a free battery, which Joint Utilities estimate would allow these customers to experience a payback period of seven to eight years for their solar system.³⁷⁷

³⁷³ CALSSA Opening Brief at 58 citing CSA-01 at 22:13 to 23:3.

³⁷⁴ CALSSA Opening Brief at 58.

³⁷⁵ Joint Utilities Opening Brief at 75.

³⁷⁶ Joint Utilities Opening Brief at 75-76.

³⁷⁷ Joint Utilities Opening Brief at 77 citing IOU-01 at 172.

Joint Utilities propose that this incentive program, called STORE, would be funded with cost shift savings realized by its proposed reform of NEM 2.0.³⁷⁸

NRDC and Public Advocates Office propose an Equity Fund or Equity Fee to help bring clean energy benefits to low-income customers and disadvantaged communities.³⁷⁹ NRDC explains that the fund is intended to be a feature of any successor tariff.³⁸⁰ In addition to exempting all CARE and FERA customers from the grid benefits charge, Public Advocates Office submits its Equity Charge has two components: 1) a per month fee of \$0.26-\$0.66/kW on non-CARE/FERA NEM 1.0 and NEM 2.0 customers to cover the cost of the exemption of the grid benefits charge; and 2) an additional monthly fee of \$3.15/kW on non-CARE/FERA NEM 1.0 and NEM 2.0 customers to provide an upfront subsidy to CARE/FERA customers.³⁸¹ Public Advocates Office proposes once these funds begin to be collected, the Commission should establish an inclusive process with disadvantaged communities, environmental justice groups, and consumer advocates to determine how the funds should be spent to address barriers to adoption in these communities.³⁸² Public Advocates Office explains the Equity Fund could be applied to existing programs such as SOMAH, which may increase the adoption of distributed renewables in disadvantaged communities.³⁸³

³⁷⁸ Joint Utilities Opening Brief at 78 citing IOU-01 at 178.

³⁷⁹ NRDC Opening Brief at 32.

³⁸⁰ NRDC Opening Brief at 32.

³⁸¹ Public Advocates Office Opening Brief at 30 citing PAO-01 at 3-56 and footnote 330.

³⁸² Public Advocates Office Opening Brief at 30 citing PAO-01 at 3-55 to 3-56 and footnote 330.

³⁸³ PAO-01 at 3-59.

PCF proposes a carve-out for low-income customers to retain access to the NEM 2.0 tariff until low-income customers reach 10,000 MW of installed behind-the-meter capacity.³⁸⁴ PCF contends this would contribute to ensuring the customer-sited distributed generation continues to grow sustainably and advance equity between customer classes.³⁸⁵

First, we decline any proposal to maintain the status quo, *i.e.*, NEM 2.0. While we recognize the barriers to adoption of behind-the-meter resources by low-income households as well as the financial challenges for low-income customers, we must meet other objectives for this tariff including ensuring the tariff is based on the costs and benefits. We have already found that NEM 2.0 does not meet this standard.

To meet the stated policies and objectives for low-income customers, including increasing participation in the successor tariff, we approve the same structure adopted above for low-income customers, including the same export compensation rates as other customers. The CARE and FERA discount will not be applied to the export compensation rate, as is currently done in NEM 2.0. The Lookback Study explains that low-income customers who participate in NEM 2.0 receive lower bill savings benefits and experience longer payback periods.³⁸⁶ As a result, installation of distributed generation is less frequent in low-income and disadvantaged communities.³⁸⁷ While this is primarily due to the cost of systems, we consider the inability to i) achieve higher bill savings and ii) receive payback in a reasonable number of years have been and continue to be barriers

³⁸⁴ PCF Opening Brief at 61.

³⁸⁵ PCF Opening Brief at 61.

³⁸⁶ Lookback Study at 94.

³⁸⁷ Lookback Study at 94.

to increased participation by low-income customers. We also find providing the same tariff structure, with the exceptions described below, will meet the equity requirement in guiding principle b.

Joint Utilities and CALSSA recommend providing discounts on certain elements of the tariff structure for eligible households. We find this will assist in meeting the objectives of improved equity and increasing participation. Accordingly, eligible customers will be exempt from the Grid Participation Charge. We also recognize the challenges of these customers with respect to time-of-use rates and the additional financial burden of electrification.³⁸⁸ Thus, we allow low-income customers in the successor tariff to take service on any time-of-use rate, including the rates in Table 6 and any future rate that may become eligible for customers enrolled in the successor tariff.

These elements of the successor tariff will be available to qualified customers for ten years from the date of interconnection. As determined in Section 8.3.2 above, the Commission will conduct an evaluation of the affordability and benefits of certain elements we adopt here, including the Grid Participation Charge, and time-of-use rates, as well as the definition of eligibility. Hence, these elements are only guaranteed to prospective tariff customers until Commission action on the evaluation. Following the evaluation, the elements could remain the same, be expanded, or be reduced.

Several parties recommended the creation of low-income or equity funding mechanisms. Joint Utilities recommend a fund solely focused on providing battery storage to CARE and FERA customers. NRDC and Public Advocates Office recommend the creation of a two-part equity fund, as described

³⁸⁸ GRID *et al.* Opening Brief at 17.

above. We find, in addition to the Market Transition Credit, an equity fund focused on promoting storage for low-income customers could assist the Commission in meeting the requirement of Public Utilities Code Section 2827.1(b)(1) to ensure the tariff includes specific alternatives designed for growth among residential customers in disadvantaged communities.

Accordingly, we adopt an Equity Fund to create improved access to distributed energy resource technology for low-income customers and disadvantaged communities. We establish the Equity Fund with an annual cap of \$150 million over a four-year period. Joint Utilities shall conduct a workshop by April 30, 2022 to solicit stakeholder input on the uses of the Equity Fund, including the potential expansion and improved alignment of existing programs such as DAC-SASH, DAC-GT, CSGT, and SGIP Equity, as well as the consideration of new programs such as the Joint Utilities STORE program or on-bill financing programs being considered in the Rulemaking on Clean Energy Financing.

Parties offer multiple options on collecting for the Equity Fund. Public Advocates Office recommends a charge of approximately \$3.81/kilowatt-hour per month to NEM 1.0 and NEM 2.0 non-CARE customers.³⁸⁹ Additionally, for customers interconnecting on the successor tariff, this charge would be assessed beginning 10 years from the date of interconnection.³⁹⁰ Public Advocates Office contends this would help ensure equity in payback periods between CARE and non-CARE customers. Joint Utilities contend that there will be a cost shift savings with adoption of its full proposal, such that for the first three years after

³⁸⁹ Public Advocates Office Opening Brief at 30-31 citing PAO-01 at footnote 30.

³⁹⁰ Public Advocates Office Opening Brief at 30-31 citing PAO-01 at footnote 30.

implementation, the Commission should allocate ten percent of the savings to its low-income battery proposal.³⁹¹

While we agree that an Equity Fund should be established to address the low adoption rate of distributed generation in low-income households, we find it reasonable to use the cost shift savings generated through the reform of the successor tariff to improve the low adoption rate, as proposed by Joint Utilities. Additional details and implementation of the Equity Fund will be developed through a future ruling asking for party comment on the discussion during the April 30, 2022 workshop, followed by a subsequent Commission decision.

8.6.2. Virtual Net Energy Metering and Net Energy Metering Aggregation

As further described below, to achieve the multiple and competing objectives of this proceeding, we adopt the same structure as discussed in Section 8.5 above for virtual net energy metering (VNEM) and Net Energy Metering Aggregation (NEMA). At this time, however, we maintain the current tariff (*i.e.*, NEM 2.0) for the low-income subtariffs of VNEM for MASH and SOMAH, which we explain below. Thus, we only address changes to the non-CARE/FERA VNEM tariff proposals in this decision, as well as NEMA.

We begin with a brief explanation of our decision to maintain the current tariff for VNEM MASH and SOMAH, at this time. A guiding principle in this proceeding is to ensure equity in the tariff. Further, we stated in the Order Instituting Rulemaking that we would coordinate with other relevant proceedings.³⁹² There is a current proceeding assessing the affordability of utility

³⁹¹ Joint Utilities Opening Brief at 78 citing IOU-01 at 173.

³⁹² Order Instituting Rulemaking 20-08-020 at 7-8 stating the proceeding would coordinate with several other proceedings, listing those proceeding, but noting the coordination is not limited to those proceedings.

services (R.18-07-006); information gathered in the affordability proceeding could be helpful in providing a more complete record with respect to the VNEM tariff. Further, there is a current evaluation of the SOMAH program being conducted, pursuant to D.17-12-022.³⁹³ A final report has been made public and we consider information from that evaluation could be useful in determining future changes to the tariff.³⁹⁴ However, at this time the report is not in the record of this proceeding. We find it prudent to delay any changes to these programs until review in this proceeding of additional findings from the affordability proceeding and the SOMAH evaluation. Accordingly, we maintain the current structure of the low-income VNEM tariffs until such review is conducted.

With respect to the general VNEM tariff, parties offer multiple proposals. CALSSA recommends maintaining the same overall structure but suggests improvements for the Commission to adopt. First, CALSSA proposes the Commission allow new tenants to automatically receive the same benefit as the previous tenant in the same unit.³⁹⁵ CALSSA explains the current process is that after a current tenant leaves, the account shifts to a backup account, which provides benefits to the property owner, and updating the account requires waiting or paying a fee to update immediately. Second, CALSSA requests the Commission allow multiple arrays on one property to be treated as one generator. CALSSA explains it is inefficient to treat each array separately when

³⁹³ D.17-12-022 at Ordering Paragraph 13 requiring measurement and evaluation of SOMAH.

³⁹⁴ The October 13, 2021 report can be found at [somah_phaseii_report_20211013_final.pdf \(ca.gov\)](#)

³⁹⁵ CALSSA Opening Brief at 214-215 citing CSA-01 at 27.

many apartment complexes require use of separate roof surfaces and points of interconnection.³⁹⁶

Like CALSSA, Ivy Energy proposes, among its recommendations, a carve-out for net energy metering to continue the NEM 2.0 structure for VNEM until 10,000 megawatts of capacity has been reached by multifamily buildings, at which time VNEM should transition to the successor tariff.³⁹⁷ Ivy Energy also supports ensuring that customers in a multifamily building, who are eligible for CARE/FERA, are able to retain that discount when the building installs a shared distributed energy resources asset.³⁹⁸

Joint Utilities recommend that VNEM and NEMA be aligned with the successor tariff, such that exports are compensated at avoided costs, and to allocate the revenues from exported energy to benefiting accounts as a dollar credit.³⁹⁹ Joint Utilities explain that because a customer is allocated a dollar credit for exports, there is no need for a grid benefits or usage charge. Joint Utilities also recommend combining VNEM and NEMA into one tariff.

Again, we decline to maintain the current structure of the general VNEM and NEMA subtariffs. One of our objectives in this proceeding is to ensure the tariff successor aligns with the costs and benefits of customer-sited renewable distributed generation. We have already determined that basing export compensation on retail rates does not meet that objective. Accordingly, the VNEM and NEMA subtariffs will be revised to mirror the successor tariff adopted in Section 8.5 above. We have found that this structure appropriately

³⁹⁶ CALSSA Opening Brief at 215 citing CSA-01 at 27.

³⁹⁷ Ivy Energy Opening Brief at 3.

³⁹⁸ Ivy Energy Opening Brief at 3.

³⁹⁹ Joint Utilities Opening Brief at 117.

balances the multiple and competing objectives in this proceeding. However, we make one change from the structure of the successor tariff. Because renters have no ability to install storage and have less ability than homeowners to install load-shifting “smart” devices, we do not require VNEM customers to adopt the electrification time-of-use rates adopted above in Section 8.5.3. However, VNEM customers will be required to continue to take service on time-of-use rates, as is the case with the current VNEM subtariff.

There are three other policy considerations that we have reviewed. First, Ivy Energy contends that Joint Utilities’ claim that “virtual NEM systems do not displace onsite load, and therefore does not provide the same distribution benefits as standard NEM” is false.⁴⁰⁰ Noting that most VNEM generation is used onsite instead of being exported and 94 percent of VNEM systems are located on the same feeder,⁴⁰¹ Ivy contends it has demonstratively proven there is onsite consumption of energy that is generated at multifamily buildings interconnected under VNEM.⁴⁰² Joint Utilities did not dispute this claim in reply briefs. Hence, we affirm that VNEM provides benefits to the grid similar to that of NEM. However, this does not affect our overall decision to adopt revisions to the VNEM tariff that align with the adopted successor tariff.

Secondly, Ivy Energy and Agricultural Parties disagree with the Joint Utilities proposal to combine the VNEM and NEMA subtariffs, contending that VNEM and NEMA subtariffs serve different purposes and should remain separate. Ivy Energy states that VNEM is for multifamily buildings and is designed to facilitate virtual metering billing arrangements. In comparison,

⁴⁰⁰ Ivy Energy Opening Brief at 5 citing IOU-01 at 156.

⁴⁰¹ Ivy Energy Opening Brief at 6 citing IOU-02 at 110.

⁴⁰² Ivy Energy Opening Brief at 5-6 citing IVY-02 at 2-4.

NEMA – Ivy contends – is available to a single customer that has generating facilities on adjacent or continuous properties and allows for aggregation as if on one site.⁴⁰³ We agree with Ivy Energy that the two subtariffs serve separate purposes and, generally, have separate customer bases: VNEM primarily for multi-tenant properties and NEMA primarily for agricultural customers.⁴⁰⁴ Accordingly, we maintain separate subtariffs for the two.

Third, CALSSA proposes the Commission allow multiple solar arrays on one property to be treated as one generator in the VNEM tariff, with credits allocated across the property. CALSSA notes that the current tariff allows multiple arrays but requires each array to serve a subset of customers on the property.⁴⁰⁵ Joint Utilities point to no engineering or policy reason to deny this change. We find this recommendation reasonable and efficient; as CALSSA points out many apartment complexes contain more than one building and often require the use of separate roof surfaces and points of interconnection.⁴⁰⁶

8.6.3. Community Project Tariffs

As previously described in Section 6 above, CCSA, CESA, and PCF put forward proposals for community storage or community distributed energy resources. CCSA proposes that renewable energy projects up to five megawatts interconnected to the distribution system receive monetary credits that are then applied to the utility bills of customers in the same utility service area who subscribe to the project. CESA recommends virtual pairing of separate solar and

⁴⁰³ Ivy Energy Opening Brief at 7.

⁴⁰⁴ Ivy Energy Opening Brief at 7 citing Transcript Vol. 5 at 803-804.

⁴⁰⁵ CSA-01 at 8.

⁴⁰⁶ CALSSA Opening Brief at 215 citing CSA-01 at 27.

offsite energy storage resources. PCF proposes growing community storage through a net energy metering customer fee.

At this time, we decline to adopt a successor tariff specifically for community distributed energy resources, as we deem it premature. We reiterate that this proceeding will coordinate with other related proceedings. There are currently aspects of community solar that are being discussed or considered in other proceedings. For example, in April 2022, PG&E, SDG&E, and SCE are required to file applications for their Disadvantaged Communities Green Tariff program and Community Solar Green Tariff program. Further, it is the intention of the Commission to conduct additional workshops to consider these external influences.

8.6.4. Revisions to NEM 1.0 and NEM 2.0 Tariffs

In D.16-01-044, determinations regarding the successor tariff (NEM 2.0) were made at a transitional moment without the advantage of a “quantitatively informed basis.”⁴⁰⁷ Over six years later, we have the data we need to make an informed decision. As indicated previously, the Lookback Study found that NEM 2.0 is not cost-effective; has negatively impacted non-participant ratepayers; and has disproportionately harmed low-income customers; certain parties contend the cost shift ranges between \$1 and \$3.4 billion a year. The changes we have made thus far in this decision do nothing to tackle this existing cost shift. The changes only attempt to prevent or at least limit additional cost shift from new customers in the successor tariff. Below we discuss whether the Commission can and should make revisions to the NEM 1.0 and NEM 2.0 tariffs.

⁴⁰⁷ D.16-01-044 at 85-86.

Several parties argue the Commission cannot and should not make any revisions to NEM 1.0 and NEM 2.0 based on legal and fairness contentions. We begin with CALSSA's claim of a due process violation. CALSSA argues that changes to NEM 1.0 and NEM 2.0 are not in the scope of this proceeding and that making changes to these tariffs would be a violation of customers' due process rights. CALSSA correctly notes that Issues 2, 4, and 5 speak solely to the matter of the successor tariff. Turning to Issue 6, CALSSA underscores the phrase, "other issues that may arise." Explaining that the scoping memo is issued following the review of the comments to the Order Instituting Rulemaking, replies to the comments, and discussion at the prehearing conferencing, CALSSA argues that the matter of changes to NEM 1.0 and NEM 2.0 was raised in those pleadings and therefore cannot be considered as "issues that may arise." CALSSA asserts that, with respect to Issue 6, a reasonable affected customer would interpret the phrase "other issues that may arise" as not including NEM 1.0 and NEM 2.0 tariffs.

TURN considers this to be a "tortured" reading of Issue 6, especially given that at no time did CALSSA file a motion to strike any proposals with respect to revisions to NEM 1.0 and NEM 2.0 tariffs. TURN highlights that CALSSA chose to conduct discovery on the proposals at issue and briefed the merits of the proposals.⁴⁰⁸ TURN asserts that Issue 6 clearly identifies the potential change to any existing net energy metering tariff as within scope of this proceeding, thus providing CALSSA with adequate notice that these issues would be

⁴⁰⁸ TURN Reply Brief at 89.

considered.⁴⁰⁹ TURN contends failure to submit a motion to strike earlier in the proceeding is fatal to CALSSA's "last minute claims."⁴¹⁰

The wording of Issue 6 may be imprecise; however, we consider CALSSA's contention that it does not include NEM 1.0 and NEM 2.0 tariffs to be disingenuous and not supported by the record of this proceeding. CALSSA argues they interpret Issue 6 to exclude NEM 1.0 and NEM 2.0 tariffs because, despite being discussed in comments prior to the scoping memo, the tariffs were not explicitly listed in the scope. However, as discussed by TURN, CALSSA's testimony, discovery, and hearing cross-examination all included discussion of NEM 1.0 and NEM 2.0. CALSSA never argued a due process violation until briefs. We find NEM 1.0 and NEM 2.0 tariffs are in the scope of Issue 6.

Turning to arguments regarding the legality of revising the legacy tariffs, we address contentions from SEIA/Vote Solar. SEIA/Vote Solar argues that because of the adoption of the legacy period, the Commission cannot make any changes to the NEM 1.0 and NEM 2.0 tariffs for current customers. In D.16-01-044, the Commission established a legacy period of 20 years from the customer's interconnection as a reasonable period over which the customer should be eligible to continue taking service under the NEM 2.0 tariff. D.16-01-044 states this would "allow customers to have a uniform and reliable expectation of stability of the net energy metering structure under which they decided to invest."⁴¹¹

Sierra Club proposes the Commission transition existing net energy metering tariff customers to electrification rates at five years from

⁴⁰⁹ TURN Reply Brief at 89-90.

⁴¹⁰ TURN Reply Brief at 90.

⁴¹¹ D.16-01-044 at 100.

interconnection and provide a storage rebate to NEM 2.0 customers in exchange for switching to the successor tariff.⁴¹² CUE, IEPA, NRDC, Public Advocates Office, and TURN support the transitioning of existing non-CARE NEM 1.0 and NEM 2.0 tariff customers to the successor tariff. These parties propose the Commission provide storage rebates to NEM 2.0 customers in exchange for voluntarily switching to the successor tariff, but then require NEM 2.0 and NEM 1.0 customers to transition to the successor tariff at eight years from the customer's interconnection date.⁴¹³ These parties assert the revised timeline would still "allow these customers to realize full paybacks before transitioning to the end-state tariff and receive ongoing bill saving and investment returns for the remainder of their system life."⁴¹⁴ Contending the Commission has the authority to revise its prior determinations, Public Advocates Office argues that allowing current NEM 1.0 and NEM 2.0 customers to remain on the tariffs through the legacy period will result in continued cost burden, as shown in the Lookback Study, and continue increases in average electric rates for all ratepayers and discourage electrification.⁴¹⁵ Further, Public Advocates Office contends continuation of this cost shift may necessitate discounts to electric vehicle rates, creating additional cost burden.⁴¹⁶ In support of the accelerated timeline for transitioning NEM 1.0 and NEM 2.0 customers, TURN maintains it "is justified by the need to balance the interests of participants and non-participants."⁴¹⁷

⁴¹² Sierra Club Opening Brief at 40.

⁴¹³ Public Advocates Office Opening Brief at Appendix A.

⁴¹⁴ TURN Opening Brief at 69.

⁴¹⁵ Public Advocates Office Opening Brief at 35 and footnote 151 citing PAO-02 at 5-31.

⁴¹⁶ Public Advocates Office Opening Brief at 40.

⁴¹⁷ TURN Opening Brief at 68.

Recognizing the Commission has the authority to modify prior decisions, SEIA/Vote Solar cautions that transitioning NEM 1.0 and NEM 2.0 tariff customers would have significant consumer protection and market impacts.⁴¹⁸ Underscoring that over one million utility customers have invested tens of billions of dollars in distributed solar under these tariffs, SEIA/Vote Solar asserts that “undermining the economic underpinnings of those investments...would be profoundly destabilizing and would impact adversely the market” for solar and other distributed energy resources.⁴¹⁹ SEIA/Vote Solar further warns that revising these tariffs undermines the project economics and efforts to ensure that consumers have the information necessary to make an informed decision and could lead to consumer backlash.⁴²⁰ Pointing to the state of Nevada, SEIA/Vote Solar underscores that similar changes were adopted but ultimately reversed.⁴²¹

While we conclude we have the authority to revise the legacy NEM 1.0 and NEM 2.0 tariffs, we also recognize our choice could result in an inequity to one of two groups: nonparticipant ratepayers or NEM 1.0 and NEM 2.0 participant ratepayers. Public Utilities Code Section 2827.1 and our guiding principles do not rank the requirements, telling us whose needs should come first: the needs of a particular group of people, the environment, or the grid. Hence, we are left with a policy decision of what requirements and needs should be prioritized. At the beginning of our discussion in this decision, we noted the adopted successor tariff is a balance of various and competing requirements, impacting participants and nonparticipants, the grid, and the environment. This is equally true of our

⁴¹⁸ SEIA/Vote Solar Opening Brief at 122.

⁴¹⁹ SEIA/Vote Solar Opening Brief at 122.

⁴²⁰ SEIA/Vote Solar Opening Brief at 123.

⁴²¹ SEIA/Vote Solar Opening Brief at 123-124.

determination for the NEM 1.0 and NEM 2.0 customers and customers who take service under NEM 2.0 after the adoption of this decision.

We find this balance can be found by taking two steps. First, we require all existing residential non-CARE NEM 1.0 and NEM 2.0 tariff customers to transition to the successor tariff, but not in 8 years as recommended by those supporting a speedier transition. The Lookback Study found that the weighted average payback years for NEM 2.0 residential customers is 10.2 years for PG&E customers, 10.8 for SCE customers, and 7.9 years for SDG&E customers,⁴²² generally longer than the payback periods proposed by parties who support decreasing the legacy period. Further, current modeling of the NEM 2.0 tariff performed in this proceeding, indicates even shorter payback periods of 3.3 to 6.3 years for non-CARE NEM 2.0 residential tariff customers in 2023.⁴²³ However, the Lookback Study also found the nonresidential sector taking service on the NEM 2.0 tariff to have a wider array of payback years, ranging from 9.4 years for the agricultural sector in PG&E territory to 18.3 years for the industrial sector in SCE territory.⁴²⁴ While the shortening of the legacy period exempts CARE/FERA customers, we recognize the remaining residential NEM 1.0 and NEM 2.0 customers include moderate income net energy metering customers who may have higher financial burdens. Hence, we find it reasonable to require existing residential NEM 1.0 and NEM 2.0 tariff customers to transition to the successor tariff at 15 years to ensure they have a reasonable payback of their investment. We note these customers will continue to experience monthly bill savings from the successor tariff, just not at the same rate

⁴²² Lookback Study at Table 5-5.

⁴²³ CSA-32 at Table 16 and Table 17.

⁴²⁴ Lookback Study at Table 5-5.

as either NEM 1.0 or NEM 2.0. This balances the needs of nonparticipants (who will experience a decrease in their monthly bills) with the needs of participants (who will continue to reap the benefits of monthly bill savings either through the legacy tariff or the successor tariff). Transitioning these customers to the successor tariff after 15 years means these customers will also be required to switch to electrification rates five years earlier, which supports our objective to promote electrification.

To support our objective to promote storage, we offer all existing NEM 2.0 tariff customers an incentive for storage if they voluntarily switch to the successor tariff within four years from the time the storage rebate becomes available. If an existing NEM 2.0 tariff customer voluntarily switches to the successor tariff during the first year of implementation, they will receive a \$0.20/Wh storage rebate, which will be available for a total of four years but decrease by 25 percent a year over the subsequent four years. Customers will be eligible for the storage rebate provided in the year they transition to the successor tariff. The customer must claim the rebate within three years of their transition by submitting proof they installed an energy storage system.

To provide the incentive, we establish a Storage Evolution Fund, which will be funded through the Joint Utilities distribution charges, as proposed by Public Advocates Office.⁴²⁵ Within 75 days from the adoption of this decision, the Joint Utilities shall file a Tier 1 Advice Letter creating balancing accounts to track costs related to the Storage Evolution Fund. No later than April 30, 2022, Joint Utilities shall hold a workshop to discuss implementation for disbursing funds for eligible customers. Alternatively, this discussion may take place

⁴²⁵ PAO-01 at 4-7.

during the previously discussed Equity Fund workshop. No later than 30 days following the workshop, Joint Utilities shall file an implementation proposal, taking into account workshop discussions. Parties shall file comments on the implementation proposal no later than 14 days following the filing of the implementation proposal; replies shall be filed seven days thereafter. The Commission will consider this proposal in a future decision.

Our second step is replacement of the 20-year legacy period with a 15-year legacy period for all future NEM 2.0 tariff customers. This includes residential customers who take service under NEM 2.0 after the adoption of this decision and before the sunset date, as well as customers taking control of (*i.e.*, owning, leasing, or paying a power purchase agreement for) a residential system interconnected under the NEM 2.0 tariff, other than when the subsequent customer is the legal partner (*i.e.*, spouse or domestic partner) of the original customer. For this latter group, the legacy period does not restart when the subsequent customer takes control of the system; the legacy period maintains its original interconnection date but lasts for 15 years instead of 20 years. For the same reasons that we require existing NEM 1.0 and NEM 2.0 tariff customers to transition to the successor tariff at 15 years, we find that 15 years is a reasonable period over which a new residential customer should be eligible to continue taking service under the NEM 2.0 tariff.

Joint Utilities shall submit Tier 1 advice letters making this change to the current tariffs within five business days of the adoption of this decision, with an effective date of five days after the advice letter submittal date. For purposes of consumer protection, Joint Utilities shall inform solar providers of the change on the date that they submit these advice letters. Each of the Joint Utilities shall email and send an automated phone call to all solar providers who submitted an

interconnection application in the three years preceding this date, and for whom the utilities have the requisite contact information. The utilities shall also mail a letter to all solar providers who submitted an interconnection application in the year preceding this date. These communications should refer solar providers to a utility website, email address, and telephone number, as well as an appropriate Commission webpage.

8.7. Implementation of the Successor Tariff

This decision has affirmed that NEM 2.0 creates a cost shift between participating customers and nonparticipant ratepayers. Hence there is a sense of urgency to transition to the successor tariff. However, the record of this proceeding indicates changes to each utility's billing systems and supporting platforms to bill customers on the successor tariff will take 12 to 24 months following the issuance of a final decision.⁴²⁶ With these implementation challenges in mind, we adopt the implementation schedule below.

Step 1: Within 30 days of the adoption of this decision, Joint Utilities shall each submit an information-only Tier 1 Advice Letter to provide the details of the successor tariff, as adopted in this decision. The individual advice letters shall summarize Joint Utilities' interpretation of how the successor tariff will be structured and include indicative levels of price components.

Step 2: Within 45 days of the adoption of this decision, Joint Utilities shall each submit a supplemental advice letter containing rate factors based on the applicable revenue requirements and associated tariff sheets. These supplemental advice letters provide the industry with the details necessary to inform customers about the successor tariff, including consumer protection

⁴²⁶ Joint Utilities Opening Brief at 101 citing IOU-01 at 181.

elements such as updated or new disclosure documents. Joint Utilities shall ensure the tariff language is standardized across all three utilities.

Joint Utilities recommend short timelines for these first two steps.⁴²⁷ Public Advocates Office recommended a 90-day turnaround.⁴²⁸ We find any unnecessary delay in providing this information to the behind-the-meter industry could lead to potential harm to the industry's ability to grow sustainably.

Step 3: No later than 100 days after the adoption of this decision, Energy Division will dispose of the advice letters from Steps 1 and 2.

Step 4: No later than 120 days after the adoption of this decision, the Commission will implement a tariff sunset on NEM 2.0, after which time no additional customers will be permitted to take service under the NEM 2.0 tariff. Joint Utilities recommend establishing the buffer period based on the interconnection application date.⁴²⁹ We find this buffer period will protect customers who are in the process of contracting for NEM 2.0 tariff service. Customers submitting interconnection applications after this sunset date will take service and be billed on the NEM 2.0 tariff and then be transitioned to the successor tariff once it is operationalized. Any delay in Step 3, the processing of the advice letters in Steps 1 and 2, will result in an equal, day-for-day, extension of time in Step 4. Customers signing an installation, lease or PPA contract after this sunset date will take service and be billed on the NEM 2.0 tariff and then be transitioned to the successor tariff once it is operationalized.

⁴²⁷ IOU-02 at 99.

⁴²⁸ PAO-01 at 6-1.

⁴²⁹ IOU-02 at 100.

Further, for customers taking interim service on the NEM 2.0 tariff, Joint Utilities propose a reduction of these benefits during the interim period.⁴³⁰ This would add an unnecessary layer of complexity. Instead, customers taking NEM 2.0 service on an interim basis will receive the full benefits of NEM 2.0 until the transition to the successor tariff. Once transitioned, these customers' export rates will be based on a five-year schedule of Avoided Cost Calculator described above. The Avoided Cost Calculator used will be the adopted calculator, as of January 1 of the calendar year of the successor tariff customer's interconnection date. Customers will retain this export rate for the five-year lock-in period.

Step 5: Within 12 months following adoption of this decision, Joint Utilities will complete alignment of related necessary billing systems and transition to full implementation of the successor tariff. Joint Utilities state that billing system upgrades for each of the utilities are currently in progress and contend this will result in delays to implementation. However, we find the delays unreasonable and require full implementation of the successor tariff no later than one year from issuance of this decision.

Public Advocates Office recommends enrollment of customers on the successor tariff by early 2022,⁴³¹ which we find would not allow behind-the-meter industry providers to sufficiently train their sales force and customer service representatives, and revise marketing material and contracts. The overall transition from NEM 2.0 to the successor tariff is as expeditious as reasonably possible to prevent additional contribution to the cost shift, ensure the

⁴³⁰ IOU-02 at 185.

⁴³¹ PAO-01 at 6-1.

compensation for these services is cost-effective, and initiate the storage and electrification benefits of the successor tariff.

Lastly, many parties expressed concern regarding the impact of the successor tariff on the California Energy Commission's Title 24 regulation. The Commission intends to collaborate with the California Energy Commission on the Title 24 regulation and its interactions with the successor tariff.

9. Comments on Proposed Decision

The proposed decision of Administrative Law Judge Kelly A. Hymes 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 _____, and reply comments were filed on _____ by _____.

10. Assignment of Proceeding

Martha Guzman Aceves is the assigned Commissioner and Kelly A. Hymes is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. The evaluation of NEM 2.0 tells us whether the tariff is or is not performing as required.
2. The evaluation of NEM 2.0 establishes a foundation for creating a successor tariff.
3. The Lookback Study does not tell a complete story but informs the Commission on how the successor tariff should be revised.
4. A disagreement on an assumption in the Lookback Study does not equate to a flaw in that assumption.
5. The cost-effectiveness analyses in the Lookback Study have been conducted in accordance with prior Commission decisions.

6. The Lookback Study is a sound analysis of the NEM 2.0 tariff.
7. NEM 2.0 tariff customers bypass infrastructure and other service costs embedded in volumetric rates by decreasing grid imports.
8. The bypassed infrastructure and other service costs embedded in volumetric rates by NEM 2.0 participants over the course of the 20-year legacy period are shifted to non-participant ratepayers.
9. The Lookback Study indicates NEM 2.0 negatively impacts non-participant ratepayers.
10. The precise financial impact of NEM 2.0 on nonparticipant ratepayers depends on the Avoided Cost Calculator values used.
11. PCF's analysis and estimate of the financial impact of NEM 2.0 is incorrect.
12. The financial impact of NEM 2.0 is caused by more than the simple bill savings from net energy metering customer energy consumption.
13. Without changes to the current tariff structure, the financial burden on the shrinking pool of nonparticipants is unsustainable and could fall disproportionately on lower-income customers.
14. The Lookback Study finds that the commercial, industrial, and agricultural customer segments of the NEM 2.0 tariff generally pass the TRC test and pay rates that fully cover their costs of services.
15. No party disputes the cost-effectiveness results of the commercial, industrial, and agricultural segments of the NEM 2.0 tariff.
16. The Lookback Study followed the directives of prior Commission decisions regarding the methods for cost-effectiveness analysis.
17. While the Lookback Study found commercial, agricultural, and industrial sectors of the NEM 2.0 tariff had TRC and PCT results of 1.0 or better, the results of the RIM test showed a cost/benefit ratio of less than 1.0.

18. The Lookback Study indicates the nonresidential sectors of the NEM 2.0 tariff are not cost-effective.

19. The Lookback Study finds the NEM 2.0 tariff is not cost-effective for the residential customer segment.

20. Lower-income customers are burdened with the additional expense of a portion of the 82 to 91 percent of the cost of service bypassed by NEM 2.0 customers whose bill payments only cover nine to 18 percent of their cost of service.

21. The Lookback Study indicates that the NEM 2.0 tariff disproportionately harms low-income customers not participating in the tariff.

22. The Lookback Study indicates that the NEM 2.0 tariff disproportionately benefits non-CARE residential NEM 2.0 tariff customers while all other customers, including those with lower incomes, bear the addition of 82 to 91 percent of the cost of service bypassed by these tariff customers.

23. Parties have varying interpretations of the phrase “grow sustainably” and what that means for the successor tariff.

24. In D.16-09-036, the Commission stated it was not placing a greater emphasis on achieving sustainable growth over other statutory obligations, and nothing in the record of this proceeding leads the Commission to stray from this position.

25. Any proposed change to the net energy metering tariff should consider the impact on the growth of the net energy metering market.

26. The net energy metering tariff has and should continue to assist California in meeting its energy and climate goals.

27. The Commission considered and adopted estimates of transmission and distribution costs, greenhouse gas reductions, and system resiliency and reliability in D.20-04-010.

28. The Standard Practice Manual states that the cost-effectiveness tests should not be used individually, but instead consider the tradeoffs between the tests.

29. D.19-05-019 directs the use of the TRC and recognized the importance of the PAC and RIM tests.

30. Each cost-effectiveness test has value and together the tests tell a complete story.

31. Consideration of all the cost-effectiveness tests allows us to consider the values and tradeoffs between the tests.

32. Application of the Societal Cost Test is premature because the evaluation to determine the final details of the test has not been completed.

33. D.20-04-020 concluded that consideration of the benefits of grid services provided by specific distributed energy resources should be addressed in resource-specific proceedings.

34. D.20-04-020 considered SEIA/Vote Solar's proposals for avoided reliability and resiliency costs and found the benefits described could only be attributable to storage and storage plus solar.

35. D.20-04-020 found the SEIA/Vote Solar proposal for avoided reliability and resiliency costs did not show any deferred or avoided costs to utility ratepayers but indicated ratepayers using these technologies receive additional participant benefits.

36. Neither SEIA/Vote Solar nor PCF provide convincing evidence that the examples of resiliency benefits offered are more than individual benefits.

37. Examples given by SEIA/Vote Solar and PCF are either private or highly speculative and limited to unique circumstances.

38. The proposed societal benefits of an updated social cost of carbon metric, land conservation, a reduced methane leakage multiplier, and avoided transmission costs are not solely applicable to net energy metering.

39. Other distributed energy resources could reduce methane leakage and avoid future transmission costs.

40. Methane leakage and updated cost of carbon can be attributable to resources other than net energy metering resources.

41. Out-of-state methane leakage, incremental greenhouse gas reduction, and land conservation and use are accounted for in the Avoided Cost Calculator.

42. Allowing for an additional value for societal benefits associated with social cost of carbon metric, land conservation, a reduced methane leakage multiplier, and avoided transmission costs would result in the double counting of these benefits.

43. Parties agree to differing degrees that the Commission should consider the length of time for a customer's payback period when determining the reasonableness of the successor tariff.

44. Analysis of the successor tariff requires balancing multiple legislative requirements and guiding principles, and the needs of participants and nonparticipants.

45. The 2013 and 2017 NREL studies show that consumers look at monthly bill savings when making an economic decision on adopting solar.

46. Payback periods are not the predominant factor for customers when considering solar adoption.

47. We find it reasonable to consider the length of time for a customer's payback period when determining the reasonableness of the successor tariff.

48. Ten years to payback in combination with the monthly bill savings presents a balanced approach to promoting the adoption of paired solar.

49. The increased number of years to payback will alleviate cost shift in the successor tariff.

50. The number of years to payback should reflect all costs of solar and paired storage adoption, including maintenance costs.

51. Only CALSSA disputes the NREL estimate of \$2.34 per watt as the cost of solar.

52. The NREL estimate is the best estimate of the cost of solar available in this proceeding.

53. Any proposed change to the tariff should consider the impact on the growth of the net energy metering market.

54. The White Paper proposed that preservation of a viable market is likely to require a glide path including both a gradual rate reform and an external transitional support mechanism designed specifically to enable a reasonable payback period for customers investing in onsite generation.

55. Inclusion of a glide path is essential to balance the multiple requirements the tariff should meet.

56. The magnitude and severity of cost shift requires immediate action by the Commission.

57. The glide paths proposed by CALSSA and SEIA/Vote Solar are inadequate.

58. The equity issue in this proceeding cannot be addressed solely by reducing the cost shift.

59. Disadvantaged communities should not continue to be left behind with respect to clean energy options, including electrification and storage.

60. The record is sufficient to establish a different low-income eligibility definition.

61. Continuation of the cost shift feeds into higher electricity rates, which discourages the adoption of electrification measures.

62. The objectives of the Lookback Study were to examine the impacts of the NEM 2.0 tariffs and to compare how different metrics have changed following the transition from the NEM 1.0 tariff to the NEM 2.0 tariff.

63. Electricity consumption patterns are not discussed in the key takeaways of the Lookback Study.

64. Energy consumption patterns included in the study contain insufficient data to make the assertion that the current structure of net energy metering promotes electrification.

65. The Lookback Study contains incomplete data regarding change in consumption for SCE customers.

66. Without complete data and more in-depth analysis on electricity consumption patterns, assertions regarding the promotion of electrification cannot be made or relied upon in this decision.

67. The Lookback Study does not indicate that the current structure of net energy metering promotes electrification goals.

68. The Commission has consistently conveyed the message that net energy metering systems should be sized to load.

69. Policy messages regarding sizing net energy metering systems to load were conveyed prior to the contemplation of the electrification policy.

70. D.06-01-024, D.06-07-028, D.11-06-016 and D.14-11-001 do not address the policy of electrification.

71. SEIA/Vote Solar's proposal to allow customers to oversize their loads by 50 percent, with the modification to compensate the net surplus generation at the current net surplus compensation rate, will promote electrification.

72. There is no reason to revise the net surplus compensation rate currently set at the Default Load Aggregation Point price.

73. The Lookback Study found that the TRC benefit-cost ratio is consistently higher for solar photo voltaic systems when compared to solar+storage systems.

74. The addition of storage provides greater benefits to both the customer and the grid.

75. The current cost of storage not only creates cost-effectiveness concerns, but also presents a barrier to widespread adoption.

76. It is the policy of the Commission to encourage paired storage with the benefits and costs in mind.

77. Continuing to base export compensation on retail rates conflicts with the guiding principles.

78. Retail rates do not reflect the actual costs of the exports or the benefits the exports provide to the utilities and the grid.

79. The Commission needs to know export actual costs and benefits in order to ensure they are approximately equal pursuant to Section 2827.1.

80. Basing export rates on retail rates has resulted in compensation levels 3.8 to 5.4 times higher than the benefits they provide to the electrical systems in the form of avoided costs.

81. Using avoided cost values instead of the retail rate bring the cost of the successor tariff closer to its value, which will ensure equity among customers and maximize the value of the resource to all customers and to the grid.

82. Export compensation based on Avoided Cost Calculator values sends more accurate price signals and promotes paired storage.

83. Ensuring the growth of customer generation is not the Commission's only concern.

84. Using the Avoided Cost Calculator approach will ensure the costs and benefits are approximately equal, as instructed by the Legislature.

85. Using the Avoided Cost Calculator approach should lead to positive outcomes for customers and nonparticipating ratepayers.

86. With the exception of the 2020 version of the Avoided Cost Calculator, the calculator has consistently reflected the value of exported energy from year to year.

87. Using Avoided Cost Calculator values to set export rates will ensure export compensation is based on the benefits they provide to the system and will reduce the cost shift.

88. The Commission can use other elements and tools to transition to the successor tariff in a measured fashion.

89. There are multiple pieces to the export compensation rate, which can lead to confusion for customers.

90. Requiring the same export compensation rate for all net energy metering customers will maintain equal treatment between nonresidential and residential customers, ensuring equity among customers.

91. Adopting similar export rates for new nonresidential net energy metering customers is reasonable.

92. The Lookback Study found the above-1.0 TRC and PCT scores for the nonresidential sector of NEM 2.0 was most likely due to the federal Investment Tax Credit.

93. Without the federal Investment Tax Credit, most TRC values for nonresidential NEM 2.0 are lower than 1.0.

94. There is nothing in the record of this proceeding that would lead us to know whether the federal Investment Tax Credit will be extended beyond the current expected sunset date of December 31, 2023.

95. The Lookback Study highlighted that most nonresidential NEM 2.0 customers have high fixed charges, minimum bills, and demand charges, which tend to lower the potential savings with solar systems.

96. If the Commission would find the NEM 2.0 structure compliant with guiding principles for the nonresidential customer sector, a change in demand charges or high fixed charges in another proceeding could lead to furthering the cost shift in net energy metering that could be challenging to unwind.

97. Requiring successor tariff customers to take service on highly differentiated time-of-use rates will improve the price signal to these customers.

98. Requiring successor tariff customers to take service on highly differentiated time-of-use rates will incentivize these customers to divert energy usage to lower-priced hours when the solar system is producing or deploying storage.

99. Highly differentiated time-of-use rates are closer to the energy prices required to run the grid.

100. Requiring successor tariff customers to take service on highly differentiated time-of-use rates maximizes the value of the generation to all customers and to the electrical system and ensures equity among all customers.

101. Highly differentiated time-of-use rates encourage electrification and help California reach its greenhouse gas emissions reduction goals.

102. Requiring successor tariff customers to take service on highly differentiated time-of-use rates will meet several guiding principles in this proceeding.

103. No evidence has been provided indicating that creating a highly differentiated time-of-use rate that is specific to net energy metering customers could discourage the adoption of multiple distributed energy resources.

104. The current design of retail rates no longer provides the ability to accurately calculate a customer's energy and grid usage, with respect to net energy metering customers.

105. Net energy metering customers intermittently reduce usage depending upon the performance of the solar system.

106. The grid must always be prepared for the intermittent decrease and increase of a customer's usage.

107. Net energy metering customers cause costs even when not directly importing energy from the grid.

108. Retail rates were created before the emergence of the two-way street of imports and exports.

109. A grid participation charge in combination with the retail rate will provide improved accuracy for considering the grid usage of net energy metering customers.

110. The addition of a grid participation charge will decrease the cost shift created by the inaccuracies related to having both imports and exports.

111. The addition of a grid participation charge will lead to just and reasonable rates for all customers.

112. The addition of a grid participation charge will ensure the successor tariff is accurately based on the generator's costs and benefits to the system as a whole and will ensure equity among customers.

113. D.16-01-044 determined the nonbypassable charges to be assessed on NEM 2.0 customers are the public purpose program charge, nuclear decommissioning, competition transition charge, and the Department of Water Resources bond charge.

114. Parties provided no evidence regarding why the list of nonbypassable charges adopted in D.16-01-044 should be expanded.

115. The examples provided by CALSSA do not indicate the Market Transition Credit is too difficult to administer.

116. The Market Transition Credit proposals from TURN and NRDC are incomplete.

117. The TURN, NRDC and E3 proposals for Market Transition Credit provides the Commission options for creating a Market Transition Credit.

118. The Market Transition Credit provides flexibility to ensure ratepayer equity and ensures that customer-sited renewable distributed generation can continue to grow sustainably.

119. The Market Transition Credit provides the best approach for a glide path in the successor tariff.

120. In D.15-07-001, the Commission adopted a minimum bill standard for residential customers on the non-generation portion of their monthly electric bill.

121. In D.15-07-001, the Commission established a minimum bill of \$5 for CARE customers and \$10 for non-CARE customers.

122. It is not necessary to adopt a minimum bill because we are adopting a grid benefits charge.

123. Reducing the netting interval exposes more of the customers' imports and exports to net billing.

124. Instantaneous netting is more consistent with cost-based compensation and will maximize the value of customer-sited renewable generation to all customers and to the grid.

125. Allowing monthly billing and annual true-ups will help California reach its environmental objectives but not at the unnecessary financial burden of non-participating customers.

126. Annual true-ups allow generation to be credited for exactly what it is valued based upon the rate that hour.

127. Annual true-ups do not undermine greenhouse gas emissions objectives.

128. Hourly Avoided Cost Calculator values for export rate compensation complicate the bill structure.

129. Averaging the Avoided Cost Calculator values across days in a month acknowledges the general trends in differences between hours and months and results in accurate values.

130. Averaging the Avoided Cost Calculator values yields more accurate signals for customer generators to reduce imports from the grid and for battery storage to dispatch during hours most valuable to the grid.

131. Averaging the Avoided Cost Calculator values across days in a month does not add the false precision of potentially inaccurate forecasts of a specific hour's weather and other conditions.

132. Using averaged monthly Avoided Cost Calculator values for export compensation ensures the tariff is based on the generator's true costs and benefits to the grid and leads to equity among all ratepayers while maximizing the value of the generation to all ratepayers and to the grid.

133. Like all forecasts, the Avoided Cost Calculator forecast values get increasingly uncertain further away from the present.

134. Basing the Avoided Cost Calculator values on a five-year schedule of values will enable solar providers to predict customer savings.

135. The certainty of a five-year lock-in rate helps to ensure that customer-sited renewable distributed generation continues to grow sustainably, enhances customer protection measures, and provides transparency to customers.

136. Using single year avoided cost values, instead of averaged costs, brings the cost of the tariff closer to its value.

137. Using single year avoided cost values aligns with requirements to ensure the tariff is based on the costs and benefits of the customer generator and ensures the benefits are approximately equal to the total costs.

138. The purpose of the Market Transition Credit is to ensure customer-sited renewable distribution generation continues to grow sustainably.

139. Limiting the Market Transition Credit to a small subset of customers would not ensure customer-sited renewable distribution generation continues to grow sustainably.

140. The Commission does not intend the growth of the market to be focused solely on low-income customers.

141. The Market Transition Credit is meant to ensure the continued growth of the market but also provide an incentive to customers to install customer sited renewable distributed generation.

142. A dollar per kilowatt credit (of the generator's installed capacity) for the Market Transition Credit is a user-friendly calculation.

143. Allowing for a discrete line on the customer's bill for the Market Transition Credit will provide customer transparency.

144. Allowing the Market Transition Credit to be applied to future bills will prevent unnecessary energy usage by customers.

145. The design of the Market Transition Credit will provide a more transparent and uniform incentive to successor tariff customers.

146. The Market Transition Credit is a glide path that improves certainly over time for the industry.

147. TURN's Market Transition Credit proposal does not provide certainty for the industry.

148. TURN's Market Transition Credit proposal is unnecessarily complicated and inconsistent in terms of the inputs.

149. In combination with other elements of the successor tariff, ratepayer funding of the stepped-down to zero dollars approach of the Market Transition Credit appropriately balances tariff requirements.

150. The transition to the successor tariff will require customers to make substantial investments in storage, as well as solar, with longer payback periods.

151. Net energy metering customers are more likely than other customers to choose critical peak pricing rates, which will help the grid during critical peak days.

152. Customers should be provided the opportunity to elect to choose critical peak pricing or peak day pricing rates on any rate option they select.

153. A grid participation charge enables the Commission to create a successor tariff that ensures equity among customers and is accurately based on the costs and benefits of the generation.

154. The name "grid participation charge" sends a clear message to the customers they are paying to use the grid.

155. Most nonresidential customers already have fixed and demand charges included in their rates.

156. The Joint Utilities' proposal to require bill credits be applied to charges in the same time-of-use period is overly prescriptive.

157. The successor tariff makes great strides in addressing the cost shift, thus addressing one element of the equity issue.

158. The Equity Fund addresses the statutory requirement of expanding access to disadvantaged communities.

159. The Market Transition Credit assists the Commission in addressing the equity issue while also addressing the statutory requirement that customer-sited renewable distributed generation continues to grow sustainably.

160. The successor tariff balances the requirements of the statute and the guiding principles adopted previously in this proceeding.

161. Low-income households have financial challenges and barriers to adoption of behind-the-meter resources.

162. The successor tariff is required to meet many objectives other than expanding access to low-income households.

163. The Lookback Study found that low-income customers who participate in NEM 2.0 receive lower bill savings benefits and experience longer payback periods.

164. Installation of distributed generation is less frequent in low-income households and disadvantaged communities.

165. The inability to achieve higher bill savings and reasonable payback periods are barriers to increased participation by low-income customers.

166. Adopting the same net billing tariff structure for all income households meets the equity requirement in guiding principle b.

167. Providing discounts on certain elements of the tariff structure for eligible households will assist the Commission in meeting the objectives of improved equity and increased participation in low-income households and disadvantaged communities.

168. Low-income households have challenges with certain time-of-use rates and electrification costs.

169. The combination of a Market Transition Credit and an equity fund could assist the Commission in meeting the requirement to ensure specific alternatives designed for growth among residential customers in disadvantaged communities.

170. It is reasonable to use the cost shift savings generated through the reform of the successor tariff to improve the low adoption rate of distributed generation in low-income households.

171. A guiding principle in this proceeding is to ensure equity in the successor tariff.

172. We stated in the Order Instituting Rulemaking that this proceeding would coordinate with other relevant proceedings.

173. There is a current proceeding assessing the affordability of utility services (R.18-07-006) and information gathered in the affordability proceeding could be helpful in providing a more complete record with respect to the VNEM tariff.

174. An evaluation of the SOMAH program has been conducted, pursuant to D.17-12-022.

175. A report of the SOMAH evaluation has been made public and the information in the evaluation could be useful in determining future changes to the tariff.

176. The SOMAH evaluation is not in the record of this proceeding.

177. It is prudent to delay any changes to low-income subtariffs of VNEM until review in this proceeding of additional findings from the affordability proceeding and the SOMAH evaluation.

178. One of our objectives in this proceeding is to ensure the successor tariff aligns with the costs and benefits of customer generation.

179. Basing export compensation on retail rates does not meet the objective of aligning costs and benefits of customer generation.

180. Aligning the VNEM tariff with the successor tariff balances the multiple and competing objectives in this proceeding.

181. Renters have no ability to install storage and have less ability than homeowners to install load-shifting smart devices.

182. Ivy Energy has demonstrated there is onsite consumption of energy that is generated at multifamily buildings interconnected under VNEM; Joint Utilities do not dispute this claim in briefs.

183. It is reasonable to affirm that VNEM provides benefits to the grid similar to that of the NEM 2.0 tariff.

184. VNEM is for multifamily buildings designed to facilitate a virtual metering billing arrangement.

185. NEMA is available to a single customer that has a generating facility or facilities on adjacent or contiguous properties and allows for aggregation as if on one site.

186. VNEM and NEMA serve separate purposes and generally have separate customer bases: VNEM for multi-family customers and NEMA for agricultural customers.

187. The current VNEM tariff allows multiple arrays but requires each array to serve a subset of customers on the property.

188. Joint Utilities point to no engineering or policy reason why multiple solar arrays on one property should not be treated as one generator on the VNEM tariff, with credits allocated across the property.

189. Many apartment complexes contain more than one building and often require the use of separate roof surfaces and points of interconnection for VNEM.

190. Treating multiple solar arrays on one property as one generator is reasonable and efficient.

191. There are aspects of community solar that are being discussed or considered in other proceedings.

192. It is the intention of the Commission to conduct workshops to consider aspects of community solar that are being discussed or considered in other proceedings.

193. It is premature to adopt a Community Solar tariff or subtariff at this time.

194. In D.16-01-044, determinations regarding the NEM 2.0 tariff were made at a transitional moment without the advantage of a quantitatively informed basis.

195. The Commission now has the data to make an informed decision on a successor tariff.

196. The Lookback Study found that NEM 2.0 is not cost-effective for residential customers, has negatively impacted non-participant ratepayers, and has disproportionately harmed low-income customers.

197. The estimated cost shift from the NEM 2.0 tariff ranges between \$1 billion and \$3.4 billion.

198. The changes made to the net energy metering tariff in Section 8.5 above do nothing to tackle the cost shift; the changes only attempt to prevent or limit additional cost shift from new customers enrolling in the successor tariff.

199. NEM 1.0 and NEM 2.0 are in the scope of Issue 6.

200. In D.16-01-044, the Commission established a legacy period of 20 years from a customers' interconnection date as a reasonable period over which the customer should be eligible to continue taking service under the NEM 2.0 tariff.

201. Our choice regarding changes to NEM 1.0 and NEM 2.0 result in an inequity to one of two groups: nonparticipant ratepayers or legacy customer ratepayers.

202. Public Utilities Code Section 2827.1 and our guiding principles do not rank the requirements for the successor tariff and tell us whose needs should come first: the needs of a particular group of customers, the environment, or the grid.

203. Determining whether to revise NEM 1.0 and NEM 2.0 tariffs requires balancing various and competing requirements, and impacts participants, nonparticipants, the grid, and the environment.

204. Remaining medium-income residential NEM 1.0 and NEM 2.0 tariff customers may have higher financial burdens.

205. Once transitioned to the successor tariff, NEM 1.0 and NEM 2.0 customers will continue to experience monthly bill savings from the successor.

206. Revising the NEM 1.0 and NEM 2.0 tariff legacy periods to 15 years for existing residential customers will continue to ensure these customers have reasonable payback of their investment.

207. Shortening the legacy period of existing residential NEM 1.0 and NEM 2.0 tariff customers balances the needs of nonparticipants with the needs of participants.

Conclusions of Law

1. The Commission should use the Lookback Study as a foundation to create a successor tariff that continues the elements that resulted in positive outcomes but corrects or replaces elements that resulted in negative outcomes.

2. The Commission should affirm the NEM 2.0 tariff negatively impacts non-participant ratepayers.

3. The Commission should develop a revised net energy metering tariff that corrects the cost shift, to the extent possible, while balancing the eight guiding principles.

4. The Commission should affirm the NEM 2.0 tariff is not cost effective for the commercial, industrial, and agricultural customer segments.

5. The Commission should affirm the NEM 2.0 tariff is not cost effective for the residential customer segment.

6. The Commission should affirm the NEM 2.0 tariff disproportionately harms low-income customers.

7. The Commission should ensure the growth of the net energy metering market does not come at the undue and burdensome financial expense of nonparticipant ratepayers.

8. The Commission should not grant the request to replace the Avoided Cost Calculator with the Lookback Study cost of service analysis.

9. The Commission should align its analysis in this proceeding with prior guidance from the Standard Practice Manual and consider the value of the TRC, PCT, and RIM cost-effectiveness tests, as well as the tradeoffs between the tests.

10. The Commission should not use the Societal Cost Test in its analysis of the successor tariff.

11. The Commission should not ascribe a resiliency adder for net energy metering customers.
12. The Commission should not adopt proposed societal benefits of an updated, social cost of carbon metric, land conservation, a reduced methane leakage multiplier, or avoided transmission costs.
13. The Commission should not rely on one single method of analysis to be the determinant of the final successor tariff.
14. The Commission should consider monthly bill savings and ten years to payback for paired storage as part of the successor tariff.
15. The Commission should use the NREL estimate of \$2.34 per watt as the cost of solar.
16. The Commission should adopt a glide path as part of the successor tariff to minimize the cost shift, to ensure equity among all customers, and also to encourage the growth of the market, but not at the undue and burdensome financial expense of nonparticipant ratepayers.
17. The Commission should address equity in the successor tariff through increased participation by disadvantaged communities and combatting the cost shift.
18. The Commission should conduct an evaluation of the equity elements adopted in this decision to determine whether they are sufficient or need to be revised.
19. The Commission should adopt a successor tariff that addresses the cost shift to ensure equity but also to encourage adoption of electrification measures.
20. The Commission should adopt SEIA/Vote Solar's proposal to allow customers to oversize their loads by 50 percent, while maintaining the current net surplus generation compensation rate, to promote electrification.

21. The Commission should continue to encourage paired solar in the successor tariff with both the benefits and costs in mind.
22. Continuing to base export compensation on retail rates does not comply with Public Utilities Code Section 2827.1.
23. The Commission should base export compensation on values derived from the Avoided Cost Calculator.
24. The Commission should ensure customers can understand the export compensation rate structure to be able to make an informed decision on whether to purchase a solar system.
25. The Commission should adopt the same export compensation rate structure for residential and nonresidential customer sectors.
26. The Commission should adopt a successor tariff that requires customers to take service on an existing highly differentiated time-of-use rate available to all customers.
27. The Commission should adopt a successor tariff that includes a grid participation charge.
28. The Commission should adopt a successor tariff that includes a Market Transition Credit as a glide path.
29. The Commission should adopt instantaneous netting in the successor tariff.
30. The Commission should allow monthly billing and annual true-ups for customers in the successor tariff.
31. The Commission should set export compensation rates at monthly values for each hour, differentiated between weekday and weekend.
32. The Commission should adopt Avoided Cost Calculator values based on a five-year schedule of values for each hour from the most recent Avoided Cost

Calculator, adopted as of January 1 of the calendar year of the new successor tariff customer's interconnection date.

33. The Commission should adopt a ratepayer-funded, stepped-down to zero, Market Transition Credit that is available to all successor tariff customers who enroll in the tariff over the next five years.

34. The Commission should permit customers to adopt critical peak pricing or peak day pricing as part of their highly differentiated time-of-use rates.

35. The Commission should adopt a grid participation charge for residential net energy metering customers as part of the successor tariff.

36. The Commission should not adopt a requirement to apply credits only to charges during the same time-of-use period.

37. The Commission should adopt the successor tariff.

38. The Commission should not maintain the NEM 2.0 tariff for low-income households.

39. The Commission should adopt the same successor base tariff for all income levels.

40. The Commission should not decrease export compensation credits by applying the CARE and FERA discounts received by low-income households.

41. The Commission should not apply the grid participation charge and should allow any time-of-use rate for low-income households enrolled in the successor tariff.

42. The Commission should establish an equity fund to address the low adoption rate of distributed generation in low-income households.

43. The Commission should maintain the current structure of the low-income VNEM tariffs until review of findings in the affordability proceeding and the SOMAH evaluation is conducted in this proceeding.

44. The Commission should not require VNEM and NEMA customers to take service on highly differentiated time-of-use rates, but rather require these customers to take service on the time-of-use rates of their choice.

45. The Commission should adopt the same net billing structure for VNEM and NEMA, at this time.

46. The Commission should affirm that VNEM provides benefits to the grid similar to that of NEM 2.0.

47. The Commission should maintain separate VNEM and NEMA subtariffs.

48. The Commission should allow multiple solar arrays on one property to be treated as one generator in the VNEM subtariff.

49. The Commission should not adopt a community solar tariff or subtariff at this time.

50. The Commission has the authority to amend previous decisions pursuant to Public Utilities Code Section 1708.

51. The Commission should revise non-CARE and FERA residential NEM 1.0 and NEM 2.0 tariffs for existing customers while considering the multiple impacts.

52. The Commission should require existing residential NEM 1.0 and NEM 2.0 tariff customers to transition to the successor tariff no later than 15 years after the date of interconnection.

53. The Commission should revise the legacy period of new residential NEM 2.0 customers to 15 years.

54. The Commission should revise the legacy period of customers taking control of a residential system to 15 years.

O R D E R

IT IS ORDERED that:

1. The following findings from the Lookback Study are affirmed:

- (a) the NEM 2.0 tariff negatively impacts non-participant ratepayers;
- (b) the NEM 2.0 tariff is not cost-effective for the commercial, industrial, and agricultural customer segments;
- (c) the NEM 2.0 tariff is not cost-effective for the residential customer segment; and
- (d) the NEM 2.0 tariff disproportionately harms low-income customers.

2. For the purposes of this decision, a low-income household is defined as residential customers eligible for California Alternate Rates for Energy (CARE) and the Family Electric Rates Assistance (FERA) programs, resident-owners of single-family homes in disadvantaged communities (as defined in Decision (D.) 18-06-0127), or residential customers who live in California Indian Country (as defined in D.20-12-003) and take service on either the standard successor tariff or aggregated net energy metering subtariff.

3. A net billing tariff is adopted. With the exception of the import rate, the adopted elements below will be available to an enrolled customer for a period of ten years from interconnection date. Imports and exports will be calculated based on instantaneous netting of consumption and production and will be trued-up on an annual basis. Bill credits will be applicable toward import charges from any time of use time period. The net billing tariff contains the following adopted elements:

- (a) Export Compensation Rates based on hourly Avoided Cost Calculator values averaged across days in a month, differentiated by weekdays and weekends. For the first

five years after system interconnection, export compensation rates will be based on a five-year schedule of values for each hour from the most recent Avoided Cost Calculator, adopted as of January 1 of the calendar year of the customer's interconnection date. Following the five-year lock in rate, export compensation rates will be based on averaged hourly avoided cost values from the most recent Avoided Cost Calculator, adopted as of January 1.

- (b) Market Transition Credits, as a glide path, based on a dollar per kilowatt installed amount. The adopted Market Transition Credit, as indicated in the table below, will be reviewed during a five-year evaluation of portions of the net billing tariff, conducted by the Commission. The Market Transition Credit will remain constant for a customer for 10 years from the customer's interconnection date.

Adopted Market Transition Credits			
Customer Segment	PG&E	SDG&E	SCE
Residential	\$1.62./kW	\$0/kW	\$3.59/kW
Low-Income	\$4.36/kW	\$0/kW	\$5.25/kW
NonResidential	\$0/kW	\$0/kW	\$0/kW

The credit will decrease by 25 percent annually, as measured by the first-year credit rate until the credit reaches zero. The monthly credit will be a discrete line on the customer's utility bill, will apply to all charges, and will apply to future bills until the credit is used. Funding for the credit will be provided by all ratepayers through the Public Purpose Program charge.

- (c) Highly differentiated time-of-use rates as provided in the following table. These rates are available to enrolled customers for a period of five years from the customer's interconnection date. Additional eligible rates may be added by utility request through submittal of a Tier 3 Advice Letter.

Eligible Time Of Use Rates by Utility			
	PG&E	SDG&E	SCE
Eligible Rate	EV2-A	EV-TOU-5	TOU-D-PRIME

- (d) Grid Participation Charges, as shown in the following table, applied only to residential customers . The Grid Participation Charge will be reviewed as part of the five-year evaluation of affordability and equity elements of the net billing tariff.

Monthly Grid Participation Charge for Net Billing Customers			
Customer Segment	PG&E	SDG&E	SCE
Residential	\$8.00/kW	\$8.00/kW	\$8.00/kW
Low-Income	\$0/kW	\$0/kW	\$0/kW
NonResidential	\$0/kW	\$0/kW	\$0/kW

- (e) Low-income customers (as defined in this decision) may also participate in the net billing tariff. For such participants, the CARE and FERA discount will not be applied to the export compensation rate. Eligible customers will be exempt from the grid participation charge and may take service on any time-of-use rate. Customers interconnecting within the five years from implementation of the net billing tariff will not experience changes in the elements (except for the import rate) for a period of ten years from the customer's interconnection date. The low-income subtariff of the net billing tariff will be reviewed during the five-year

evaluation of affordability and equity elements of the net billing tariff.

4. Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company shall track the number of successor tariff applications and jointly submit a Tier 2 Advice Letter, annually, no later than July 1, to propose maintenance of the Market Transition Credit reduction trajectory or any specific changes to it.

5. Energy Division is authorized to conduct a five-year evaluation of the affordability and equity elements contained in the net billing tariff adopted in Ordering Paragraph 2 above. A future decision will consider the results of the evaluation to determine if changes are needed.

6. An Equity Fund is established to address the low adoption rate of customer-sited distributed generation in low-income households and households in disadvantaged communities. We establish an annual cap of \$150 million, with funding provided through the cost shift savings generated by the reforms adopted in this proceeding. Additional details will be finalized in a future decision, following a workshop and party comment.

7. No later than April 30, 2022, Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company shall conduct one or more workshops to solicit stakeholder input on a) use of the Equity Fund adopted in Ordering Paragraph 6, including the potential expansion and improved alignment of existing low-income programs and new programs; and b) use of the Storage Evolution Fund, adopted in Ordering Paragraph 15.

8. The Virtual Net Energy Metering tariff for low-income eligible households shall remain unchanged until review of additional findings in

Rulemaking 18-07-006 and the evaluation of the Solar on Multifamily Affordable Housing program.

9. The Virtual Net Energy Metering (VNEM) general tariff shall adhere to the same changes as the successor net energy metering tariff we adopt in Ordering Paragraph 2 above, with one distinction: VNEM customers shall take service on the time-of-use rates of their choice. Further, the VNEM tariff is revised to allow multiple solar arrays on one property to be treated as one generator, with credits allocated across the property. VNEM for low-income customers remains unchanged until further notice.

10. The Net Energy Metering Aggregation tariff shall adhere to the same changes as the successor net energy metering tariff we adopt in Ordering Paragraph 3 above.

11. Implementation of the changes adopted in the previous ordering paragraphs of this decision shall occur in the following steps:

- (a) Step 1: Within 30 days of the adoption of this decision Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company (Joint Utilities) shall each submit an information-only Tier 1 advice letter to provide the details of the net billing tariff, conforming to the elements adopted in Ordering Paragraph 3.
- (b) Step 2: Within 45 days of the adoption of this decision, Joint Utilities shall each submit a supplemental advice letter containing rate factors based on the applicable revenue and associated tariff sheets. Joint Utilities shall ensure the tariff language is standardized across all three utilities.
- (c) Step 3: No later than 100 days after the adoption of this decision, the Commission's Energy Division should dispose of the advice letters from Steps 1 and 2.

- (d) Step 4. No later than 120 days after the adoption of this decision, the Commission will implement a tariff sunset on the prior net energy metering tariff, known as NEM 2.0, after which time, no additional customers will be permitted to take service under the NEM 2.0 tariff. Any delay in Step 3 above, will result in an equal, day-for-day, extension of time in the tariff sunset date. Customers signing contracts after this sunset date will take service and be billed on the NEM 2.0 tariff and transitioned to the net billing tariff, once it is operationalized.
- (e) Step 5: No later than 12 months following adoption of this decision, Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company will complete alignment of related necessary billing systems and transition to full implementation of the net billing tariff.

12. The original Net Energy Metering tariff, referred to as NEM 1.0, and its successor, referred to as NEM 2.0, are revised as follows:

- (a) Existing non-California Alternate Rates for Energy (CARE) residential customers on these two tariffs shall transition to the tariff we approve in Ordering Paragraph 3 above no later than 15 years after the customer's interconnection date.
- (b) Existing NEM 2.0 tariff customers who voluntarily transfer to the net billing tariff adopted in this decision, within four years from its inception, are eligible to receive a \$0.20 per watt hour storage rebate. The storage rebate is available for a total of four years but will decrease by 25 percent a year over the subsequent four years. Customers are eligible for the storage rebate in the year they transition to the successor tariff. Customers must claim the rebate within three years of their transition to the net billing tariff by submitting proof of an energy storage system installation.

- (c) Immediate replacement of the 20-year legacy period with a 15-year legacy period for all future NEM 2.0 tariff customers, including residential customers who take service under NEM 2.0 after the adoption of this decision, as well as customers taking control of (*i.e.*, owning, leasing, or paying a power purchase agreement for) a residential system, other than when the subsequent customer is the legal partner (*i.e.*, spouse or domestic partner) of the original customer.

13. No later than five business days after the adoption of this decision, Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company (Joint Utilities) shall submit Tier 1 Advice Letters revising the legacy period for residential non-California Alternate Rates for Energy (CARE) customers on the current net energy metering tariff (NEM 2.0) and the previous net energy metering tariff (NEM 1.0) from 20 years to 15 years, with an effective date of five days after the advice letter submittal date. Joint Utilities shall inform solar providers of the change on the date that they submit these advice letters. Each of the Joint Utilities shall email and send an automated phone call to all solar providers who submitted an interconnection application in the three years preceding this date, and for whom the utilities have the requisite contact information. The Joint Utilities shall each mail a letter to all solar providers who submitted an interconnection application in the year preceding this date.

14. No later than 15 days from the adoption of this decision, Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company shall notify customers of the original net energy metering tariff, NEM 1.0, and the current net energy metering tariff, NEM 2.0, of the changes in the tariff, as directed in Ordering Paragraph 12.

15. A Storage Evolution Fund is established and will be funded through the distribution charges of Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company.

16. No later than 30 days following the workshop directed in Ordering Paragraph 7, Pacific Gas and Electric Company, San Diego Gas & Electric Company and Southern California Edison Company shall file an implementation proposal for the Storage Evolution Fund. No later than 14 days following the filing of the Storage Evolution Fund implementation proposal, parties shall file comments on the proposal; replies shall be filed seven days thereafter.

17. Rulemaking 20-08-020 remains open to address issue seven in the Scoping Memo and continuing matters related to this decision.

This order is effective today.

Dated _____, at San Francisco, California.

Appendix A
Customer Explanation of
Net Billing Tariff

How Electricity Bill Savings Work

If you go solar, the majority of your electricity bill savings will come from reducing the amount of electricity that you buy, or import, from your electricity provider. A minor additional amount of bill savings will come from your provider's Net Billing program. Net Billing provides you with financial credits on your bill when your solar system sends excess electricity to the electric grid after first powering the electricity needs at your home. The value of these credits varies by time of day and season depending on the current supply and demand for electricity on the grid. It will usually be lower than the rate that you pay for electricity, just as wholesale prices for other goods are lower than their retail prices. Finally, you will receive an additional bill credit if you interconnect your solar system while California has its Market Transition Credit in effect.

Net Billing and Your Electricity Bill

Importing and Exporting Electricity

Since the sun isn't always shining, most solar customers also rely on electricity from the electric grid. Pairing a battery with your solar system allows you to store your excess solar generation and then reduce the amount of electricity you need to import from the grid in the evening. After your solar system is interconnected to the grid, your monthly electricity bill will summarize how much electricity your home imported from and exported to the grid.

Bill Charges

PG&E, SCE, and SDG&E solar customers are required to go on a time-of-use (TOU) rate plan. On a TOU rate plan, you will pay different prices for electricity at different times of the day (also called "TOU periods"). Prices for the energy you import from the electric grid are typically highest between 4 p.m. and 9 p.m.

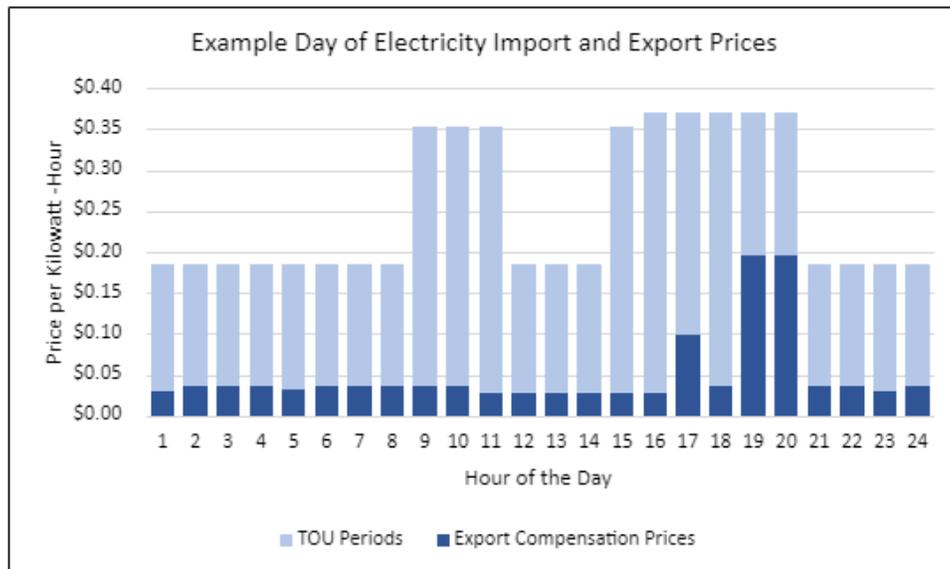
In addition, you will be responsible for paying a Grid Participation Charge in order to contribute your fair share of costs to maintain the grid and help low-income and disadvantaged Californians afford energy and access clean energy programs. The Grid Participation Charge is \$8 per kilowatt (kW) of solar installed per month. For example, if your solar system is 5 kW, your Grid Participation Charge will be \$40 per month. You cannot offset this charge using solar bill credits, but you can by using any Market Transition Credit and/or net surplus compensation you receive (see below).

You will not need to pay the Grid Participation Charge if you participate in the CARE or FERA programs, live in a disadvantaged community, or live in California Indian Country.

Bill Credits

Bill Credits for Exports

You will receive bill credits at a set price per unit of electricity (kilowatt-hour) exported, based on the value of the electricity to your provider in each hour of the day. The value generally follows TOU periods, meaning you will receive higher prices for energy exported during the most expensive TOU periods, and so on. If you want to maximize your bill credits, you can pay closer attention and use less energy (in order to export more) during the specific hours in a TOU period when prices are highest. If you have a battery, you may be able to program it to automatically store up energy produced by your solar panels during sunny hours, and then export energy during the most lucrative hours later in the day.



For the first five years after your solar system is interconnected to the grid, these prices will be based on what was predicted before you installed solar, in order to provide a measure of certainty for the purpose of predicting bill savings. After five years, the prices you receive will be set each year. They can rise or fall but are not expected to change drastically each year.

Market Transition Credit

If you interconnect your system to the grid by the end of 2027, you will receive a Market Transition Credit (MTC) on your electricity bill for ten years. The MTC is determined based on the amount of solar generation expected from your system. If you have a low bill in a given month and part of the MTC is left over after reducing your bill to the minimum amount, that part of the MTC will roll over to future months as needed and will not expire.

Monthly Payments and Net Surplus Compensation

Customers who are required to add solar (e.g. by California's building code) do not receive the MTC.

Your charges and credits will be "trued up" each month. Even though going solar can reduce your electricity costs, most customers still owe some money to their electricity provider at true-up time.

Though it's rare, if you export more electricity than you import in a month, you are typically eligible to be paid "net surplus compensation" for your excess electricity, which is around 2 to 3 cents per kilowatt-hour. Because this rate is lower than the rate you pay for electricity from the grid, it is generally not in your financial interest to install a solar system that produces much more energy than you use, unless you plan to make purchases that will increase your electricity usage, e.g., an electric vehicle.

(END OF APPENDIX A)

Appendix B

Modeling Inputs and Results

Modeling Assumptions: The Net Billing Tariff was modeled using the following assumptions.

- Key output metrics of Simple Payback Period, First-year Cost Shift, Participant Cost Test, Ratepayer Impact Measure, and Total Resource Cost
- Illustrative single-family residential inland customers with 7,500 kWh/year electric usage for each of the three utilities in this proceeding
- Illustrative small commercial inland customers with 17,000 kWh/year electric usage for each utility
- 2023 adoption of a solar or solar-plus-storage system
- Solar system sized to generate 50 percent and 100 percent of annual customer usage
- Storage capacity sized to solar AC capacity; storage duration of 2 hours discharge
- Hourly representations of load, generation, and battery dispatch
- Electric rates assumed to escalate at 4 percent/year (nominal), reflecting the Commission’s August 2020 “Decision Adopting Standardized Inputs and Assumptions for Calculation Estimated Electric Utility Bill Savings from Residential Photovoltaic Solar Energy Systems”
- Discount rate of 7.68 percent (nominal), reflecting utility WACC as in the Avoided Cost Calculator
- 20-year system lifetime
- To account for battery degradation, system costs assume that battery energy capacity is oversized by 30 percent to approximate full output over the 20-year period
- System cost forecasts from “NREL 2020 Annual Technology Baseline,” “Lawrence Berkeley National Lab: Tracking the Sun – Distributed Solar 2020 Data Update,” and “Lazard Levelized Cost of Storage 6.0.”

- 2023 20-year NPV system costs before customer tax credits or incentives:

Solar – Residential	\$/kW	\$2,588
Solar – Commercial	\$/kW	\$2,461
Storage Power Capacity (Res and Com)	\$/kW	\$269
Storage Energy Capacity (Res and Com)	\$/kWh	\$575

- 22 percent ITC available in 2023; systems modeled with and without a \$200/kWh SGIP incentive
- Customer rates used:

	PG&E	SCE	SDG&E
Residential: pre-solar	E-TOU-C	TOU-D	TOU-DR1
Residential: post-solar	EV2-A	TOU-D-PRIME	EV-TOU-5
Commercial (pre- and post-solar)	B-1	TOU-GS-1 E	TOU-A

- Grid Participation Charge of \$8/kW-AC/month applied to residential customers
- Market Transition Credits applied as described in Sections 8.4.6 and 8.5.2
- Battery storage dispatch uses 2023 avoided costs
- CARE discounts as follows:

	PG&E	SCE	SDG&E
Volumetric Charges	35%	32.5%	35%
Customer Charges	N/A	32.5%	50%

Model Results

Table 1: Residential Customer, pre-MTC

Simple Payback Period (years)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	9.4	14.5	11.1	16.5	4.3	7.4
Non-CARE	Solar + 2-hr Storage	0	7.9	10.5	9.0	11.2	5.3	7.8
Non-CARE	Solar + 2-hr Storage	200	6.9	9.1	7.8	9.7	4.6	6.8
CARE	Solar	0	10.4	13.1	10.8	13.2	5.0	7.6
CARE	Solar + 2-hr Storage	0	10.0	11.5	10.4	11.6	6.4	8.6
CARE	Solar + 2-hr Storage	200	8.7	10.0	9.0	10.0	5.6	7.5

First-Year Bill Savings (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$524	\$670	\$405	\$541	\$1,054	\$1,211
Non-CARE	Solar + 2-hr Storage	0	\$948	\$1,416	\$770	\$1,224	\$1,319	\$1,767
Non-CARE	Solar + 2-hr Storage	200	\$948	\$1,416	\$770	\$1,224	\$1,319	\$1,767
CARE	Solar	0	\$475	\$740	\$419	\$676	\$909	\$1,178
CARE	Solar + 2-hr Storage	0	\$749	\$1,292	\$668	\$1,189	\$1,092	\$1,606
CARE	Solar + 2-hr Storage	200	\$749	\$1,292	\$668	\$1,189	\$1,092	\$1,606

First-Year Cost Shift (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$330	\$282	\$201	\$134	\$881	\$866
Non-CARE	Solar + 2-hr Storage	0	\$563	\$614	\$386	\$451	\$983	\$1,091
Non-CARE	Solar + 2-hr Storage	200	\$661	\$810	\$477	\$632	\$1,074	\$1,272
CARE	Solar	0	\$281	\$352	\$215	\$269	\$736	\$833
CARE	Solar + 2-hr Storage	0	\$364	\$490	\$284	\$416	\$757	\$930
CARE	Solar + 2-hr Storage	200	\$462	\$686	\$374	\$597	\$847	\$1,111

PCT								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	1.62	1.01	1.41	0.94	3.47	2.00
Non-CARE	Solar + 2-hr Storage	0	1.91	1.38	1.72	1.34	2.84	1.87
Non-CARE	Solar + 2-hr Storage	200	2.04	1.51	1.85	1.47	2.97	2.00
CARE	Solar	0	1.34	0.97	1.26	0.98	2.64	1.67
CARE	Solar + 2-hr Storage	0	1.43	1.16	1.35	1.17	2.10	1.50
CARE	Solar + 2-hr Storage	200	1.56	1.29	1.48	1.31	2.23	1.63

RIM								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.22	0.35	0.41	0.62	0.11	0.20
Non-CARE	Solar + 2-hr Storage	0	0.32	0.46	0.52	0.67	0.21	0.32
Non-CARE	Solar + 2-hr Storage	200	0.30	0.42	0.49	0.61	0.20	0.30
CARE	Solar	0	0.26	0.37	0.46	0.59	0.15	0.23
CARE	Solar + 2-hr Storage	0	0.43	0.54	0.66	0.76	0.28	0.40
CARE	Solar + 2-hr Storage	200	0.39	0.49	0.60	0.68	0.26	0.37

TRC								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
Non-CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
Non-CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60

MTC Needed For 10-year Simple Payback Period (\$/kW-AC/mo)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	N/A	N/A	N/A	N/A	N/A	N/A
Non-CARE	Solar + 2-hr Storage	0	-	\$1.62	-	\$3.59	-	-
Non-CARE	Solar + 2-hr Storage	200	-	-	-	-	-	-
CARE	Solar	0	N/A	N/A	N/A	N/A	N/A	N/A
CARE	Solar + 2-hr Storage	0	\$0.16	\$4.36	\$2.38	\$5.25	-	-
CARE	Solar + 2-hr Storage	200	-	\$0.02	-	\$0.92	-	-

Table 2: Residential Customer, post-MTC

Simple Payback Period (years)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	8.8	13.1	9.4	12.9	4.3	7.4
Non-CARE	Solar + 2-hr Storage	0	7.6	10.0	8.2	10.0	5.3	7.8
Non-CARE	Solar + 2-hr Storage	200	6.6	8.7	7.1	8.7	4.6	6.8
CARE	Solar	0	8.6	10.3	8.8	10.4	5.0	7.6
CARE	Solar + 2-hr Storage	0	8.9	10.0	9.1	10.0	6.4	8.6
CARE	Solar + 2-hr Storage	200	7.7	8.7	7.9	8.7	5.6	7.5

First-Year Bill Savings (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$560	\$743	\$481	\$692	\$1,054	\$1,211
Non-CARE	Solar + 2-hr Storage	0	\$984	\$1,490	\$846	\$1,375	\$1,319	\$1,767
Non-CARE	Solar + 2-hr Storage	200	\$984	\$1,490	\$846	\$1,375	\$1,319	\$1,767
CARE	Solar	0	\$574	\$937	\$512	\$862	\$909	\$1,178
CARE	Solar + 2-hr Storage	0	\$848	\$1,490	\$761	\$1,375	\$1,092	\$1,606
CARE	Solar + 2-hr Storage	200	\$848	\$1,490	\$761	\$1,375	\$1,092	\$1,606

First-Year Cost Shift (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$367	\$355	\$277	\$285	\$881	\$866
Non-CARE	Solar + 2-hr Storage	0	\$600	\$688	\$461	\$602	\$983	\$1,091
Non-CARE	Solar + 2-hr Storage	200	\$697	\$883	\$552	\$783	\$1,074	\$1,272
CARE	Solar	0	\$380	\$549	\$308	\$455	\$736	\$833
CARE	Solar + 2-hr Storage	0	\$463	\$688	\$377	\$602	\$757	\$930
CARE	Solar + 2-hr Storage	200	\$561	\$883	\$467	\$783	\$847	\$1,111

PCT								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	1.68	1.07	1.53	1.06	3.47	2.00
Non-CARE	Solar + 2-hr Storage	0	1.95	1.41	1.80	1.42	2.84	1.87
Non-CARE	Solar + 2-hr Storage	200	2.08	1.54	1.93	1.55	2.97	2.00
CARE	Solar	0	1.48	1.12	1.44	1.16	2.64	1.67
CARE	Solar + 2-hr Storage	0	1.53	1.26	1.47	1.29	2.10	1.50
CARE	Solar + 2-hr Storage	200	1.66	1.39	1.60	1.42	2.23	1.63

RIM								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.21	0.34	0.38	0.55	0.11	0.20
Non-CARE	Solar + 2-hr Storage	0	0.31	0.44	0.50	0.63	0.21	0.32
Non-CARE	Solar + 2-hr Storage	200	0.29	0.41	0.46	0.57	0.20	0.30
CARE	Solar	0	0.24	0.32	0.40	0.50	0.15	0.23
CARE	Solar + 2-hr Storage	0	0.40	0.50	0.61	0.69	0.28	0.40
CARE	Solar + 2-hr Storage	200	0.37	0.45	0.56	0.63	0.26	0.37

TRC								
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CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
Non-CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
Non-CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60

MTC (\$/kW-AC/mo)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) --->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$1.62	\$1.62	\$3.59	\$3.59	-	-
Non-CARE	Solar + 2-hr Storage	0	\$1.62	\$1.62	\$3.59	\$3.59	-	-
Non-CARE	Solar + 2-hr Storage	200	\$1.62	\$1.62	\$3.59	\$3.59	-	-
CARE	Solar	0	\$4.36	\$4.36	\$5.25	\$5.25	-	-
CARE	Solar + 2-hr Storage	0	\$4.36	\$4.36	\$5.25	\$5.25	-	-
CARE	Solar + 2-hr Storage	200	\$4.36	\$4.36	\$5.25	\$5.25	-	-

Table 3: Commercial Customer

Simple Payback Period (years)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	5.3	7.7	6.9	9.1	4.7	6.9
Non-CARE	Solar + 2-hr Storage	0	7.5	9.0	7.8	9.2	6.9	8.3
Non-CARE	Solar + 2-hr Storage	200	6.5	7.8	6.7	7.9	6.0	7.2

First-Year Bill Savings (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$1,964	\$2,692	\$1,392	\$2,099	\$2,077	\$2,804
Non-CARE	Solar + 2-hr Storage	0	\$2,175	\$3,616	\$1,931	\$3,271	\$2,181	\$3,626
Non-CARE	Solar + 2-hr Storage	200	\$2,175	\$3,616	\$1,931	\$3,271	\$2,181	\$3,626

First-Year Cost Shift (\$)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	\$1,524	\$1,813	\$930	\$1,176	\$1,686	\$2,021
Non-CARE	Solar + 2-hr Storage	0	\$1,311	\$1,801	\$1,089	\$1,507	\$1,510	\$2,194
Non-CARE	Solar + 2-hr Storage	200	\$1,533	\$2,244	\$1,294	\$1,918	\$1,716	\$2,605

PCT								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	2.71	1.78	2.11	1.54	3.12	2.04
Non-CARE	Solar + 2-hr Storage	0	1.91	1.52	1.87	1.60	2.11	1.77
Non-CARE	Solar + 2-hr Storage	200	2.05	1.66	2.01	1.73	2.25	1.91

RIM								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.14	0.21	0.29	0.40	0.13	0.20
Non-CARE	Solar + 2-hr Storage	0	0.33	0.42	0.49	0.58	0.32	0.40
Non-CARE	Solar + 2-hr Storage	200	0.30	0.38	0.46	0.53	0.30	0.37

TRC								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.38	0.38	0.62	0.62	0.42	0.42
Non-CARE	Solar + 2-hr Storage	0	0.63	0.64	0.92	0.92	0.68	0.71
Non-CARE	Solar + 2-hr Storage	200	0.63	0.64	0.92	0.92	0.68	0.71

MTC (\$/kW-AC/mo)								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
System Size (% of Load) ---->			50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.38	0.38	0.62	0.62	0.42	0.42
Non-CARE	Solar + 2-hr Storage	0	0.63	0.64	0.92	0.92	0.68	0.71
Non-CARE	Solar + 2-hr Storage	200	0.63	0.64	0.92	0.92	0.68	0.71

Non-CARE	Solar	0	N/A	N/A	N/A	N/A	N/A	N/A
Non-CARE	Solar + 2-hr Storage	0	N/A	N/A	N/A	N/A	N/A	N/A
Non-CARE	Solar + 2-hr Storage	200	N/A	N/A	N/A	N/A	N/A	N/A

Table 4: Residential and Commercial Customer (post-MTC)

PCT								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
Residential	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	1.68	1.07	1.53	1.06	3.47	2.00
Non-CARE	Solar + 2-hr Storage	0	1.95	1.41	1.80	1.42	2.84	1.87
Non-CARE	Solar + 2-hr Storage	200	2.08	1.54	1.93	1.55	2.97	2.00
CARE	Solar	0	1.48	1.12	1.44	1.16	2.64	1.67
CARE	Solar + 2-hr Storage	0	1.53	1.26	1.47	1.29	2.10	1.50
CARE	Solar + 2-hr Storage	200	1.66	1.39	1.60	1.42	2.23	1.63
Commercial	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	2.71	1.78	2.11	1.54	3.12	2.04
Non-CARE	Solar + 2-hr Storage	0	1.91	1.52	1.87	1.60	2.11	1.77
Non-CARE	Solar + 2-hr Storage	200	2.05	1.66	2.01	1.73	2.25	1.91

RIM								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
Residential	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.21	0.34	0.38	0.55	0.11	0.20
Non-CARE	Solar + 2-hr Storage	0	0.31	0.44	0.50	0.63	0.21	0.32
Non-CARE	Solar + 2-hr Storage	200	0.29	0.41	0.46	0.57	0.20	0.30
CARE	Solar	0	0.24	0.32	0.40	0.50	0.15	0.23
CARE	Solar + 2-hr Storage	0	0.40	0.50	0.61	0.69	0.28	0.40
CARE	Solar + 2-hr Storage	200	0.37	0.45	0.56	0.63	0.26	0.37
Commercial	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.14	0.21	0.29	0.40	0.13	0.20
Non-CARE	Solar + 2-hr Storage	0	0.33	0.42	0.49	0.58	0.32	0.40
Non-CARE	Solar + 2-hr Storage	200	0.30	0.38	0.46	0.53	0.30	0.37

TRC								
CARE Status	System Type	SGIP (\$/kWh)	PG&E	PG&E	SCE	SCE	SDG&E	SDG&E
Residential	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
Non-CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
Non-CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar	0	0.37	0.37	0.59	0.59	0.40	0.40
CARE	Solar + 2-hr Storage	0	0.62	0.63	0.91	0.90	0.60	0.60
CARE	Solar + 2-hr Storage	200	0.62	0.63	0.91	0.90	0.60	0.60
Commercial	System Size (% of Load) --->		50%	100%	50%	100%	50%	100%
Non-CARE	Solar	0	0.38	0.38	0.62	0.62	0.42	0.42
Non-CARE	Solar + 2-hr Storage	0	0.63	0.64	0.92	0.92	0.68	0.71
Non-CARE	Solar + 2-hr Storage	200	0.63	0.64	0.92	0.92	0.68	0.71

(END OF APPENDIX B)