BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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PUBLIC ADVOCATES OFFICE'S PROPOSAL FOR A SUCCESSOR TO THE CURENT NET ENERGY METERING TARIFF

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March 15, 2021

Pursuant to Administrative Law Judge (ALJ) Hyme's January 28, 2021 ruling, the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) submits this proposal for a successor to the current net energy metering tariff. The proposal is Attachment A to this filing.

Respectfully submitted,

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ATTACHMENT A

PUBLIC ADVOCATES OFFICE
CALIFORNIA PUBLIC UTILITIES COMMISSION

PUBLIC ADVOCATES OFFICE PROPOSAL for a SUCCESSOR TARIFF to the CURRENT NET ENERGY METERING TARIFFS

San Francisco, California
March 15, 2021

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MEMORANDUM

This proposal was prepared by the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) in Rulemaking (R.) 20-08-020. On February 16, 2021, Administrative Law Judge (ALJ) Kelly Hymes requested party proposals on the successor to the current Net Energy Metering (NEM) tariff, developed pursuant to Assembly Bill (AB) 327 (Perea, 2013). In this report, Cal Advocates presents its analysis and recommendations for a successor tariff.

Alec Ward served as Cal Advocates' project coordinator in this review and is responsible for the overall coordination in the preparation of this report. Special thanks to the Cal Advocates staff members Alec Ward, Benjamin Gutierrez, Nathan Chau, Adam Buchholz, Sophie Babka, Kristin Rounds for their diligence and professionalism in the preparation of this document.

1 EXECUTIVE SUMMARY

I. INTRODUCTION

Cal Advocates hereby submits this proposal (Proposal) in response to the *Joint Assigned Commissioner's Scoping Memo and Administrative Law Judge Ruling Directing Comments on Proposed Guiding Principles* (Scoping Memo) requesting parties submit policy proposals on successors to the current Net Energy Metering (NEM).[1] Cal Advocates has organized the discussion of this Proposal consistent with Administrative Law Judge (ALJ) Kelly Hymes' January 21, 2021 email with instructions to parties.[2] Cal Advocates' Proposal addresses:

- Issues with the current NEM tariffs;
- Policy proposals for the successor tariff to address the issues;
- Justifications for the policy proposals;
- Timelines for the implementation of these policy proposals; and
- Comparisons between Cal Advocates' proposal and the *Alternative Ratemaking Mechanisms for Distributed Energy Resources in California* whitepaper (Whitepaper).[3]

Alec Ward, Senior Analyst at Cal Advocates (alec.ward@cpuc.ca.gov) will present this Proposal during the March 23-24, 2021 "Workshop Presenting Party Proposals."[4]

II. BACKGROUND

NEM was first established in 1995 by Senate Bill (SB) 656 (Alquist). In 2013, Assembly Bill (AB) 327 (Perea 2013)[5] added Section 2827.1 to the Public Utilities Code. Public Utilities

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[1] *Joint Assigned Commissioner's Scoping Memo and Administrative Law Judge Ruling Directing Comments on Proposed Guiding Principles* (Scoping Memo), R.20-08-020 (November 19, 2020), p. 4.

[2] Email from ALJ Kelly A. Hymes to R.20-08-020 Service List, "R2008020 Email Ruling Presenting Final Verdant Study and Instructing Parties to Respond," January 21, 2021. The Commission also stated reply comments are due February 16, 2021.

[3] Energy and Environmental Economics, Inc, *Alternative Ratemaking Mechanisms for Distributed Energy Resources in California* (Whitepaper), January 28, 2021.

[4] This information is responsive to Email from ALJ Kelly A. Hymes to R.20-08-020 Service List, "R.20-08-020 Email Ruling Providing March 23-24 Workshop Preparation Instructions," March 5, 2021.

[5] Perea, Stats. 2013, ch. 611.

Code Section 2827.1 provides the requirements for a NEM successor tariff. These requirements include that the tariff:

> (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.[6]

Public Utilities Code Section 2827.1 further requires that "[a]ny rules adopted by the [C]ommission 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 statute also directs that participants be provided electric service at just and reasonable rates.[8] Public Utilities Code Section 451 mandates that rates be just and reasonable for all customers, which includes non-participants.[9]

In Decision (D.)16-01-044, the Commission created NEM 2.0 and committed to reviewing the NEM 2.0 tariff in 2019 to consider "adjustments to the successor tariff that include an export compensation rate for NEM successor tariff customers that takes into account locational and time-differentiated values."[10] To help prepare for the 2019 review of the successor tariff, D.16-01-044 concluded that the Commission is authorized to take steps "that would contribute to the Commission's administration of the NEM successor tariff and any programs that implement alternatives for growth of renewable DG among residential customers

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[6] Public Utilities Code § 2827.1(b)(1)-(4).

[7] Public Utilities Code § 2827.1(b)(6).

[8] Public Utilities Code § 2827.1(b)(7).

[9] See Pub. Util. Code § 451: "All charges demanded or received by any public utility, or by any two or more public utilities, for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable."

[10] D.16-01-044, p. 4.

in disadvantaged communities."[11] In 2019, the Commission announced it would not review a potential successor until 2020.[12] On September 3, 2020, the Commission issued the instant Order Instituting Rulemaking, (R.) 20-08-020, to create a NEM successor tariff.

On November 11, 2020, Assigned Commissioner Martha Guzman Aceves and ALJ Hymes released the Joint Scoping Memo in R.20-08-020, which sets forth the issues, the need for hearings, a schedule, the proceeding category, and other matters. On January 21, 2021, ALJ Hymes released Verdant Associates, LLC's (Verdant) *Net Energy Metering 2.0 Lookback Study* (Lookback Study), which examines the performance of the NEM 2.0 program and its impacts. On January 28, 2021, ALJ Hymes released the Whitepaper by Energy and Environmental Economics, Inc (E3) and Verdant, which offers policy options for a NEM successor tariff. On February 17, 2021, the Commission issued D.21-02-007 which provides the guiding principles for the development of the NEM successor tariff.[13]

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[11] D.16-01-044, p. 122. Disadvantaged communities include communities scoring in the top 25% of census tracts according to CalEnviroscreen, including those scoring in the top 5% for pollution burden without an overall score. They may also include tribal lands, low-income households, and low-income census tracts. See https://www.cpuc.ca.gov/discom/

[12] *Sixth Amended Scoping Memo and Ruling of Assigned Commissioner*, R.14-07-002 (June 28, 2019), p. 5.

[13] *Decision Adopting Guiding Principles for the Development of a Successor to the Current Net Energy Metering Tariff* (D.21-02-007), R.20-08-020 (February 17, 2021), pp. 45-46. The decision provides eight guiding principles for the proceeding:

(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;

Guiding Principles:

(a) 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;

(b) A successor to the net energy metering tariff should maximize the value of customer-

III. GOALS FOR AN IMPROVED SUCCESSOR TARIFF

Reforming NEM is a pivotal opportunity to support behind-the-meter (BTM) generation adoption that will facilitate reaching California's climate and equity goals as quickly as possible.[14] Adoption of electric vehicles (EVs), and replacement of gas appliances in homes and businesses (electrification) will be critical for California to achieve its climate goals. High electricity prices will make this transformation more difficult. Our future depends on Californians increasing their use of renewable energy.

This Proposal is rooted in the fact that California ratepayers are currently paying too much toward incentives for BTM generation through NEM. The cost of NEM incentives unfairly raises electricity rates for those customers without BTM generation. These non-participating customers are paying unreasonable amounts of money (the cost burden) to subsidize the customers who can afford to install BTM generation. The cost of NEM incentives create hardships, especially for lower-income customers and customers in disadvantaged communities.

A successor tariff should foster sustainable growth[15] of customer-sited renewable distributed generation in a way that equitably benefits all customers. To achieve this, this

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sited renewable generation to all customers and to the electrical system; and

(c) A successor to the net energy metering tariff should consider competitive neutrality amongst Load Serving Entities.

[14] Senate Bill (SB) 100, De León, Stats. 2018, ch. 312: "it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045." §2(e)(1): "[s]upplying electricity to California end-use customers that is generated by eligible renewable energy resources is necessary to improve California's air quality and public health, particularly in disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code, and the commission shall ensure rates are just and reasonable, and are not significantly affected by the procurement requirements of this article;" and Executive Order (EO) B-55-18 to Achieve Carbon Neutrality, September 10, 2018. This EO sets a statewide goal of carbon neutrality by 2045. The EO emphasizes that "all policies and programs undertaken to achieve carbon neutrality shall seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities."

[15] Cal Advocates agrees with the definition of "sustainable growth" put forth in the proposed decision on guiding principles, Conclusion of Law 7, p. 36: "The Commission should not focus the definition of sustainable growth in a narrow manner but, rather, interpret sustainable growth to mean growth whereby all customers can sustain the cost of that growth." See: *Proposed Decision Adopting Guiding Principles for the Development of the Successor to the Current Net Energy Metering Tariff,* R.20-08-020 (January 5, 2021), p. 10. However, the Commission removed the definition in its final decision to give parties flexibility to determine their own definition.

Proposal aims to reform NEM by creating a successor tariff with a structure that provides a strong financial incentive for NEM adoption, supports efficient electricity use, and promotes equity and affordability.

The matrix in Appendix B shows how other parties are offering policy proposals that achieve similar goals - creating a successor tariff that would allow California to achieve its climate and equity goals.

The following section of this Proposal will demonstrate how these goals are aligned with statute and proceeding guiding principles.

IV. PROPOSAL SUMMARY

A. Summary of Successor Tariff Policy Proposal

In order to reach California's climate and equity goals as quickly as possible, and to align with statute and the Commission's guiding principles, Cal Advocates proposes a successor tariff that benefits participants, fairly values their systems' benefits, increases program equity, and supports electric service affordability for all customers.

1. Create a more fair, balanced successor tariff

i. Compensating a NEM participant through net billing at the avoided cost for their exported energy instead of at the retail rate, would maintain a participant's ability to offset their usage with their BTM generation. It would also reasonably and fairly compensate the customer for the energy exported based upon the actual value of the energy.[16]

ii. Establishing a Grid Benefits Charge (GBC)[17] would ensure NEM participants are paying their fair share for grid services including distribution, transmission, and public program costs.

iii. Providing storage incentives to encourage NEM 1.0 and 2.0 participants to transition to the successor tariff would maximize grid benefits. This transition also would minimize the unintended rate burdens from the current tariffs that conflict with state equity and climate goals.

2. Create a more equitable, affordable successor tariff.

i. Exempting lower income customers from the proposed Grid Benefits Charge would create a larger value proposition for BTM adoption for lower income customers.

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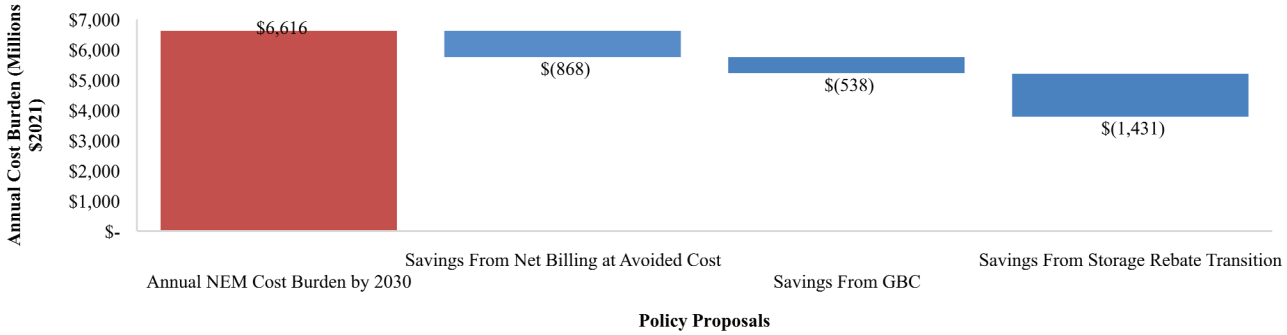
[16] En Banc White Paper (Utility Costs and Affordability of the Grid of the Future, Feb. 2021), pp. 3-6.

[17] Grid Benefits Charges (GBCs) are also known as Grid Access Charges.

ii. An Equity Charge on program participants to fund programs focused on increasing adoption of BTM systems in disadvantaged communities would address inequities created by the current NEM tariffs.[18]

In total, these policy proposals would lower the total annual cost burden of the successor tariff on all non-participating customers by $1.52 billion per year in 2030. In addition, Cal Advocates' proposed transition of NEM 1.0 and 2.0 customers to the successor tariff would reduce the net present value of the total remaining cost burden created by NEM 1.0 and 2.0 customers by $26.06 billion from a total of $45.4 billion,[19] or a 57.4% reduction over all remaining years of their current 20-year transition period.[20] Figure 1 below illustrates the annual cost burden reductions in 2030 if all Cal Advocates' proposed policies are adopted.

Figure 1: Cal Advocates' Policy Proposal Reductions to Annual NEM Cost Burden in 2030 (Millions $2021)



In terms of bill savings, reforming NEM through these combined policies would save non-participating customers between $180 and $235 each year by 2030.[21]

With these reforms, residential customers on the successor tariff would still receive a meaningful subsidy; with monthly bill savings allowing for the systems to pay for themselves in

[18] The funds from an Equity Charge could be used to help these customers overcome initial barriers to adoption.

[19] Cal Advocates uses real 2021 dollars, not nominal dollars. Cal Advocates has removed the effects of inflation to see the value of the cost burden in today's dollars. These estimates assume annual escalation of electric rates by 4%. The discount rate is based on the inflation rate or increase in the Consumer Price Index for All Urban Consumers (CPI-U) in 2018 of 1.9%.

[20] This Proposal does not completely eliminate the cost burden as it balances addressing the cost burden with ensuring the sustainable growth of BTM generation for all ratepayers.

[21] Cal Advocates calculated the average subsidy of all NEM generation per customer by 2030 and then applied the % reduction to the cost burden that Cal Advocates' Proposal would produce to derive the % reduction in bills per customer.

13-15 years.[22] These payback periods are generous considering solar panels still retain 80% of their starting efficiency after 40 years, so the system owner stands to accrue substantial long-term benefits.[23]

B. Summary of Statutory Support for Cal Advocates' Proposal

The Commission has broad discretion to change the NEM tariff and adopt new policies.[24] Cal Advocates' proposal aligns with both statute and the Commission's guiding principles.[25] The proposed net billing of exported energy at avoided cost, Grid Benefits Charge, Equity Charge, and storage incentives to encourage NEM 1.0 and 2.0 customers to transition to the successor tariff all align with statutory mandates as they ensure the NEM tariff is based on the benefits of renewable electrical generation,[26] NEM participants are given just and reasonable rates,[27] and that the benefits of NEM approximately equal the costs.[28] These policies would also ensure that the NEM tariff does not create an unreasonable cost burden on non-participants.[29] Reducing the cost burden also ensures BTM generation adoption can continue growing sustainably.[30] The Equity Charge and waiving the Grid Benefits Charge for lower income successor participants would accomplish the statutory requirement of including specific alternatives that would incentivize BTM generation adoption for customers in disadvantaged communities.[31] Additionally, the proposed incentives to transition NEM 1.0 and 2.0 customers

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[22] Average solar payback period with these reforms is 13 years for SCE, 14 years for PG&E, and 15 years for SDG&E. Using average 2021 PV system installation costs of $4.16/Watt derived from Verdant residential base case total installation costs of $3.80/Watt in 2018 dollars derived from Lawrence Berkeley National Laboratory's 2019 Tracking the Sun report. Cal Advocates applied annual escalation of 2.3% to derive 2021 installation costs of $4.16/Watt. Verdant Associates, LLC, "Net Energy Metering 2.0 Lookback Study," p. 72.

[23] Jordan, C. and Kurtz, S. *NREL Photovoltaic Degradation Rates- An Analytical Review*, p. 1. See: https://www.nrel.gov/docs/fy12osti/51664.pdf. This calculation is based on a median degradation rate of 0.50% per year.

[24] Cal Advocates discusses further in Section 4.

[25] Cal Advocates demonstrates proposal alignment with guiding principles throughout Section 3.

[26] Public Utilities Code § 2827.1(b)(3).

[27] Public Utilities Code § 2827.1(b)(7).

[28] Public Utilities Code § 2827.1(b)(4).

[29] See Public Utilities Code § 451.

[30] Public Utilities Code § 2827.1(b)(1).

[31] Public Utilities Code § 2827.1(b)(1).

to the improved successor tariff are designed to ensure these customers would receive a reasonable payback period.[32]

C. Policy Proposal Comparison to Whitepaper Summary

This Proposal largely aligns with the Whitepaper. The Whitepaper notes NEM "creates equity concerns between customer-generators and nonparticipating customers" because of the "substantial misalignment between costs and value under the current compensation structure" which creates "costs to be recovered from nonparticipating customers."[33]

The Whitepaper and this Proposal offer policy solutions that balance addressing this cost burden while ensuring the sustainable growth of BTM generation for all ratepayers. Both recommend net billing at avoided cost to fairly and accurately compensate participants.[34] Both recommend grid benefits charges[35] to ensure participants are paying their fair share. Lastly, both papers offer a glidepath for transitioning customers to the new successor tariff.[36]

D. Remaining Issues

This Proposal addresses all requirements from AB 327 (Perea, 2013), but does not address all issue categories in ALJ Hymes' email.[37]

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[32] Public Utilities Code § 2827.1(b)(6).

[33] Whitepaper, p. 8.

[34] Whitepaper, p. 16.

[35] Whitepaper pp. 20-21. Instead of using the term grid benefits charge (GBC), the Whitepaper uses the term grid access charge.

[36] Whitepaper pp. 26-32. The Whitepaper offers glidepath models through 2030, but does not support a specific model. In Section 5 of this Proposal Cal Advocates recommends a glidepath to the successor tariff should not span beyond January 31, 2025.

[37] Cal Advocates does not respond to the following issues in this Proposal:

- Continued application of secondary customer benefits (e.g., exemptions from interconnection upgrade costs, standby charges, and departing load charges);
- Treatment for systems 1 megawatt and larger;
- Any modifications to existing smart inverter requirements for systems taking service on the successor tariff; and
- Any safety issues related to the successor tariff.

See: Email from ALJ Kelly A. Hymes to R.20-08-020 Service List, "R2008020 Email Ruling Presenting Final Verdant Study and Instructing Parties to Respond," January 21, 2021.

2 ISSUES WITH THE CURRENT NEM TARIFFS

I. NEM IS NOT COST EFFECTIVE AND UNREASONABLY BURDENS NON-PARTICIPANTS

NEM is not a cost-effective program.[38] The Lookback Study demonstrates that NEM 1.0 and 2.0 are significantly cost ineffective with a Ratepayer Impact Measure (RIM) test result of 0.37.[39] Although the Total Resource Cost (TRC) test omits important aspects of tariff impacts, like participant compensation and any cost burden on non-participants, the residential NEM 2.0 tariff still fails the TRC test with a score of 0.84.[40] This means ratepayers are spending billions of dollars on a program with costs that greatly outweigh the benefits.

NEM cost-ineffectiveness negatively impacts non-participants by creating a large cost burden. This increased ratepayer cost burden threatens California's climate goals because it drives up electrical rates thereby undermining EV adoption and building electrification efforts. Additionally, the cost burden imposed by the current NEM program leads to a failure to maximize grid benefits. A cost-ineffective NEM program contravenes statutory requirements as it is not based on the benefits of renewable electrical generation,[41] non-participants are not served at just and reasonable rates,[42] and the program benefits do not approximately equal the costs for all customers participants and non-participants.[43] Instead, NEM creates a subsidy for customers who can afford to install rooftop solar, or other BTM generation. This subsidy is not explicit but is built in to the NEM tariff and results in a cost burden that drives unreasonable increases to overall electricity rates.[44] This cost burden also discourages sustainable growth in BTM generation adoption, because without a policy shift, the cost burden due to BTM

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[38] Cost-effectiveness tests results under the Commission's Standard Practice Manual will be further examined in Section 4 of this Proposal.

[39] Lookback Study, Table 1-3, p. 6. 0.37 is the average RIM result across the three IOUs: SCE (0.43), PG&E (0.31), and SDG&E (0.41).

[40] Lookback Study, Table 1-3, p. 6. A passing score on the TRC is 1.0 or above.

[41] Public Utilities Code § 2827.1(b)(3).

[42] Public Utilities Code § 2827.1(b)(7).

[43] Public Utilities Code § 2827.1(b)(4).

[44] See Pub. Util. Code § 451.

generation will exacerbate electric service equity and affordability issues to the point where continued incentives for adoption will be impossible.[45]

A cost-ineffective NEM tariff further conflicts with the proceeding's guiding principles to "ensure equity among customers"[46] and "maximize the value of customer-sited renewable generation to all customers and to the electrical system."[47]

A. NEM is Creating an Unreasonably Large and Growing Cost Burden

Under current NEM tariffs, customers can offset every unit of energy they consume with each unit of energy they generate. This mechanism allows current NEM customers to get a credit equal the retail volumetric charges associated with every kilowatt hour (kWh) their BTM system generates. Because residential rates primarily collect costs through volumetric charges, NEM customers avoid paying for the energy, capacity, and fixed costs that the utility recovers through volumetric charges. While the generation from these BTM systems helps to offset some utility costs, this benefit is much smaller than the total charges NEM customers avoid with their generation. The difference between the amount of retail volumetric charges NEM customers avoid and the benefits that their generation from their BTM systems provide creates a revenue shortfall that the utility must collect from non-participating customers. This revenue shortfall is the cost burden that is shifted from NEM participants to non-participating customers.

Cal Advocates calculates that in 2020 the average San Diego Gas and Electric (SDG&E) NEM 1.0 customer was compensated at almost seven times the value of the energy generated.[48] The overcompensation of NEM participants is also evidenced in the extremely short payback periods for current NEM customers. A NEM 2.0 customer's exported energy is so highly compensated that their NEM system can on average pay for itself in only three years for SDG&E

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[45] Public Utilities Code § 2827.1(b)(1).

[46] See D. 21-02-007, p. 45: "(b) A successor to the net energy metering tariff should ensure equity among customers."

[47] See D. 21-02-007, p. 46: "(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."

[48] Cal Advocates calculates that SDG&E's NEM 1.0 customers are on average compensated at a rate of 34.7 cents per kWh whereas the avoided cost value of solar PV generation in 2020 was 5.3 cents/kWh. Therefore 34.7/5.3 = a multiple of savings over avoided cost is 6.55.

customers, five years for PG&E customers, and eight years for SCE customers.[49] Since solar panels retain 80% of their starting efficiency after 40 years,[50] an SDG&E participant can completely pay off the cost of their system within one tenth (fraction) of the panel's life. This means the NEM participant currently gets nearly 36 years of additional incentives that unfairly burden non-participating customers.

Cal Advocates calculates that the cost burden generated by the current NEM tariffs (NEM 1.0 and 2.0) and paid for by non-participating customers totals $2.85 billion dollars (in 2021 dollars) annually.[51] The current tariffs are unsustainable, and if the Commission does not reform the tariffs, the cost burden to be paid for by non-participants will grow to $6.62 billion annually (in 2021 dollars) by 2030. These figures represent the cost burden generated by NEM customers of all customer classes combined.

To calculate this forecasted cost burden, Cal Advocates obtained solar photovoltaic (PV) forecasts from the three largest investor-owned utilities (IOUs) using 2020 tariffs.[52]
Cal Advocates employed a 10-year levelized avoided cost of solar generation from the 2020 avoided cost calculator to calculate the benefits. The following equation[53] simplifies this cost burden calculation.

$$Cost\ Burden_{yj} = PVkWh_{yj}(Retail\ Energy\ Rate_j - Avoided\ Cost)$$

Where
y = year cost burden is evaluated
j = customer class (e.g. residential, small commercial, medium and large industrial, and agriculture)
$PVkWh_{yj}$ = solar production (kWh) in year "y" attributed to class "j"
$RetailEnergyRate_j$ = the average PV-weighted retail rate attributed to class "j" ($/KWh).
Avoided cost = Avg. PV profile-weighted avoided costs ($/kWh).

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[49] The average payback period is dropping across all IOU territories. Cal Advocates data requests IOUs: PGE-4, SDGE-5, SCE-6. *See*, Appendix C of this document.

[50] Jordan, C. and Kurtz, S. NREL Photovoltaic Degradation Rates- An Analytical Review, p. 1. https://www.nrel.gov/docs/fy12osti/51664.pdf This calculation is based on a median degradation rate of 0.50% per year.

[51] Annual rate escalation at 4% per year and a discount/inflation rate of 2%.

[52] No changes to rate design assumed.

[53] Thus, the cost burden for each year "y" for class "j" is equal to the solar PV production attributed to each class multiplied by the difference between the retail rate and avoided cost. The cost burden amounts are calculated on a rate schedule basis and for each function (e.g., distribution, transmission, generation etc.) and are then aggregated to the class and IOU level.

The Energy Institute at Haas at the University of California Berkeley assessed the residential rate implications of the NEM cost burden by estimating what residential rates would have been absent investments in residential solar PV.[54] Its analysis shows that the average Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) non-NEM non-California Alternate Rates for Energy[55] (CARE) residential customer paid $152, $100, and $234 more in their annual bills, respectively, due to the current NEM tariff in 2019.[56] The average PG&E, SCE and SDG&E non-NEM CARE customer paid $106, $67, and $128 more on their annual bills in 2019, respectively.[57]

The current NEM tariff produces inequitable outcomes. Because residential customers are credited at retail electricity rates for every kWh of solar electricity they generate, the burden to recover marginal costs[58] and fixed costs[59] is shifted to customers that have not adopted BTM generation under the NEM tariff. As of the end of 2020, residential NEM customers comprise just 11%, 8%, and 15% of total residential customers in PG&E's, SCE's, and SDG&E's service territories, respectively. Yet this small group is the beneficiary of these billions in incentives that are ultimately paid by all other customers. Thus, the vast majority of non-NEM residential customers are forced to subsidize this subset of customers, who are often more affluent. This inequity is further discussed later in this proposal.

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[54] Dr. Severin Borenstein, Meredith Fowlie, and James Sallee. "Designing Electricity Rates for An Equitable Energy Transition," p. 28. "For each utility-year, the electricity generated by installed residential BTM PV was simulated and then this generation was added to the actual residential electricity sales. Next, an estimate of how much lower retail rates would have been had costs been spread across this broader base of residential electricity consumption was established."

[55] Dr. Severin Borenstein, Meredith Fowlie, and James Sallee. "Designing Electricity Rates for An Equitable Energy Transition," p. 28.

[56] These figures assume that the cost burden generated are kept within the residential class. However, some of these costs are shifted on to non-residential customers.

[57] Dr. Severin Borenstein, Meredith Fowlie, and James Sallee. "Designing Electricity Rates for An Equitable Energy Transition," p. 28.

[58] For instance, NEM 2.0 customers pay on average only 9-18% of their total cost of service, which is significantly below even the marginal costs to serve them. Verdant Associates, LLC, "Net Energy Metering 2.0 Lookback Study," 21 Jan 2021, p. 12.

[59] As opposed to recovery of marginal costs. Fixed costs are defined herein as the difference between total marginal costs revenues of the system and the total revenue requirement (total cost of service). For more information, see Section 3.III, explaining GBCs.

B. The Current NEM Tariff Undermines Electric Vehicle Adoption and Building Electrification

The cost burden attributable to NEM is increasing average electric rates, which conflicts with the state's goal of achieving greenhouse gas (GHG) reductions. High electric rates will make it less economic for consumers to switch from gasoline/natural gas fueled technologies – and left unchecked, could make these important technologies prohibitively expensive. The Whitepaper likewise points to the importance of building electrification and how NEM can threaten it.[60] The Legislature identified[61] that widespread transportation electrification is needed to achieve the goals set forth in the Charge Ahead California Initiative, and to reduce emissions of GHG "to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050."[62] To realize such ambitious goals, the state has set a target of 5 million Zero Emission Vehicles on the road in California by 2030.[63]

To achieve these goals, the Commission must keep electric rates low. Generally, for every dollar increase in the cost per gallon of gasoline, the breakeven point in fueling costs in terms of the cost per kWh of electricity is roughly equal to 10 cents.[64] Thus, when the cost per gallon of gasoline is $3, the cost of fueling an equivalent vehicle with electricity must be lower than 30 cents/kWh to break even in fueling costs.[65] This arithmetic does not account for differences in upfront costs and operating costs of purchasing internal combustion engine vehicles and EVs.[66]

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[60] Whitepaper, pp. 25-26.

[61] Public Utilities Code § 740.12(a)(1).

[62] D.20-08-045, p. 7.

[63] D.20-08-045, p. 49.

[64] EVGO Fleet and Tariff Analysis Phase 1: California," p. 1. "Utilities, their regulators, and EV charging station owners and operators must work together to provide all EV drivers—especially those without home and workplace charging options—access to reliable EV charging at a rate competitive with the gasoline equivalent cost of $0.29/kWh." This figure assumes 32 mpg, $3/gallon of gas, 0.32 kWh/mile as descried in footnote 2. Thus, for every dollar increase in the cost per gallon of gasoline, the breakeven point in fueling costs in terms of the cost per kWh of electricity increases by 10 cents.

[65] EVGO Fleet and Tariff Analysis Phase 1: California," p. 1.

[66] EVs are often more expensive on an upfront basis than ICE vehicles. Therefore, it is important to maintain electrical fueling prices at levels that are consistently lower than gasoline prices to help drive EV adoption.

Unfortunately, electric prices have been increasing faster than natural gas and gasoline prices.[67] Between January 2010 and January 2020, the average price for a gallon of gasoline in California increased by 14%. Over the same period, PG&E's, SCE's, and SDG&E's residential average rates increased by 41%[68], 22%,[69] and 60%,[70] respectively. If this trend continues, Californians may find that it is prohibitively expensive to replace internal combustion vehicles with EVs because of the costs they would face for fueling the vehicle.

The potential to realize significant cost fuel savings by switching from gasoline to electricity is a major driver behind customer adoption of EVs. At the February 24, 2021 "En Banc on Energy Rates and Costs," David Rapson, Director of the Davis Energy Economics Program at the University of California, Davis, presented that "[e]ach $0.10/kWh increase in electricity prices" results in a "15% decrease in EV demand."[71] The Legislature likewise found that widespread transportation electrification requires electrical corporations to increase access to the use of electricity as a fuel.[72] Thus, keeping electric rates low is imperative in this endeavor. Notably, simply discounting certain EV or electrification rates to get around high average electric rates can exacerbate the existing equity issues caused by NEM. If EV or electrification rates are discounted such that the rates paid by EV customers are less than marginal costs plus non-bypassable charges to serve these customers, then non-EV customers must bear the costs. Discounting rates (even if not all the way down to the avoided cost level) would reduce any potential rate reduction benefits of new sales from EVs and electrification. When EVs charge at discounted rates, EVs contribute less to fixed cost recovery. Reducing the existing subsidies to

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[67] The average price per gallon of gasoline (all grades) in California was $3.66/gallon in January 2014 and $3.49/gallon in January 2020. This period coincides with the significant uptake in residential solar PV adoption and excludes any months during which the California's COVID-19 shelter-in-place order was in effect. See Energy Institute of America: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPM0_PTE_SCA_DPG&f=A.

[68] AL 3518-E and AL 5661-E.

[69] 1-22-19_CPUC Affordability Workshop Materials and AL 4116-E-A.

[70] AL 2135-E and AL 3487-E.

[71] See "Electric Vehicles: Demand and Usage, slide 36, https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/Rates%20En%20Banc_PANEL%201_Updated.pdf.

[72] D.20-08-045, p. 7. The Legislature also found that "[a]dvanced clean vehicles and fuels are needed to reduce petroleum use, to meet air quality standards, to improve public health, and to achieve greenhouse gas emissions reductions goals," and that widespread transportation electrification "requires electrical corporations to increase access to the use of electricity as a transportation fuel."

NEM customers and implementing more efficient economic pricing (lower average electric rates) is the best solution to improve equity, economic efficiency, and create benefits to all ratepayers while ensuring EV adoption and electrification is properly incentivized.

C. NEM is Less Cost-Effective Than Other Renewable Energy Procurement Strategies

The cost of generating renewable energy through the current NEM tariff is much higher than the cost of Renewable Portfolio Standard (RPS) procurement contracts, meaning that customer dollars could be invested in more cost-effective ways to achieve the states' climate goals.[73] In fact, as utility rates continue to climb, and RPS costs decline, the excess cost of NEM generation continues to grow. From 2018 to 2019, the average price of an executed RPS contract dropped from 0.0381 to 0.0282 $/kWh, about a 26% decrease.[74] In comparison, in November 2020 the average residential retail electricity rate for California was 0.2226 $/kWh, a 10.7% increase from November 2019 when it was 0.20.11 $/kWh.[75] The Commission forecasts that the average residential retail rates of energy, and thus the price paid for NEM 2.0 excess generation, is set to continue to increase at a rate of about 4% per year.[76] The cost burden caused by NEM 1.0 and 2.0 alone is higher than the cost of execution of an RPS contract. Figure 2 below shows the average NEM cost burden per utility compared to the average cost of executed RPS contracts.

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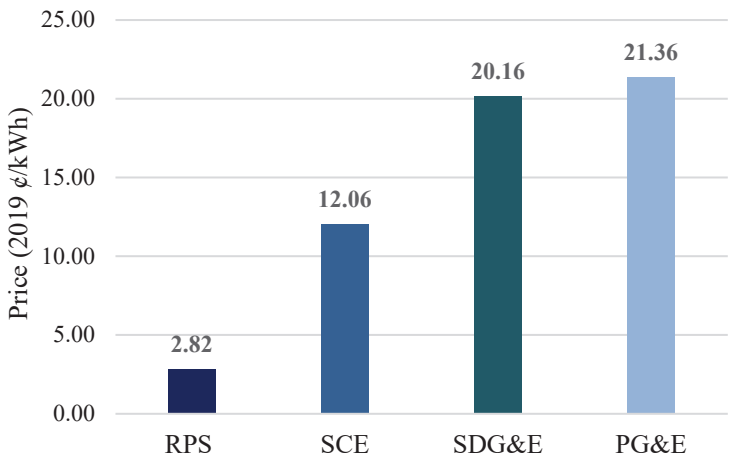
[73] RPS contracts renewable energy resource contracts' eligibility is defined by Section 399.12(a).

[74] 2020 Padilla Report (costs and costs savings for the RPS Program), published May 2020, (Padilla Report) pp. 2,10-11. https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/Office_of_Governmental_Affairs/Legislation/2020/2020%20Padilla%20Report.pdf?__ac_lkid=2a14-b0f6-39ef-d2f417268072d07. These values are for contracts above 3MW. From 2007 to 2019 the average cost of a contract for all technologies decreased 12.7%, with wind and solar technologies together accounting for 87.4% of IOU's collective RPS generating technology.

[75] EIA, Average Price of Electricity to Ultimate Customers by End Use Sector, https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a, accessed on February 7, 2021.

[76] D.20-08-001 Decision Adopting Standardized Inputs and Assumptions for Calculating Estimated Electric Utility Bill Savings From Residential Photovoltaic Solar Energy Systems, p. 17.

Figure 2: 2019 NEM Cost Shift Comparison to RPS Executed Contracts



The IOU's cost burdens are 4.28, 7.15, and 7.57 times higher than the cost of a 2019 RPS contract for SCE, SDG&E, and PG&E, respectively. Overall, the weighted statewide average cost burden caused by NEM 1.0 and 2.0 total renewable generation combined is 6.41 times higher than RPS contracts for renewable generation. The current NEM tariff is a costly mechanism to reaching the state's climate goals compared to available alternatives such as RPS contracted renewable energy.

II. NEM GROWTH LAGS IN DISADVANTAGED COMMUNITIES

The current NEM structure is inconsistent with statutory requirements because the tariff does not include specific alternatives designed to increase BTM generation adoption rates for customers in disadvantaged communities (DAC).[77] NEM 1.0 and 2.0 have not proportionally benefited low-income customers, communities of color, or DAC residents.[78] These categories overlap: CalEnviroScreen-designated DACs have significantly higher populations of low-income customers[79] and people of color than non-DACs.[80]

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[77] Public Utilities Code § 2827.1(b)(1).

[78] Lookback Study, p. 22, and Sunter, D., Castellanos, S., and Kammen, D. (2019). Disparities in Rooftop Photovoltaics Deployment in the United States by Race and Ethnicity. *Nature*, 2, pp. 71-76.

[79] CalEnviroScreen 3.0 Manual. See: https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf.

[80] "Analysis of Race/Ethnicity, Age, and CalEnviroScreen 3.0 Scores," California Office of Environmental Health Hazard Assessment 2018, p. 3.

Currently, DAC customers have less access to NEM,[81] receive a lower return when they have BTM generation, and subsidize wealthier ratepayers' bill savings from NEM. Out of all residential customers, CARE[82] customers represent 28% of total residential customers but only 10%[83] of NEM program participants,[84] meaning lower income customers are significantly underrepresented in NEM. Currently, the few lower income customers with solar get a lower value than non-CARE customers, because net-metered credits are valued at their discounted retail rate.[85] These NEM CARE customers are also much less likely than wealthier customers to own their solar panels,[86] which reduces their savings because they must purchase the energy produced by the solar panels from the third-party owner, or pay fees to lease the panels. In addition, CARE customers without BTM generation are harmed by the NEM cost burden: in 2019, the average PG&E, SCE and SDG&E non-NEM CARE customer annually paid $106, $67, and $128 more, respectively, due to NEM.[87] To put this into perspective, the overall annual NEM cost burden ($2.85 billion) is more than double the total funding to provide bill discounts

[81] The SB350 Barriers Study cites a variety of barriers to DAC adoption including low homeownership rates, less access to credit, complex homeownership arrangements, remoteness, and others. Barriers Study p. 2.

[82] CARE customers have annual incomes up to twice the federal poverty level and receive a 30-35 percent discount on their energy bills. Family Electric Rate Assistance (FERA) customers have incomes at 250 percent of the federal poverty level and receive an 18 percent discount on their energy bill. See: https://www.cpuc.ca.gov/lowincomerates/.

[83] Cal Advocates data requests IOUs: PGE-3, SDGE-3, SCE-3. *See,* Appendix C of this document.

[84] Annual reports filed by PG&E, SCE, and SDG&E on the Energy Savings Assistance and California Alternative Rates for Energy Programs. PG&E: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/PGE-2020-PY2019-ESA-CARE-Annual-Report.pdf, SCE: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/SCE-2020-PY2019-ESA-CARE-Annual-Report.pdf, SDG&E: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/SDGE-2020-PY2019-ESA-CARE-Annual-Report.pdf .

[85] California Code, Public Utilities Code - PUC § 739.1 establishes a 30-35% discount on energy rates for low-income customers.

[86] Nationally, low-income areas have a 17% higher rate of leasing rather than other areas. "The impact of policies and business models on income equity in rooftop solar adoption." O'Shaughnessy et al., 2020. Published in Nature Energy. 48.6% of adopters in low-income communities lease their solar panels, compared to 41.5% of adopters in other areas. See: https://etapublications.lbl.gov/sites/default/files/cesa_ne_webinar.pdf, p. 16.

[87] Dr. Severin Borenstein, Meredith Fowlie, and James Sallee. "Designing Electricity Rates for An Equitable Energy Transition," p. 28.

through the CARE program each year ($1.3 billion).[88] Ratepayers are paying almost double to fund an incentive program that predominantly benefits more affluent customers than they are paying to fund a low-income assistance program.

DAC residents also have less access to BTM generation. The Lookback Study found that only 11% of NEM customers live in DACs, while DAC residents constitute 25% of the state's population.[89] This 11% DAC adoption rate is likely to be an overestimate because the Lookback Study aggregated data from census tracts to zip codes in a way that tends to overstate DAC adoption rates.[90] Given that lower income populations are part of the definition of DACs,[91] DACs are likely to be disproportionately populated by CARE customers suffering the same exclusion, unfair compensation, low rate of ownership, and unfair cost burdens discussed above.

III. NEM IS NOT MAXMIZING GRID VALUE

NEM currently conflicts with the proceeding's guiding principle that NEM should maximize value to all customers and the electrical system.[92] NEM predominately incentivizes standalone rooftop solar.[93] The Whitepaper notes that standalone solar fails to maximize grid benefits because the hours it produces energy "do not coincide with the hours when customer demand on the electric system as a whole is peaking."[94]

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[88] From IOU ESA CARE Annual Reports:

- PG&E: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/PGE-2020-PY2019-ESA-CARE-Annual-Report.pdf.
- SDG&E: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/SDGE-2020-PY2019-ESA-CARE-Annual-Report.pdf.
- SCE: https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2020/12/SCE-2020-PY2019-ESA-CARE-Annual-Report.pdf.

[89] Lookback Study, p. 22.

[90] *Comments of the Public Advocates Office on the Net Energy Metering 2.0 Lookback Study*, p. 4.

[91] CalEnviroScreen 3.0 Manual, https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf.

[92] See D.21-02-007, p. 46: "(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."

[93] "More than 90% of all megawatts (MW) of customer-sited solar capacity interconnected to the grid in the three large investor-owned (IOU) territories (PG&E, SCE, and SDG&E) in California are on NEM tariffs." See: https://www.cpuc.ca.gov/NEM/.

[94] Whitepaper p. 11.

Energy is less valuable during the middle of the day, when rooftop solar primarily generates electricity, because there is more energy available. In fact, with the increasing number of solar installations, there is an overabundance of electricity in the middle of the day. The California Independent System Operator (CAISO) has stated that due to the "increasing amounts of renewable resources, oversupply conditions are expected to occur more often," meaning they will have to curtail excess energy more often.[95]

The Whitepaper states "[w]hile the majority of the solar photovoltaic (PV) generation takes place during the middle of the day, the higher marginal cost value falls between hours ending 16 through 21" when "solar generation declines rapidly and therefore does not provide meaningful capacity value."[96] This also means standalone solar is unable to replace natural gas peaker plants that are needed to serve later hours of peak demand.[97]

Section 3 of this Proposal discusses the various ways paired storage can mitigate this issue. Unfortunately, the Lookback Study demonstrates that few NEM participants are pairing their systems with energy storage. Since only 6% of NEM systems interconnected in 2019 were paired with energy storage,[98] NEM policy is not currently calibrated to solve this problem.

The Commission needs to make bold policy reforms, as recommended in Section 3 of this Proposal, in order to address these issues.

LIST OF ATTACHMENTS FOR SECTION 2

#	Attachment	Description
1	C	Related to Footnote 83

[95] See the growing annual rates of energy curtailment by CAISO: http://www.caiso.com/informed/Pages/ManagingOversupply.aspx.

[96] Whitepaper p. 11.

[97] "The Private and Public Economics of Renewable Electricity Generation." Severin Borenstein, *Journal of Economic Perpectives,* 2012, p. 72.

[98] Lookback Study, p. 27. Figure 3-4.

3 SUCCESSOR TARIFF POLICY PROPOSALS

I. EXPORT COMPENSATION: NET BILLING

The Commission should replace net metering with net billing[99] in the successor tariff. Cal Advocates agrees with the Whitepaper's finding that, "the primary benefit of net billing is that allowing compensation of exports to be disassociated with the retail rate provides a more objective and transparent method, unaffected by the structure of the retail rate."[100] Under the Cal Advocates proposal for net billing, the Commission can set compensation for exported energy at a level equal to what it is worth, instead of the current retail rate. As demonstrated in Section 2, retail electricity rates are rising rapidly. At the same time, the price of PV systems continues to fall.[101] Net billing provides "an improvement in economic efficiency compared to classic NEM."[102] The Whitepaper appropriately notes that a net billing structure would create "more opportunities to price BTM solar output at its electricity system value."[103]

Cal Advocates further agrees that "[m]oving away from net metering and towards net billing is considered a 'middle ground' approach among alternatives," as "participating [NEM] customers retain the ability to earn bill savings at the full retail rate for the remaining solar output which is consumed onsite."[104] A 2018 report by Gridworks, "Sustaining Solar Beyond Net Metering," similarly recommends reforming NEM by adopting a net billing successor tariff.[105]

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[99] Net billing "provides different compensation to participating customers depending on whether they consume or export the output of their BTM system," whereas net metering "provides bill credits at the retail rate for generation exported to the grid." See Whitepaper, p. 16.

[100] Whitepaper, p. 16.

[101] SEIA/Wood Mackenzie Power and Renewables. US Solar Market Insight 2020 Q4. Accessed February 22, 2021. Available at https://www.seia.org/solar-industry-research-data.

[102] Whitepaper, p. 16.

[103] Whitepaper, p. 16.

[104] Whitepaper, p. 16. The Whitepaper notes that net billing is a "middle ground" between the current net metering structure, and a "buy all, sell all" structure where "the customer must pay for their gross usage at the retail price, and therefore generation that is consumed onsite is valued at the difference between the retail tariff and the sales price."

[105] Gridworks, "Sustaining Solar Beyond Net Metering," January 2018, p. 10.

Section 1 of this Proposal demonstrates that net billing is aligned with numerous statutes. Furthermore, net billing is aligned with guiding principle (f), that a successor tariff should be transparent and understandable.[106]

II. VALUING EXPORT COMPENSATION: AVOIDED COST

NEM provides unreasonable incentives because it compensates participants for exported energy at the retail rate, which is much higher than the value of the energy produced, as detailed in Section 2 of this Proposal.

Retail rates are rising, and NEM is responsible for a significant portion of this rise.[107] To correct for over-compensation through use of the current retail rate,[108] the NEM export compensation instead should reflect the most recent avoided cost values adopted by the Commission in the Integrated Distributed Energy Resource (IDER) proceeding, R.14-10-003. These values should be produced through the prevailing Avoided Cost Calculator (ACC) 1-year values to ensure the value of exported energy is compensated accurately and in accordance with the benefits distributed generation systems provide to the larger grid.[109] The Whitepaper points out that for these reasons, states across the country are reforming NEM, moving away from retail rates.[110]

Decision (D.) 20-04-010 in the IDER proceeding adopted the 2020 ACC, which leverages inputs from the Integrated Resource Planning (IRP) (R.16-02-007) and Distributed Resource Plan (R.14-08-013) proceedings. The Commission emphasized that coordinating the ACC with the IRP process was critical for maintaining consistency in the evaluation of supply- and demand-side resources in electric sector planning.[111] Accordingly, aligning net billing with the values of the ACC would better support the grid planning efforts of the IRP and Distributed

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[106] See D. 21-02-007, p. 46: "(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;"

[107] "Designing Electricity Rates for An Equitable Energy Transition" by Next 10 and the Energy Institute at Haas, p. 28.

[108] See Section I (A), above.

[109] The current Avoided Cost Calculator is available at: https://www.cpuc.ca.gov/General.aspx?id=5267

[110] Whitepaper, p. 34. See, New York, Hawaii, and Arizona.

[111] *Decision Adopting 2020 Policy Updates to the Avoided Cost Calculator,* Decision (D.) 20-04-010, R.14-13-003, filed April 16, 2020, pg. 24.

Resource Plan proceedings. Additionally, using the ACC values would align with the proposals presented in the Whitepaper.[112]

The ACC sufficiently values the benefits provided by BTM generation through the avoided cost values of GHG emissions, transmission capacity, distribution capacity, energy, and system generation capacity. The methodologies underlying these categorical avoided costs values are summarized below.:

A. Avoided Greenhouse Gas Emissions

The avoided cost of greenhouse gas (GHG) emissions estimated by the ACC is calculated by determining both the avoided *amount* of emissions from the electric grid and the *value* of those emissions that would be associated with a given Distributed Energy Resource (DER) measure. The value is based on the GHG shadow price, which represents the cost of reducing an additional unit of GHGs in each year.[113] In order to best reflect the value of GHG reductions over the next decade, the 2030 GHG shadow price from the Renewable Energy Solutions Model[114] is discounted for 2020-2029 based on the utility weighted average cost of capital. The amount of emissions, or the actual impacts on emissions output from DER measures, is calculated through a two-step approach that first derives marginal emissions and then rebalances the portfolio so annual GHG intensity targets are met.[115]

D.20-04-010 in the IDER proceeding, which adopted 2020 updates to the ACC states this methodology "offers the best proposal in the record to address the concern that GHG costs have been overestimated."[116] The approach the ACC used to calculate avoided GHG costs is similar

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[112] Whitepaper, p. 15. ("We propose that the excess generation not consumed onsite be valued at system, time-differentiated avoided costs, i.e., using a "net billing" approach with exports compensated at avoided costs.)

[113] *2020 Distributed Energy Resources Avoided Cost Calculator Documentation*, *Version 1c*. June 24, 2020. California Public Utilities Commission, pg. 21. Available at https://www.cpuc.ca.gov/General.aspx?id=5267.

[114] The Renewable Energy Solutions Model is a publicly available resource planning model created by E3 that is used in the IRP proceeding. This model is used to create the final Reference System Plan (RSP). The models, inputs, and results are available here: https://www.cpuc.ca.gov/General.aspx?id=6442464143 .

[115] *2020 Distributed Energy Resources Avoided Cost Calculator Documentation*, *Version 1c*. June 24, 2020. California Public Utilities Commission, p. 24.

[116] *Decision Adopting 2020 Policy Updates to the Avoided Cost Calculator,* Decision (D.) 20-04-010, R.14-13-003, filed April 16, 2020, p. 47.

in concept to both the fuel substitution test (D. 19-08-009) used for energy efficiency, and for the California Energy Commission's (CEC) Title 24 building standards.[117] Therefore, the ACC methodology for valuing GHG avoided costs is the best approach for quantifying the environmental benefits associated with DER installations, and is the appropriate benchmark for NEM billing.

B. Transmission Capacity

The ACC provides a quantification of transmission avoided capacity costs to represent the estimated cost impacts on utility transmission investments as a result of peak load reductions.[118] Because the ability to avoid transmission projects is dependent on a variety of specific factors, the avoided cost values are not associated with any "specified" transmission deferral projects. Those projects are evaluated in the CAISO Transmission Planning Process and are not incorporated into the ACC.[119] The "unspecified" transmission avoided cost values within the ACC represent the value provided by a DER if the peak load reductions can be obtained in the right amount, right location, and with sufficient dependability to avoid or defer a transmission investment.[120] These avoided costs are calculated through the marginal cost of transmission, which is derived from the IOUs' General Rate Case (GRC) Phase 2 proceedings. Transmission marginal costs are based on the capacity-driven projects for each utility's transmission plan and estimated using the Discounted Total Investment Method.

The Commission deemed this approach as the appropriate valuation method for transmission avoided costs within the ACC in D.20-04-010.[121] The Commission also vetted this approach in the Distribution Resource Plan Proceeding (R.14-08-013) and adopted it in D.20-03-005. As noted above, "unspecified" avoided transmission costs exist in the

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[117] *2020 Distributed Energy Resources Avoided Cost Calculator Documentation*, *Version 1c*. June 24, 2020. California Public Utilities Commission, p. 24.

[118] *2020 Distributed Energy Resources Avoided Cost Calculator Documentation*, *Version 1c*. June 24, 2020. California Public Utilities Commission, p. 36.

[119] *Decision Adopting 2020 Policy Updates to the Avoided Cost Calculator,* Decision (D.) 20-04-010, R.14-13-003, filed April 16, 2020, p. 56.

[120] *2020 Distributed Energy Resources Avoided Cost Calculator Documentation*, *Version 1c*. June 24, 2020. California Public Utilities Commission, pg. 36.

[121] *Decision Adopting 2020 Policy Updates to the Avoided Cost Calculator,* Decision (D.) 20-04-010, R.14-13-003, filed April 16, 2020, pg. 61.

hypothetical. Cal Advocates agrees with the Commission that the ACC's approach is the best methodology available for calculating these costs, as any specified transmission deferral costs associated with a DER installation are appropriately evaluated and compensated through the CAISO Transmission Planning Process.

C. Distribution Capacity

Similar to the transmission capacity avoided costs, the avoided costs for distribution in the ACC represent the value of deferring or avoiding investments in distribution infrastructure through reductions in distribution peak capacity needs and represent "unspecified" deferral or avoidance values. The costs are derived through a system-average approach and are based on data from the utility's Distribution Deferral Opportunity Report, Grid Needs Assessment, and GRC filings.[122]

The avoided cost values for distribution capacity adopted by the Commission in D.20-04-010 are modeled to capture the long-term value that BTM generation can provide in deferring distribution system upgrades. The method is adjusted to fit the distribution needs of each IOU (based on their respective GNA's) and is vetted in the Distributed Resource Plan proceeding. The ACC accurately values the benefits of deferred or avoided distribution system investments that can be attributed to BTM generation.

D. Energy Generated

The ACC uses the Strategic Energy Risk Valuation Model[123] to project energy prices until 2030. The model simulates the wholesale price of energy based on projected generation portfolios and weather forecasts. The modeling scenario used for the ACC assumes no new BTM generation, thus giving an estimate of the marginal impact of a new DER.[124] These values are used to estimate the dollar value of energy generated by a DER and are an essential component of estimating the avoided costs of energy.

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[122] For detailed descriptions of the avoided distribution cost methodologies, see the 2020 ACC documentation at https://www.cpuc.ca.gov/General.aspx?id=5267.

[123] 2020 Avoided Cost Calculator Documentation, p. 5.

[124] 2020 Avoided Cost Calculator Documentation, p 5.

E. System Generation Capacity

System generation capacity indicates the DER's contribution to avoided grid peak capacity costs. The ACC uses E3's Renewable Energy Solutions Model to estimate the Net Cost of New Entry of a 4-hour battery with optimal dispatch according to the CEC Solar + Storage Model. These Cost of New Entry values are subtracted from the levelized fixed costs of the battery to generate the Net Cost of New Entry. The value of this dispatch is allocated to the hours of the year with the highest system capacity need according to the E3 Renewable Energy Capacity Expansion model, which results in allocation of these values to evening hours in late Summer and early Fall.[125]

F. Export Compensation Should be Set Accurately at the Time-Varying Avoided Costs Value of Exports

The export compensation rates (ECR) should vary by time-of-use (TOU) period to reflect the time-varying nature[126] of the marginal costs/avoided cost of providing an increment/decrement kWh of electricity.[127] Avoided costs profiles for the three IOUs from the 2020 ACC, like marginal costs, show significantly higher values during the evening hours than during mid-day or overnight hours during all seasons. Avoided costs represent the marginal costs *savings* to the system of having to serve one less unit of demand.[128]

The ECR during each TOU period should be set as closely as possible to the time-dependent avoided costs value of exports within that TOU period. The average avoided costs produced by exports ($/kWh) of any generator is most accurately measured by calculating the annual average of hourly avoided costs weighted by the amount of exports (kWh) during each hour. The same is true for measuring the avoided costs value of exports within a TOU period. Therefore, the ECR for each TOU period should be set equal to the weighted average avoided

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[125] 2020 ACC Documentation p. 33.

[126] Consumption or generation varies by time of day, day type, and by season.

[127] The Commission has long recognized that marginal costs to the system of an incremental kWh of consumption varies temporally throughout the year with changes in customer demand and in the availability, type, and variable and fixed costs of generation resources, among other factors. D.17-01-006, FoF 4-7, 10-11.

[128] This can be achieved either by a reduction of a unit of demand, such as through consumption of on-site generation leading to a reduction in metered load, or by customers supplying an incremental unit of the product (e.g. kWh) that avoids the costs that would have been incurred to serve that unit of demand. The Whitepaper also uses avoided costs and marginal costs interchangeably. Whitepaper, pp. 15, 20, 22.

costs to ensure that the annual average compensation that customers receive ($/kWh) equals the annual average time-varying avoided costs value of their ($/kWh) exports.[129] This approach would align total costs of exports to ratepayers with total benefits.

By contrast, the ECR should be set differently for the evening period to encourage exports in these hours. Exports during the evening hours have a higher potential to provide generation and distribution capacity avoided costs. Therefore, it is more beneficial to the system to provide a higher ECR value during the evening peak. The hourly generation profiles of emerging storage technologies are very different than PV export profiles. While only 4-6% of a typical rooftop solar system's annual generation occurs during system peak hours,[130] a residential BTM storage device that is operated to perform TOU price arbitrage[131] would most likely discharge 100% of its stored energy during the system peak.[132] These exports during the system peak should not be compensated using a PV-weighted avoided costs profile and should receive a higher compensation to reflect their greater value. Since it is difficult to forecast the exact composition of emerging storage technologies and their exports profile, the Commission should set the system peak ECR at the *simple average* of avoided costs. Doing so can encourage storage and other similar technologies to export during the evening peak when the energy discharged from storage can provide the most value to the system.[133] Cal Advocates presents its proposed method to setting the ECR by the IOUs' base TOU periods below.

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[129] Total annual exports compensation simply equals average compensation times total annual exports.

[130] And solar Peak generation is weighted heavily in the hour 4-5pm when solar irradiance is highest.

[131] TOU arbitrage refers to the practice of charging the battery either from on-site solar PV (if the customer has it) or during the lowest cost TOU period and *discharging* during the highest cost TOU period (Peak/Mid-Peak). This enables the customer to take advantage of the varying price differentials of retail rates at different times of day and to capture the difference as bill reductions.

[132] In addition, the hourly export profile would likely be spread among more and different hours than solar production (which is focused in 4-5pm during the Peak), because many storage devices have maximum discharge durations that are longer than one hour. For instance, many residential batteries on the market have 3-hour discharge capacity. See fn 131.

[133] The simple average of avoided costs during the summer On-Peak is 75% higher than PV-weighted average avoided costs of the On-Peak for PG&E, 57% higher for SCE, and 114% higher for SDG&E.

Table 1. Cal Advocates' Proposed Method of Setting ECR by TOU Period by Performing Different Averaging of Avoided Costs (AC) for PG&E

PG&E TOU Period	Cal Advocates Proposed ECR
Summer Peak	Simple Average
Summer Off-Peak	PV-Weighted Average
Winter Peak	Simple Average
Winter Off-Peak	PV-Weighted Average

Table 2. Cal Advocates' Proposed Method of Setting ECR by TOU Period by Performing Different Averaging of Avoided Costs (AC) for SCE

SCE TOU Period	Cal Advocates Proposed ECR
Summer Peak	Simple Average
Summer Mid-Peak	Simple Average
Summer Off-Peak	PV-Weighted Average
Winter Mid-Peak	Simple Average
Winter Off-Peak	Simple Average
Winter Super Off-Peak	PV-Weighted Average

Table 3. Cal Advocates' Proposed Method of Setting PG&E ECR by TOU Period by Performing Different Averaging of Avoided Costs (AC)

SDG&E TOU Period	Cal Advocates Proposed ECR
Summer Peak	Simple Average
Summer Off-Peak	PV-Weighted Average
Summer Super Off-Peak	Simple Average[134]
Winter Peak	Simple Average
Winter Off-Peak	PV-Weighted Average
Winter Super Off-Peak	PV-Weighted Average

[134] SDG&E's summer Super Off-Peak (SOP) covers the hours weekdays midnight-6am and weekends midnight-2pm. Overnight hours typically have higher marginal/avoided costs and higher marginal greenhouse gas (GHG) emissions rates than mid-day hours. A considerable portion of EV charging occurs overnight, and it is important to encourage clean generation during overnight hours so Cal Advocates sets the summer SOP at the higher simple average avoided costs.

Cal Advocates' ECR proposal will reduce average over-compensation of PV exports for most on-site PV customers from 14%-33%[135] to between 0%-10%[136] compared to using the simple average avoided costs for all TOU periods. Net billing based on Cal Advocates' PV-weighted ECR proposal will reduce the total cost burden to ratepayers of the successor tariff by $868 million per year in 2021 dollars by 2030, or by 30%, compared to business as usual.[137]

By accurately aligning export compensation with the time-varying avoided costs value of exports to the system, Cal Advocates' ECR proposal is consistent with Public Utilities Code Section 2827.1 (3) which requires that the successor tariff be based on costs and benefits of the electric generating facility, and with 2827.1 (4) that total successor tariff costs to all customers and the electric system are approximately equal to total benefits. In addition, Cal Advocates' Proposal demonstrates that net billing at avoided cost is aligned with the proceeding's guiding principles to "ensure equity among customers,"[138] "maximize the value of customer-sited renewable generation to all customers and to the electrical system,"[139] "be coordinated with the

[135] Assuming the ECR is set at simple average avoided costs during all TOU periods. Simple average avoided costs are higher than PV-weighted avoided costs during all time periods, so setting all time periods at simple averages would significantly overcompensate solar customers.

[136] Overcompensation ranges from ¢0 to 0.576/kWh depending on the extent exports are concentrated in the Off-Peak/Super Off-Peak vs. Peak periods. The average ECR of any customer depends on their unique usage profile and how it interacts with their on-site generation profile. Cal Advocates' ¢0 estimates assumes 100% exports occur during the mid-day period in proportion to an hourly profile from PVWatts, while the higher values (10.2% for PG&E, 9.8% for SDG&E, and 6.5% for SCE) assume exports occur during all time periods are in proportion to a PVWatts annual generation profile. Theoretically a customer could export proportionally more in the On-Peak periods than the PVWatts profile resulting in over-compensation for exports greater than 10%, but this will be rare among residential customers as their consumption is typically highest in the evening Peak hours, reducing their Peak exports.

[137] Derived from IOUs' cost burden models, which use the CEC's 2018 Integrated Energy Policy Report (IEPR) mid-mid demand forecast of annual growth in BTM PV. Business as usual assumes the successor tariff is a continuation of NEM 2.0 policies.

[138] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

[139] See D.21-02-007, p. 46: "(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."

Commission and California's energy policies,"[140] and "be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[141]

III. RATE STRUCTURE: TIME-OF-USE RATES, GRID BENEFITS CHARGE AND EQUITY CHARGE

A. TOU Rates and Grid Benefits Charge

The successor tariff rate structure should consist of TOU rates paired with a Grid Benefits Charge to recover the costs to provide distribution and transmission services to successor tariff customers and ensure fair, accurate recovery of the costs of public purpose programs (non-bypassable charges [NBCs]) that produce broad societal benefits.

1. The successor tariff should function as a rate overlay in order to promote customer choice.

The successor tariff should function as a rate overlay to TOU rates that are available to customers by the time the successor tariff is in place, and for which the customer would otherwise be eligible for.[142] A rate overlay means that it should be a separate rate tariff that can be paired with eligible TOU rates.[143] Once it is paired with a TOU rate schedule, the successor tariff would ensure that the customer pays through a Grid Benefits Charge and that all of their net exports are compensated at avoided costs. A rate overlay will preserve customer choice and allow customers who own additional clean technologies like EVs to choose among multiple TOU rate offerings. This choice will enable customers to select a rate that best aligns with their usage pattern, and their ability and willingness to respond to different time-based price signals. This customer choice-based approach is consistent with the Commission's guidance in D.17-01-006 on the TOU order instituting rulemaking (R.15-12-012). Here the Commission encouraged

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[140] See D. 21-02-007, p. 46: "(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."

[141] See D. 21-02-007, p. 46: "(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."

[142] For instance, a customer who only has rooftop solar PV should not be allowed to take service on a TOU rate designed specifically for EVs and storage.

[143] This is the same approach as the NEM 1.0 and 2.0 tariffs. See Applicability and Rates sections of NEM 2.0 tariff sheets. PG&E Schedule NEM2 tariff sheet, PG&E Cal. P.U.C. Sheet No. 4717-E, Sep. 14 2018. SDG&E Schedule NEM-ST tariff sheet, Cal P.U.C. Sheet No. 27171-E, Oct. 29 2018. SCE Schedule NEM-ST tariff sheet, Cal. P.U.C. Sheet No. 27171-E, Oct. 29 2018.

parties to work in utility-specific rate design proceedings to develop "a menu of different TOU and other time-varying rates as a way to maximize customer acceptance by providing a range of rates that will be appropriate for different levels of customer sophistication, technology, and understanding."[144] As D.17-01-006 recognized, offering customer choice among TOU rate options also promotes customer acceptance, which is an important part of the success of any new rate.[145] In the context of the successor tariff, the Commission should require that successor tariff-eligible TOU rates have the most updated TOU periods.[146] Successor tariff rates for consumption and exports must reflect accurate, cost-based groupings of underlying marginal costs and current grid conditions. TOU rates that align closer to costs will maximize benefits to all ratepayers.

2. The successor tariff should include a Grid Benefits Charge to ensure equitable, cost-based recovery of transmission and distribution costs of service.

TOU rates are necessary for recovering marginal costs that vary temporally and tend to be highest during times of peak customer demand and lowest availability of capacity relative to demand (peak-related or time-varying marginal costs). However, there are significant costs of service incurred that are not peak-related but are equally important to ensuring the provision of sufficient, reliable, and safe grid services to all customers including NEM participants. Therefore, in addition to the TOU rate component, the successor tariff should include a Grid Benefits Charge to accurately reflect the costs of providing distribution and transmission service to successor tariff customers and ensuring fair and equitable recovery of NBCs.

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[144] D.17-01-006, p. 43, FoF 41, Appendix 1 p. 2. All three IOUs now offer default TOU rates, which feature the simplest TOU periods that new customers can take service on and that accurately reflect underlying patterns of marginal costs. In addition, the IOUs offer optional TOU rates that feature a combination of alternative TOU period configurations, stronger TOU price differentials, and dynamic pricing components.

[145] D.17-01-006, p. 39, FoF 42.

[146] Those that were adopted by the Commission in the most recent GRC Phase 2 or Rate Design Window proceeding that set default TOU periods, or more recently. For instance, PG&E proposed an optional E-ELEC rate for residential customers with BTM storage in its 2020 GRC Phase 2, even though it implemented new default TOU periods as an outcome of its 2017 GRC Phase 2. The proposed E-ELEC rate features a higher fixed charge, lower volumetric rates, and a 6-time period TOU structure that includes additional summer and winter Partial Peak periods (3-4pm, 9pm-midnight). The default rate has a simpler 4-time period TOU structure. A.19-11-019, Ex. PG&E-5, PG&E Testimony on Schedule E-ELEC, July 2020 Errata, p. 1-6.

The Grid Benefits Charge should be assessed as a $/kW charge per month, based on the size (kW) of the generation system a customer installs, to properly collect the aforementioned distribution, transmission and public program costs that such customers benefit from. The Public Purpose Program (PPP) charge and Department of Water Resources Bond-Charge (DWRB-C) should be recovered on the basis of volumetric usage served by on-site generation (gross consumption), because they are required to be recovered on a volumetric basis by statute.

As the Whitepaper states, "meeting the directives of AB 327 requires a rate mechanism that precludes the shifting of non-avoidable, fixed costs of serving customer-generators to nonparticipating customers."[147] The Whitepaper uses the phrases "fixed costs" or "unavoidable cost of service" to refer to all the costs of providing electrical service that are non-time varying marginal costs.[148] The electric power industry is a capital-intensive industry, and the utilities' approved revenue requirements – which represents the total costs to serve customers – are frequently above marginal costs.[149] The costs above marginal costs include costs to maintain, replace, and upgrade capacity[150] are a critical part of cost of service for all ratepayers and are not affected by customers' consumption or generation decisions.

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[147] The Whitepaper, p. 8.

[148] The Whitepaper makes it clear that in all three of its alternative proposals, the goal is to reduce the volumetric rates as close as possible to marginal/avoided costs and to recover all the remaining unavoidable or fixed costs of service through some combination of demand, fixed, and grid access charges. The Whitepaper, pp. 20, 23.

[149] The Commission's preferred method of dealing with this different in costs in revenue allocation and rate design is the equal percent of marginal cost (EPMC) approach, whereby revenues are assigned to each customer class in proportion to how they impose marginal costs on the system and then each class' revenues are scaled up by the same EPMC scalars to ensure recovery of the full revenue requirement. D.18-08-013, pp. 13-15.

[150] The unavoidable or fixed costs of service include the equal percent of marginal cost (EPMC) scalar in the Commission's rate making terminology. EPMC revenues equal the different between system-level marginal cost revenues and the utility's approved revenue requirement. The EPMC scalars scale the marginal cost revenues to the full revenue requirement. The Commission has repeatedly stated its preference for EPMC scaling of marginal costs, which assigns costs to customer groups in proportion to the marginal costs they impose on the system. The Commission has stated that rates based on EPMC scaled marginal costs are cost-based rates and that EPMC scaling is the preferred way to achieve *fair, equitable* rates. Therefore when NEM customers do not pay their EPMC-scaled marginal costs (cost of service), it violates the Commission's definition of fair, equitable rates. D.18-08-013, pp. 14, 18, 19.

3. NEM customers currently do not pay for the value of distribution and transmission services provided to them.

The current NEM tariffs do not adequately capture the benefits that NEM customers derive from grid services. The timing of BTM solar generation does not align well with the timing of highest demand and marginal costs on the distribution system, which tend to be focused in the evening hours when BTM solar generation drops off. Thus, BTM solar generation does very little to reduce the costs to serve customers either on a marginal or non-marginal basis. Yet, under the current volumetric rate structure and NEM 2.0 policies, average residential NEM 2.0 customers pay only 18% of their cost of service for PG&E, 9% for SCE, and 9% for SDG&E.[151] In addition, the current NEM tariff enables NEM customers to avoid paying a large portion of NBCs, which include the costs of public purpose programs that serve broad societal purposes and benefit all ratepayers.[152] The utility, however, still incurs these costs to serve its customers, including NEM customers, and must recover its Commission-approved revenue requirement. Any costs to serve NEM customers that are not collected from NEM customers are instead recovered from non-participants,[153] directly increasing non-participants' costs. This situation will continue to drive large inequities in cost responsibility among ratepayers, if left unmitigated. As on-site generation grows, the cost burden of maintaining, repairing, upgrading, and ensuring the safety and reliability of the distribution and transmission systems will compound the cost burden to non-NEM customers. A Grid Benefits Charge (GBC) would rectify this inequitable cost burden.

Cal Advocates' proposed GBC is designed to recover a portion of the difference between what successor tariff customers would pay on their monthly bills under net billing and 100% of cost of service, net of any reductions to cost of service due to on-site generation. Cal Advocates'

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[151] In contrast, prior to installing on-site generation, residential NEM 2.0 customers paid 139% of COS for PG&E, 91% for SCE, and 94% for SDG&E. Lookback Study, p. 12.

[152] Examples include costs of the California Alternative Rates for Energy (CARE) program, the costs of decommissioning nuclear plants that provided baseload power to all customers, and the costs of procuring energy to avoid continued blackouts during the 2001 energy crisis (Department of Water Resources Bond-Charge).

[153] Costs of revenue undercollections caused by NEM customers are paid for all by ratepayers. However, since NEM customers' usage is so low after installing on-site generation, they only pay a small fraction of the total undercollection they create.

proposed GBC is considerably smaller than the fixed and grid access charges proposed by E3 in the Whitepaper, which will mitigate customer bill impacts among successor tariff customers.

The difference between the average monthly GBC under this Proposal and average monthly fixed charges and grid access charges under the Whitepaper's proposed "Multi-Part Grid" rate[154] are shown below for illustrative purposes for a residential customer with a PV system size of 5.5 kW.[155] E3 developed the Multi-Part Grid rate using SDG&E's TOU-DR-1 rate as the basis.[156] It did not develop any rate proposals using PG&E or SCE rates, but the magnitude of monthly fixed and grid access charges under the multi-part grid rate for SCE and PG&E would likely be similar to SDG&E's charges.

Table 4. Illustrative Average Residential Monthly Fixed, Demand, and Grid Access Charges Under the Whitepaper's Multi-Part Grid Rate and Cal Advocates' Proposed GBC Assuming a System Size of 5.5 kW

	PG&E	SCE	SDG&E
Whitepaper Multi-Part Grid Rate	-	-	$174.20
Cal Advocates' Proposal	$35.42	$35.86	$33.00

Cal Advocates' proposed GBC would increase average payback periods for non-CARE solar customers by 3 years.

[154] The Whitepaper's cost-based Multi-Part Grid rates brings the volumetric rates significantly closer to avoided costs and recovers the unavoidable costs of service through a $40 monthly fixed charge and a $24.40/kW monthly grid access charge. This is one of three alternative rate proposals put forth by E3. The other two proposals have even larger fixed and/or demand charges. The Whitepaper, p. 24.

[155] Actual average system sizes of CARE NEM installations that began to operate in 2020 are 5.9 kW for PG&E, 5.15 kW for SCE, and 5.15 kW for SDG&E. Cal Advocates used a constant level of 5.5 kW to produce consistent results for this illustrative example. Derived from data requests Cal Advocates-PGE 3, Cal Advocates-SCE 03, and Cal Advocates-SDGE 3.

[156] E3 designed the Multi-Part Grid rate to be revenue neutral to TOU-DR-1 residential rate using the class average load shape. E3 White Paper, p. 23.

Table 5. Effect of Cal Advocates' Proposed GBC on Average Solar PV Payback Periods[157]

	PG&E	SCE	SDG&E
Average Payback Period - no GBC	11 years	10 years	12 years
Average Payback Period including GBC	14 years	13 years[158]	15 years

The proposed GBC will reduce average annual bill savings in 2030 for PG&E, SCE, and SDG&E Non-CARE customers by 16.2%, 15.6%, and 18.4%, respectively, as shown below.[159] Annual savings and reductions to savings are shown in 2021 dollars.

Table 6. Effect of Cal Advocates' Proposed GBC on Average Annual Bill Savings[160] of a Non-CARE Customer with Solar PV in 2030

	PG&E TOU-C ($ per customer per year)	SCE TOU-D-4-9pm ($ per customer per year)	SDG&E TOU-DR1 ($ per customer per year)
Annual Average Bill Savings no GBC	$2,029	$2,045	$1,734
Annual Average Bill Savings with GBC	$1,580	$1,608	$1,331
Reduction to Annual Bill Savings ($)	$449	$437	$403
Reduction to Annual Bill Savings (%	22.1%	21.4%	23.2%

[157] Assumes a system installed in 2022, 4% annual rate escalation. Uses average 2021 PV system installation costs of $4.16/Watt derived from Verdant residential base case total installation costs of $3.80/Watt in 2018 dollars derived from Lawrence Berkeley National Laboratory's 2019 Tracking the Sun report. Cal Advocates applied annual escalation of 2.3% to derive installation costs in 2021 ($4.16/Watt). Verdant Associates, LLC, "Net Energy Metering 2.0 Lookback Study," p. 72.

[158] SCE residential have the highest percentage of on-site consumption of annual NEM generation (56% compared to 35.6% for SDG&E) of the three IOUs. Since on-site consumption is compensated at the full retail rate, this means the average payback periods of SCE customers are lower than the other two IOUs.

[159] The GBC proposal will not have any effect on CARE customers' bill savings because Cal Advocates proposes that CARE customers be exempt from the GBC. See the following paragraph after table 3.

[160] Assumes 4% annual rate escalation and average NEM 2.0 system size (kW) current as of August/September 2020. Average NEM 2.0 system sizes are 5.98 kW for PG&E, 5.59 kW for SCE, and 5.60 kW for SDG&E. Derived from Cal Advocates-PG&E DR 3 Q1+2, Cal Advocates-SCE DR 3 Q1+2, and Cal Advocates-SDG&E DR 3 Q 1+2.

4. CARE and FERA customers should be exempted from paying the GBC in order to ensure parity in annual bill savings with Non-CARE NEM Customers.

CARE and FERA customers should be exempted from paying the GBC in order to address one of the historical barriers to lower income customers' access to BTM generation. Specifically, NEM CARE and FERA customers have had lower internal rates of return on their solar PV investments due to the NEM compensation being tied to discounted CARE and FERA retail rates. Using the illustrative 5.5 kW PV system size above,[161] exempting CARE customers from paying the GBC charges will increase CARE customers' annual bill savings in 2021 dollars by $449 for PG&E, $437 for SCE, and $403 for SDG&E. This will help ensure greater parity in annual bill savings between CARE and Non-CARE customers, which will provide greater incentives for CARE customers to adopt as well as for DER developers to market to CARE customers. The GBC exemption will help address CARE and FERA customers' historical exclusion from accessing BTM generation and promote greater equality in access to BTM benefits between lower income and non-lower income customers, which is discussed in Section 2 of this Proposal.

5. The GBC should include NBCs to ensure all customers pay their fair share.

Finally, this Proposal would ensure that the amount that successor tariff customers pay in NBCs[162] is unaffected by the decision of whether to install on-site generation. NBCs include the costs of public purpose programs that serve broad societal purposes and benefit all ratepayers.[163] The departure of load does not reduce the need for or costs of these programs. This Proposal would ensure that such costs are truly non-bypassable.

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[161] Actual average system size of CARE NEM installations that began to operate in 2020 are 5.9 kW for PG&E, 5.15 kW for SCE, and 5.15 kW for SDG&E. Cal Advocates used a constant level of 5.5 kW to produce consistent results for this illustrative example. Derived from data requests Cal Advocates-PGE 3, Cal Advocates-SCE 03, and Cal Advocates-SDGE 3.

[162] These are the Nuclear Decommissioning (ND) charge, Competition Transition Charge (CTC), Public Purpose Program (PPP) charge, and Department of Water Resource Bond-Charge (DWRB-C).

[163] Examples include California Alternative Rate for Energy (CARE) program costs, costs of decommissioning nuclear generators (Nuclear Decommissioning charge), and costs the state incurred to provide electricity and prevent further widespread outages during the 2001 energy crisis (Department of Water Resources Bond-Charge).

Currently, NEM 2.0 customers are required to pay four NBCs based on their metered load (kWh) during each billing cycle. These include charges for transmission and nuclear decommissioning (ND), and the Competition Transition Charge (CTC). Under the NEM 2.0 tariff, NEM customers can avoid paying a large portion of their NBCs by choosing to serve some of their gross consumption from an on-site generator, which reduces their metered load. Unlike NEM customers, departing load customers are still required to pay the same amount of NBCs as if they remained bundled service customers. Similarly, in order to achieve financial indifference between NEM and non-NEM participants, NEM participants should not be allowed to avoid paying these costs. To achieve equitable recovery of NBCs and avoid non-economic bypass, NBCs should be assessed on NEM participants' gross consumption. This approach would ensure equity for non-NEM customers by no longer incenting customers to seek alternative sources of generation[164] to avoid paying their fair share of NBCs.

The assessment of NBCs on metered load for DG customers leads to a highly inequitable outcome where those customers who have the most financial means—that is, customers who are homeowners and who have sufficient capital or access to credit to install BTM generation—are able to bypass significant portions[165] of the costs of public programs that are designed to produce broad societal benefits. In addition to the important equity issues this raises, the current treatment of NBCs also promotes inefficient economic investment decision-making, because it leads prospective DG customers to make investment decisions on the assumption that they can reduce NBCs when in reality the value that their generation provides to the system and society is marginal/avoided costs.

Lastly, the GBC will significantly reduce the cost burden to non-participating ratepayers. Cal Advocates' proposed GBC will reduce the total annual cost burden in 2030 of the successor tariff by at least $538 million per year in 2021 dollars, or by 19%.

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[164] Departing load customers receive generation services from an alternative generation provider, but the ability of alternative providers to offer generation services at prices lower than utility prices is directly contingent on their ability to negotiate prices with generation resources that are different than the utility's. Ownership of the generation assets should not be the issue, but rather a customer's decision to switch to an alternative source of generation should be based only on the economics and other relevant characteristics of the generation resources, and their responsibility to pay for public programs that benefit all ratepayers should remain unchanged.

[165] Residential customers bypass, on average, NBCs equivalent to 56% of their annual solar generation for SCE, 52% for PG&E (4,779 kWh), and 35.5% of annual generation for SDG&E (3,661 kWh).

Section 1 of this Proposal demonstrates that the GBC is aligned with numerous statutes and the proceeding's guiding principles to "ensure equity among customers,"[166] "maximize the value of customer-sited renewable generation to all customers and to the electrical system,"[167] "be coordinated with the Commission and California's energy policies,"[168] and "be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[169]

The legality of charges on participants is discussed in Section 4 of this Proposal.

B. Equity Charge

The Natural Resources Defense Council (NRDC) is proposing an Equity Charge to redress part of the inequities produced by NEM 1.0 and 2.0 and described in Section 2 of this Proposal. NRDC's Equity Charge is a useful framework that could provide meaningful benefits to customers that historically have been under-represented among NEM participants. Cal Advocates recommends that should the Commission impose an Equity Charge, the charge should begin upon the effective date of the successor tariff, with CARE and Family Electric Rate Assistance (FERA) NEM customers being exempt. After a reasonable payback period non-CARE and non-FERA customers on the successor tariff should be subject to the Equity Charge.

1. Allocation of funds from the Equity Charge

The Commission should use the collected funds to increase access to renewable distributed generation in disadvantaged communities, as is required by statute.[170] While the exemption for CARE customers from the GBC will ensure near-parity in compensation between

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[166] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

[167] See D.21-02-007, p. 46: "(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."

[168] See D.21-02-007, p. 46: "(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."

[169] See D.21-02-007, p. 46: "(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."

[170] See Pub. Util. Code § 2827.1(b)(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."

CARE and non-CARE customers, residents of DACs face unique barriers that will not be overcome without more targeted alternatives.

Senate Bill 350 commissioned a study to identify these barriers. The study identified the following challenges ("SB 350 Barriers"):[171]

A) Low home ownership rates

B) Complex needs, ownership, and financial arrangements for low-income multifamily housing

C) Insufficient access to capital

D) Building age

E) Remote or underserved communities

The National Renewable Energy Laboratory (NREL) has identified increased up-front incentives as a means to address the issue of insufficient access to capital.[172] Establishing an Equity Charge could provide these upfront incentives to lower income customers.

Prior to imposing the Equity Charge, the Commission should identify the mechanism for targeting these collected funds to directly provide the benefit of increasing solar adoption by lower income customers. Table 7 compares the effectiveness of a variety of existing and possible Commission programs at addressing the identified SB 350 barriers. These include the Community Solar Green Tariff, the Disadvantaged Communities Green Tariff (DAC-GT), the Disadvantaged Communities - Single-family Solar Home (DAC-SASH), the Self Generation Incentive Program (SGIP) equity budget, Solar on Multifamily Affordable Housing (SOMAH), and an increased CARE and FERA discount in DACs.

[171] SB 350 Barriers Study, p. 2.

[172] "The impact of policies and business models on income equity in rooftop solar adoption." O'Shaughnessy et al., 2020. Published in *Nature Energy*.

Table 7. Clean energy program options for increasing DAC access to distributed renewable energy.

Barrier	DAC-SASH[173]	SGIP Equity Fund[174]	CSGT/DAC-GT	SOMAH	Increased CARE/FERA Discount
Low home ownership rates	N	Y	Y	Y	Y
Complex needs, ownership, and financial arrangements for low-income multifamily housing	N	Y	Y	Y	Y
Insufficient access to capital	Y	Y	Y	Y	Y
Building age	N	Y	Y	Y	Y
Remote or underserved communities	Y	Y	Y	Y	Y
Total Barriers Addressed (out of 5)	**2**	**5**	**5**	**5**	**5**

Table 7 demonstrates that there are several existing programs which may increase adoption of distributed renewables in DACs: DAC-GT, Community Solar Green Tariff program, the SGIP Equity Budget, SOMAH, and an increased CARE/FERA discount. As explained below, the programs that are most likely to successfully increase successor tariff adoption in DACs based on the criteria above are DAC-GT and the SGIP Equity Fund.

i. DAC-GT builds mid-size solar arrays in DACs and allows nearby DAC residents to sign up for a portion of the array's generation capacity for a 20% discount on their electrical bills. Costs for energy from these arrays are capped,[175] and all benefits from these projects go to CARE customers in DACs.[176]

[173] DAC-SASH provides no-cost solar to low-income homeowners in DACs.

[174] SGIP provides incentives for behind the meter storage and other distributed energy systems.

[175] Resolution E-4999, p. 66: "PG&E, SCE, and SDG&E shall include a cost containment mechanism for the DAC-GT program in their RFO solicitation documents that is 200% of the maximum executed contract price in the previous Renewable Auction Mechanism's as-available peaking category or the previous Green Tariff, whichever is higher."

[176] See: https://www.cpuc.ca.gov/SolarInDACs/.

The IOUs have demonstrated the ability to quickly sign customers on for DAC-GT discounts: PG&E, for example, was ordered to auto-enroll customers into their DAC-GT program using existing qualifying solar capacity until new DAC-GT facilities come online. PG&E automatically enrolled 10,255 customers by the end of 2020.[177] Customers with the highest need can be enrolled automatically.

CARE ratepayer arrearages increased by $324 million between February and December 2020, in large part due to the COVID-19 pandemic.[178] These residents and other CARE and FERA customers can be served by qualifying solar capacity until new facilities come online, quickly bringing the benefits of new distributed renewables to DACs while meeting immediate needs with interim capacity.

ii. The SGIP Equity Fund provides incentives for behind the meter battery storage for qualifying customers. These funds can cover up to 85% of the cost of a residential storage system. There are several eligibility criteria, some of which allow participation by low-income ratepayers outside of DACs:[179] the SGIP equity fund can be accessed by renters in low-income housing.[180]

The SGIP Equity Budget is currently waitlisted in PG&E and The Center for Sustainable Energy's programs. However, SCE and SoCalGas have available incentives to their customers.[181]

The other program options also could provide some benefits, but also have limitations:

iii. SOMAH provides funding for solar on multifamily affordable housing, and also addresses the SB 350 Barriers. SOMAH currently receives up to $100 million per year.[182] After an initial rush of applications the program has spare funding and no waitlists in any of the IOU

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[177] Quarterly Disadvantaged Communities Green Tariff and Semi-Annual Solar Green Tariff Programs Report of PG&E for Period October-December 2020, p. 1.

[178] Order Instituting Rulemaking to Address Energy Utility Customer Bill Debt Accumulated During the COVID-19 Pandemic, Proposed Decision.

[179] D.19-09-027 qualifies all California Indian Country as DACs for the purposes of the SGIP equity budget. Appendix A, p. A1.

[180] D.19-09-027, p. 17.

[181] See: https://www.selfgenca.com/home/program_metrics/. Accessed March 1, 2021.

[182] See: https://calsomah.org/about.

service territories.[183] It does not need additional funding, because funding is not a limiting factor at this time.

iv. The Community Solar Green Tariff program, under which a utility partners with a local nonprofit or governmental organization to sign up CARE and non-CARE DAC residents for a 20% bill discount and subscription to the output of a local mid-size solar array, addresses each of the SB 350 barriers. However, program implementation has been delayed to the point that it is difficult to assess its effectiveness. No projects are online.

v. Increasing the CARE and FERA Discount for DAC residents may be the simplest to implement but it does not meet the mandate to "include specific alternatives designed for ['customer-sited renewable distributed generation'] growth among residential customers in disadvantaged communities." This option would give access to the financial benefits of distributed generation but would not ensure DER growth specifically in DACs.

vi. DAC-SASH could be used to provide up-front incentives to low-income residents of DACs. DAC-SASH, which provides residential solar to CARE homeowners in DACs, currently provides an incentive of $3 per watt and receives $10 million per year in funding.[184] According to the program administrator, the average installation is 3.7 kW and costs $5.14/W, for a total average cost of $19,000 per installation.[185] The program does not increase access for renters, which is a significant drawback.

Section 1 of this Proposal demonstrates that the Equity Charge aligns with numerous statutes. In particular, the Equity Charge aligns with the Commission's guiding principles to "ensure equity among customers,"[186] "maximize the value of customer-sited renewable generation to all customers and to the electrical system,"[187] "be coordinated with the Commission

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[183] See: https://calsomah.org/waitlist. Accessed March 1, 2021.

[184] D.18-06-027 p. A-5.

[185] July 2020 DAC-SASH Semi-Annual Progress report, p. 12.

[186] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

[187] See D.21-02-007, p. 46: "(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 California's energy policies,"[188] and "be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[189]

IV. TERMS OF SERVICE AND BILLING RULES: NET BILLING WITH NO NETTING PERIOD, MONTHLY ROLL OVER, AND ANNUAL TRUE-UP

The Commission should adopt net billing with instantaneous netting and allow excess bill credits to roll over to the next billing cycle until an annual true-up. Rate tariffs are subject to changes depending on conditions such as changes in underlying system costs, Commission rate design policies and other policy goals, impacts on ratepayers, and the existence of other tariff offerings. As is the standard practice for most tariffs, successor tariff participants should be allowed service on the tariff for as long as the Commission authorizes the IOUs to provide the tariff and until it orders them to close the tariff and shift participants onto other tariffs.

The successor tariff should employ instantaneous netting, meaning that only on-site generation that occurs simultaneously with consumption will be compensated at the full retail rate. Under instantaneous netting, retail rates for consumption will be billed based on a customer's *net consumption* (metered consumption net of on-site generation in real time), and customers will not be allowed to credit any net exports[190] against net consumption that occurs at a different time (even within a time interval such as 1 hour or 15 minutes). Allowing any direct netting of exports against consumption at other times is not cost-based and will lead to compensation of exports above their avoided costs value, which will increase costs to non-participating ratepayers. Since the IOUs' advance metering infrastructure already tracks *net consumption* on one channel (Channel 1) and *net exports* on another channel (Channel 2), this policy simply means there should be no netting of Channel 2 meter readings against Channel 1 meter readings.

Any excess bill credits that successor tariff participants generate should be trued up at the end of the calendar year at wholesale energy market prices, consistent with the current NEM 2.0

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[188] See D. 21-02-007, p. 46: "(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."

[189] See D. 21-02-007, p. 46: "(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."

[190] Net exports occur at any point in real time when a customer's on-site generation exceeds their consumption, resulting in net exports (kWh) to the grid.

annual true-up process. This will prevent customers from oversizing their systems beyond their annual usage and carrying forward credits beyond a single year, which would blunt their time-varying and other marginal cost price signals the following year.

At the end of each billing cycle, the utility should calculate the total value of net export credits accrued by individual rate component and apply the credits to the same rate components of the customer's bill. For instance, if a customer accrues $20 in monthly transmission net export credits, they can only be applied to the transmission component of their bill. This will maintain consistency with the Commission' guidance that rates should reflect cost causation principles.[191] Customers should still be allowed to carry credits forward on a month-to-month basis until the annual true-up. This will maintain some consistency with the previous NEM structure and allow for simpler calculations of annual bill savings and payback periods.

Section 1 of this Proposal demonstrates that these billing rules are aligned with numerous statutes. Furthermore, these billing rules are aligned with the proceeding's guiding principles to "ensure equity among customers,"[192] "maximize the value of customer-sited renewable generation to all customers and to the electrical system,"[193] "be coordinated with the Commission and California's energy policies,"[194] and "be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[195]

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[191] D.15-07-001, p. 28.

[192] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

[193] See D.21-02-007, p. 46: "(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."

[194] See D.21-02-007, p. 46: "(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."

[195] See D.21-02-007, p. 46: "(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."

V. INTEGRATING ENERGY STORAGE: INCENTING NEM 1.0 AND 2.0 TO TRANSITION TO SUCCESSOR TARIFF

Section 2 of this Proposal discusses how NEM predominately encourages standalone rooftop solar,[196] which does not maximize grid benefits. Only 6% of NEM systems interconnected in 2019 were paired with energy storage.[197]

The successor tariff should be designed to encourage paired storage systems. Without paired storage, increased renewable energy from solar will ultimately have minimal or negative value as the generation added does not align with system needs.[198] The Whitepaper explains the benefits of paired storage as the "value that battery storage can provide by shifting solar generation from the lower-value midday hours to the higher-value evening hours."[199] The most recent report on SGIP also demonstrates paired storage can maximize the benefits of BTM generation by allowing generated energy to be used at times when it is more valuable to the grid, reducing peak grid demand and GHG emissions.[200] If storage is dispatched to maximize grid benefits, it also has the potential to increase resiliency, support reliability during periods of system and local peak demand, and improve customer bill savings.[201]

Statutory mandates also require that the Commission establish transition periods, allowing NEM customers to remain on their current NEM tariff for a period of time to set "a reasonable expected payback period based on the year the customer initially took service under the tariff."[202] D.14-03-041 established a 20-year transition period, beginning when the system

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[196] "More than 90% of all megawatts (MW) of customer-sited solar capacity interconnected to the grid in the three large investor-owned (IOU) territories (PG&E, SCE, and SDG&E) in California are on NEM tariffs." See: https://www.cpuc.ca.gov/NEM/.

[197] Lookback Study, p. 27. Figure 3-4.

[198] See the growing annual rates of energy curtailment by CAISO: http://www.caiso.com/informed/Pages/ManagingOversupply.aspx.

[199] Whitepaper p. 11.

[200] ITRON, 2018 SGIP Advanced Energy Storage Impact Evaluation (January 29, 2020), p. 1-10. See https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/Customer_Gen_and_Storage/SGIP%20Advanced%20Energy%20Storage%20Impact%20Evaluation.pdf.

[201] 2018 SGIP Advanced Energy Storage Impact Evaluation, p. 4-14.

[202] Public Utilities Code § 2827.1(b)(6).

was interconnected for NEM 1.0 customers.[203] D.16-01-044 established a 20-year transition period for NEM 2.0 customers.[204] Section 2 of this Proposal demonstrates that because the current NEM tariff is based on the full retail rate, the current payback period is an unreasonably short three to eight years,[205] and that the overcompensation to NEM 1.0 and 2.0 customers is creating an unsustainable cost burden. In addition, more than 70% of NEM systems have been installed since 2015, meaning the majority of systems still have 15 years of overcompensation from NEM, further driving the cost burden well into the future.[206]

To create the reasonable payback periods required by statute, the Commission should incent existing NEM customers to switch over to the reformed successor tariff by offering rebates on paired storage systems. These rebates will generously compensate customers to switch to the new tariff with BTM systems that enhance grid benefits compared to stand-alone rooftop solar. Existing NEM customers, whether or not they have opted to receive this incentive, should be required to take service on the reformed successor tariff at the end of 5 years. Currently, customers taking service on NEM 1.0 and 2.0 either have already paid off their systems with their utility bill savings, or they can do so in three to eight years.[207] Requiring existing customers to transition to the successor tariff after five years is reasonable because the majority of these systems would have paid for themselves at that time. Additionally, the successor tariff would continue to provide meaningful bill savings to customers with onsite generation.

The Commission should reduce storage rebate offerings in a stepwise fashion over a 5-year period. NEM 1.0 customers should receive a 10% reduction in rebate level relative to NEM 2.0 customers, as they have received more years of payback for their BTM system. Any NEM 1.0 customer who interconnected their system before 2006 should be ineligible for the

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[203] *Decision Establishing a Transition Period Pursuant to Assembly Bill 327 for Customers Enrolled in Net Energy Metering Tariffs*, D.14-03-041 (March 27, 2014), p. 2.

[204] D.16-01-044, p. 100.

[205] A NEM 2.0 system can on average pay for itself in only three years for SDG&E customers, five years for PG&E customers, and eight years for SCE customers. Cal Advocates data requests IOUs: PGE-4, SDGE-5, SCE-6. *See,* Appendix C of this document.

[206] Lookback Study, p. 24.

[207] A NEM 2.0 system can on average pay for itself in only three years for SDG&E customers, five years for PG&E customers, and eight years for SCE customers. Cal Advocates data requests IOUs: PGE-4, SDGE-5, SCE-6. *See,* Appendix C of this document.

storage rebates, as the remaining amount of cost burden they will create is less than the cost of the proposed rebate.

For the first two years of this transition period, the Commission should offer NEM 2.0 customers a $3,200 rebate for the price of purchasing a paired storage system.[208],[209] This rebate amount is commensurate with the average incentives SGIP provided general market residential customers to encourage storage interconnected in 2020.[210] The Commission should offer NEM 1.0 customers a $2,880 rebate, which is 10% less than the rebate for NEM 2.0 customers. The two-year offering should help avoid customers rushing to receive the incentive within the first year of this program. For the remaining three years, the Commission should drop the rebate level by 10% each year. To ensure CARE and FERA-eligible customers are equitably compensated for their transition to the new successor tariff, these customers should receive the full $3,200 rebate if they switch at any point over the 5-year window.

These rebated storage systems should be dispatchable by the IOUs in order to maximize grid benefits. The most recent report on SGIP notes that with current retail rates, the incentives for customers to "minimize bills are not well aligned with the goals of minimizing GHG emissions."[211] But, the report states that it is possible to "significantly reduce GHG emissions without a material impact on customer bills."[212] Not only does dispatchability lower GHG emissions and peak demands, it also can ensure that instead of pulling energy from the grid

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[208] These figures are based off the price of a $7,500 residential storage system. "Solar batteries range from $5,000 to $7,000+." See: https://www.energysage.com/solar/solar-energy-storage/what-do-solar-batteries-cost/.

[209] It is important to note that the cost of storage is projected to drop significantly in coming years. IRENA, Electricity Storage and Renewables: Costs and Markets to 2030, p. 18. https://www.irena.org/publications/2017/Oct/Electricity-storage-and-renewables-costs-and-markets.

[210] In 2020, the average incentive for residential general market customers to purchase and install storage through SGIP was $3,172.80. See "Real-Time Public Report," accessed March 5, 2021: https://www.selfgenca.com/home/resources/.

[211] 2018 SGIP Advanced Energy Storage Impact Evaluation, p. 1-10.

[212] 2018 SGIP Advanced Energy Storage Impact Evaluation, p. 1-10.

immediately before a storm or power shutoff event, customers export energy when it most enhances grid resiliency.

After the 5-year period, all remaining NEM 1.0 and 2.0 customers should be automatically transitioned to the successor tariff in order to align NEM compensation with state climate and equity goals and applicable statutes.

The cost recovery for these rebates should be amortized over multiple years to avoid an immediate growth in the NEM cost burden. The funding could be collected through distribution charges over multiple years, ensuring participants are unable to bypass the charges and pay their fair share.

Transitioning existing NEM customers to the reformed successor tariff within 5 years, while offering them storage incentives to transition sooner, can reduce the cost burden by $26.06 billion from a total of 45.4 billion over all remaining years of their current 20-year transition period status. Limiting NEM tariff reform to new participants in the successor tariff would only reduce the costs burden by $1.52 billion annually.

Section 1 of this Proposal demonstrates that this storage incentive for transition is aligned with numerous statutes. Furthermore, this storage incentive for transition is aligned with the proceeding's guiding principles to "ensure equity among customers,"[213] "maximize the value of customer-sited renewable generation to all customers and to the electrical system,"[214] "be coordinated with the Commission and California's energy policies,"[215] and "be transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[216]

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[213] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

[214] See D.21-02-007, p. 46: "(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."

[215] See D.21-02-007, p. 46: "(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."

[216] See D.21-02-007, p. 46: "(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."

VI. THE COMMISSION CAN LEGALY TRANSITION NEM 1.0 AND 2.0 CUSTOMERS TO THE SUCCESSOR TARIFF.

The Commission has both the authority and obligation to ensure the NEM 1.0 and NEM 2.0 customers transition to the new successor tariff. The Commission should use its authority to remediate the immense cost burden that ratepayers are currently paying due to NEM 1.0 and 2.0 legacy customers. Limiting NEM tariff reform to new participants in the successor tariff would only reduce the cost burden by $1.52 billion annually, compared to the total $45.4 billion cost burden created by NEM customers over the remainder of their current 20-year transition periods. As explained in Section 4.I of this Proposal, the Commission has wide discretion including the authority to alter previous decisions and thus revoke the legacy period granted to NEM 1.0 and 2.0 customers. Decision 16-10-044 creates a legacy period for NEM 2.0 customers to stay on the NEM 2.0 export rate for 20 years from the original year the customer's system was interconnected.[217] However, this language is not required by statute and the Commission has the authority to modify prior decisions with new decision language.[218]

The solar installation industry recognizes the Commission's ability to alter the NEM structures. The Solar installer's contract language and the IOUs' NEM interconnection agreements[219] explicitly advises customers that the IOU or the solar installer is not responsible

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[217] NEM 2.0 Decision 16-01-044 OP 15 "In order to promote fairness in the treatment of customers under the existing NEM tariff and customers under the NEM successor tariff established by this decision, any customer that switches from the existing NEM tariff to the NEM successor tariff pursuant to Ordering Paragraph 2 of D.14-03-041 should be able to use the NEM successor tariff until the expiration of 20 years from the original year of interconnection of the customer's system."

[218] D.18-03-012, March 5, 2018, p 9.

[219] PG&E Agreement and Customer Authorization Net Energy Metering (NEM2) Interconnection for Solar And/Or Wind Electric Generating Facilities of 30 Kilowatts or Less with Energy Storage of 10 Kilowatts or Less, p. 6, "This Agreement shall at all times be subject to such changes or modification by the CPUC as said Commission may, from time to time, direct in the exercise of its jurisdiction." https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/interconnection-renewables/Form_79-1151A-02.pdf

SCE NEM Solar and Wind Generating Facility 10 Kilowatt or Less Interconnection Agreement, p. 4. "This Agreement shall at all times be subject to such changes or modifications by the Commission as the Commission may, from time to time, direct in the exercise of its jurisdiction." https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/forms/interconnection-agreements/ELECTRIC_FORMS_14-923.pdf

SDG&E Interconnection Application and Agreement for Customers with Solar and/or Wind Electric Generating Facilities of 30 kilowatts or less, and for Customers Installing Energy Storage Paired with Such Generating Facilities "This Agreement shall at all times be subject to such changes or modification

for any changes in the tariff during the course of the customer's contract if the Commission chooses to execute its authority to do so. For example,[220] Tesla's pro forma contract states:

> At the time of installation, your local utility WILL credit you for excess energy your System generates. The rules applying to such credit are set by your jurisdiction. Your utility offers a net energy metering policy as required under state statute or as regulated by a public utility commission. Changes in net energy metering policy or utility rate structures during the life of the system may result in lower utility bill savings than estimated or none at all; Tesla Energy will not be responsible for reassessing[221]

Given the Commission's authority to change the tariff language and the requirement of contracts to be in alignment with Commission authority, the Commission faces no legal impediments to transitioning NEM 1.0 and NEM 2.0 customers to the successor tariff.

VII. OTHER LEGAL ISSUES ASSOCIATED WITH THIS PROPOSAL

Section 4 of this Proposal discusses the legality of Cal Advocates' policy proposals. Section 3 explains how these policy proposals will help the Commission achieve state climate and equity goals, and it details how each proposal is aligned with statutory mandates and guiding principles.

Specifically, this Proposal will create a successor tariff that fosters sustainable growth[222] in a way that equitably benefits all ratepayers while promoting a balance of BTM generation and other renewable generation to help reach our climate goals. Included in the proposed decision's holistic definition of "sustainable growth" is the goal that the solar industry continue to grow sustainably, in a way that is not harming non-participating customers. The policies proposed

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by the Public Utilities Commission of the State of California as said Commission may, from time to time, direct in the exercise of its jurisdiction." https://www.sdge.com/sites/default/files/ELEC_ELEC-SF_142-02774.pdf

[220] Sunrun Solar Energy System Disclosure Document, p. 4 "You agree to take the NEM Service currently in effect for this Utility or, in the event that the NEM Service is no longer in effect, you agree to use a substitute metering program as chosen by Sunrun in its sole discretion."

[221] Tesla Solar Purchase Disclosure v. 2021, p. 2.

[222] Cal Advocates agrees with the Commission's definition of "sustainable growth" in its proposed decision on guiding principles, Conclusion of Law 7, p. 36: "The Commission should not focus the definition of sustainable growth in a narrow manner but, rather, interpret sustainable growth to mean growth whereby all customers can sustain the cost of that growth." See: *Proposed Decision Adopting Guiding Principles for the Development of the Successor to the Current Net Energy Metering Tariff,* R.20-08-020 (January 5, 2021), p. 10. However, the Commission removed this definition in the final decision to give parties flexibility to determine their own definition.

continue to incent the adoption of BTM generation including rooftop solar, and in fact include new incentives for storage, but the growth of the solar industry is also ensured through the California Solar Mandate and lower income programs, as described below.

A. The Continued Growth of Solar Industry Would be Ensured.

1. The California Solar Mandate guarantees growth for the California solar industry.

Title 24, section 6 of the California Energy Code, also known as the California Solar Mandate requires solar panels on all newly constructed residential buildings up to three stories,[223] guaranteeing a steady customer stream for the solar industry. This mandate drives 74,000[224] to 100,000[225] solar installations, and 444 to 600 MW[226] of residential rooftop capacity each year. Approximately 143,000 homes installed rooftop solar in 2019,[227] so the mandate could drive up to 70% growth[228] in the number of solar rooftops in California. With this mandate, the solar industry in California will see significant guaranteed sales over the coming years, ensuring sustainable growth in solar penetration regardless of how the Commission choses to reform the NEM tariff.

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[223] California Energy Code, Title 24 Part 6.

[224] E3's report to the California Energy Commission estimated 74,000 units per year, but only includes single-family homes, thus underestimating the total number of qualifying units. Measure Proposal Rooftop Solar PV Systems from the California Energy Commission's Title 24, Part 6, Building Energy Efficiency Standards Rulemaking, p. 48.

[225] The Federal Reserve Bank of St Louis indicates that 109,800 units were approved for construction in 2019 in California. It does not allow users to identify how many units are in buildings with four or more stories, thus providing an upper bound of around 100,000 qualifying units. 2019 was chosen as the reference year because the COVID-19 Pandemic may make 2020 non-representative of the norm. "New Private Housing Units Authorized by Building Permits for California." Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/CABPPRIVSA#0.

[226] DGStats indicates that the average solar installation in 2019 was approximately 6 kW. 74,000 * 6kW = 444 MW. 100,000 * 6kW = 600 MW. https://www.californiadgstats.ca.gov/

[227] Distributed Generation Stats. https://www.californiadgstats.ca.gov/. 2019 was chosen as the comparison year because 2020 may not be a valid comparison due to economic disruption by the COVID-19 pandemic.

[228] Assuming that most of the 143,000 installations in 2019 were not on newly constructed homes, the 100,000 annual installations will increase the number of annual BTM residential solar installations by 70%.

2. The proposed policies will not cause financial hardship on the solar industry.

The current high NEM export rates were created when the rooftop solar industry was nascent and California policymakers wanted to subsidize solar adoption to transform the industry. Today California leads the nation with the highest percentage of the state's electricity generated from solar at 22.27%.[229] When there were few customers with solar, the costs to non-participants were negligible. With the successful transformation of the industry, the Commission should update NEM to ensure the achievement of California's equity and environmental goals. The decline of costs associated with solar due to innovation and efficiency allows for the new NEM export rate to decrease without causing undue financial hardship to the solar industry.

Since the NEM tariff's original design, the cost of solar has decreased drastically and is expected to continue to decline, which will continue to promote installation rates and solar industry revenues. From 2009 to 2019 the cost of solar has decreased by more than 60% (from $8/W to $3/W).[230] This impressive reduction in costs can be heavily attributed to the declining cost of the solar panels and inverters. The cost of solar panels decreased from $10/W in 1980 to $2/W in 2010, an 80% decrease over 30 years. An additional 50% decrease from 2015 to 2019 contributed to the current price of $0.35/W.[231] More recently, adjusting for inflation, residential photo-voltaic system costs have decreased by $0.06/W from Q1 2019 to Q1 2020.[232] The costs of solar are expected to decrease gradually into the future.[233]

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[229] SEIA, "California Solar", https://www.seia.org/state-solar-policy/california-solar. This number is not specified to be exclusive of solely rooftop solar, and NREL Q4 2019/Q1 2020 Solar Industry Update, slide 22 https://www.nrel.gov/docs/fy20osti/77010.pdf. In 2019 California had the highest penetration at almost 20% of generation.

[230] Energy Sage, How have the solar equipment costs declined over time? https://news.energysage.com/how-have-solar-equipment-costs-declined-over-time/.

[231] Energy Sage, How have the solar equipment costs declined over time? https://news.energysage.com/how-have-solar-equipment-costs-declined-over-time/.

[232] NREL US Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020, p. v. https://www.nrel.gov/docs/fy21osti/77324.pdf.

[233] Tracking the Sun: Pricing and Design Trends for Distributed PV Systems in the US – 2019 Edition, pp. 18-19. https://emp.lbl.gov/publications/tracking-sun-pricing-and-design The installed price of solar declined sharply from 2009-2014 due to module price decrease, with a gradual decline in cost continuing. The decline in price has been dampened by higher customer acquisition costs as early adopters are converted, and by a greater emphasis on profitability by large installation firms.

Meanwhile, decreasing technology costs coupled with "value-stacking" policies, under which a NEM participant can receive compensation for providing grid benefits, allow the solar industry to maintain lucrative economics despite the lowering or fluctuation of NEM export compensation rates.[234] In addition to these new opportunities, the Federal Investment Tax Credit (ITC) was recently extended,[235] increasing the value-proposition of solar installation by further shortening the potential pay-back period.

3. Commission approved lower income solar adoption programs guarantees growth for the California solar industry going forward.

Section 3.II.B describes the numerous Commission programs currently incenting the adoption of rooftop solar and paired storage on lower income housing.

This proposal ensures the successor tariff is aligned with all statutory requirements including ensuring that the solar industry continues to grow sustainably, in a way that does not unreasonably burden non-participating customers.

[234] For example, the recent adoption of the Partnership Pilot in decision (D.)21-02-006 of the IDER Proceeding allows for BTM generation resources under the NEM Tariff to be considered "fully incremental for the purposes of all DIDF procurement mechanisms… if the distributed energy resources provider makes a material enhancement to provide the utility-solicited deferral services."[234] This decision allows NEM customers who fit the specified technology criteria to be compensated for providing grid services on an individual basis, providing direct valuation for a BTM generation system's contribution to deferring grid upgrades. SEIA/Wood Mackenzie Power and Renewables. *US Solar Market Insight 2020 Q4*. Accessed February 22, 2021. Available at https://www.seia.org/solar-industry-research-data.

[235] See: https://www.energysage.com/solar/cost-benefit/solar-investment-tax-credit/

4 JUSTIFICATIONS FOR POLICY PROPOSALS

I. THE POLICIES ALIGN WITH STATUTORY MANDATES AND GUIDING PRINCIPLES

Cal Advocates' proposals are properly submitted to this proceeding record to assist the Commission in developing the formal record for the successor tariff rulemaking. Cal Advocates' analysis and Proposal support modifications to the current NEM tariff that will provide fair and equitable rates for non-participants. Proposals such as changing the compensation structure of the NEM program, adopting a Grid Benefits Charge and an Equity Charge, changing billing rules, altering the system payback period, and incentivizing storage, are based on the currently known facts and circumstances of NEM policy and appropriately added to this record.

Pursuant to Public Utilities Code Section 451, all rules affecting or pertaining to a public utility's charges or service to the public shall be just and reasonable.[236] Consistent with this code section, the Commission's NEM policy has developed over time. Information about the policy impacting just and reasonable rates has evolved. Beginning in 1995, SB 656 required that utilities provide a standard net energy metering tariff that compensates customers for self-generated electricity fed back to the grid. Since 1995, NEM policy has evolved based on various legislative mandates and Commission regulatory processes implementing these mandates.[237]

Each new NEM policy development has necessitated a new formal Commission proceeding, the development of a new record, and the adoption of a new decision to ensure that the Commission satisfies due process principles and ensures just and reasonable rates.[238]

The Commission has great discretion to improve the NEM tariff and adopt new policies and is not bound by its prior determinations if facts or circumstances warrant different outcomes.[239] The Commission's decision must be supported by the record and findings of fact. However, absent an abuse of its discretion or lack of substantial support, there is a strong

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[236] Public Utilities Code Section 451.

[237] NEM has expanded technology eligibility and increased the NEM program cap. *See,* AB 1755 (Keeley, Olberg, and Takasugi, 1998); SB 1 (Murry 2006).

[238] "In determining what is "just" and "reasonable," [the CPUC] often look[s] to whether a utility's conduct was reasonable in light of facts and circumstances that were known or should have been known at the time." D. 14-02-046, Feb. 27, 2014. (2014 Cal. PUC LEXIS 114 (Cal. P.U.C. February 27, 2014).

[239] D.18-03-012, March 5, 2018, p 9. *See*, e.g., *Postal Telegraph-Cable Company v. Railroad Commission* (1925) 197 Cal. 426, 436-437; *Folsom Estate Unit No. 2B & 3 Homeowners Association v. Citizens Utilities Company of California* [D.93-12-051] (1993) 52 Cal.P.U.C.2d 677, 679.

presumption in favor of upholding the Commission's decision.[240] In this case, there is substantial record support to justify reforms.

This Proposal is appropriate for further discussion and party comment as the Commission continues to develop the successor tariff. Over the course of this proceeding, the Commission will evaluate the record developed in this proceeding, consider and apply new facts and circumstances, and develop a just and reasonable Decision for the successor tariff.

Section 1 of this Proposal demonstrates these proposed policies are aligned with numerous statutes, as this Proposal is based on the benefits of BTM renewable electrical generation,[241] participants are given just and reasonable rates,[242] and its benefits approximately equal the costs for all NEM participants and non-participants.[243] This Proposal would also ensure the cost burden does not grow to a point where rates are unreasonably high for non-participants,[244] which ensures BTM adoption can continue growing sustainably.[245] This Proposal includes specific alternatives to grow BTM adoption for customers in disadvantaged communities[246] and ensure NEM 1.0 and 2.0 customers receive a reasonable payback period.[247]

Furthermore, Section 3 demonstrates this Proposal is aligned with the proceeding's guiding principles including "comply[ing] with the statutory requirements of Public Utilities Code Section 2827.1,"[248] "fairly consider[ing] all technologies,"[249] "ensur[ing] equity among customers,"[250] "maximiz[ing] the value of customer-sited renewable generation to all customers

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[240] *PG&E v. Public Utilities Commission* (2015) 237 Cal. App. 4th 812, 838.

[241] Public Utilities Code § 2827.1(b)(3).

[242] Public Utilities Code § 2827.1(b)(7).

[243] Public Utilities Code § 2827.1(b)(4).

[244] See Pub. Util. Code § 451.

[245] Public Utilities Code § 2827.1(b)(1).

[246] Public Utilities Code § 2827.1(b)(1).

[247] Public Utilities Code § 2827.1(b)(6).

[248] See D. 21-02-007, p. 45 "(a) A successor to the net energy metering tariff should comply with the statutory requirements of Public Utilities Code Section 2827.1."

[249] See D. 21-02-007, p. 45 "(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."

[250] See D.21-02-007, p. 45 "(b) A successor to the net energy metering tariff should ensure equity among customers."

and to the electrical system,"[251] "be[ing] coordinated with the Commission and California's energy policies,"[252] and "be[ing] transparent and understandable to all customers and should be uniform, to the extent possible, across all utilities."[253]

II. THIS PROPOSAL WOULD REDUCE THE COST BURDEN

Section 1 of this Proposal demonstrates that it would substantially lower the cost burden on non-participating customers by creating a successor tariff that is aligned with state equity and climate goals. In summary, this Proposal would lower the total annual cost burden of the successor tariff by $1.52 billion per year in 2021 dollars by 2030 compared to a continuation of the current NEM 2.0 rate structure (business as usual). In addition, this Proposal would reduce the total net present value of the cost burden of all NEM 1.0 and 2.0 customers by $26.06 billion in 2021 dollars over all remaining years of their transition period status, creating significant savings for ratepayers and helping to alleviate the unsustainable upward pressure on electric rates.

Reforming NEM through the combined changes in this Proposal would save customers between $180 and $235 each year by 2030.

With all of these reforms, participating residential customers would still receive generous average payback periods on their investments of 12-14 years.

III. THIS PROPOSAL SHOULD ADDRESS COST-EFFECTIVENESS

The Commission should impose standard assumptions for the TRC and RIM throughout the course of this proceeding and test each party's proposal with these uniformities.[254] In order to ensure that the successor tariff is aligned with decision language, the Commission is required to take into account the RIM test, in considering parties' proposals.[255] The TRC test does not

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[251] See D.21-02-007, p. 46: "(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."

[252] See D.21-02-007, p. 46: "(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."

[253] See D.21-02-007, p. 46: "(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."

[254] Cal Advocates intends to provide cost effectiveness scores for our policy proposals in Testimony.

[255] D.19-05-019 Ordering Paragraph 2

capture alterations in tariff design nor does it address equity concerns. In accordance with the statute, it is required that the successor tariff be based on the costs and benefits of the renewable electrical generation facility.[256] Furthermore, the Commission's guiding principles for this proceeding set forth that a successor tariff should ensure equity among customers.[257]

The TRC test by design cannot account for equity as it does not account for any costs passed on to customers who do not participate in NEM (non-participants). The TRC is designed to capture both the participant's (a customer with a NEM system installed) and the utility's costs of administering a program.[258] Instead of differentiation between "non-participants" and "participants," the TRC combines the two into a broader category of "ratepayers." Because of this generalization, any benefits to participants that come at the expense of non-participants is netted out of the test.[259] Because of this, the TRC does not capture any impact that the program will have specifically on non-participants, such as the cost burden associated with NEM.[260] The TRC is a summation of the participant cost test[261] and the RIM test, thus revenue/bill changes to customers caused by the program will be canceled out by incentives provided to the program.[262]

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https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M293/K833/293833387.PDF "Beginning on July 1, 2019, all Commission activities, including filings and submissions, requiring cost-effectiveness analysis of distributed energy resources, except where expressly prohibited by statute or Commission decision shall also review and consider the results of the Program Administrator Cost test and the Ratepayer Impact Measure test. Determinations shall include a discussion of the other tests."

[256] Public Utilities Code 2827.1 (b) (3).

[257] D.21-02-007, OP 1 Guiding Principle B: "A successor to the net energy metering tariff should ensure equity among customers."

[258] California Standard Practice Manual Economic Analysis of Demand Side Programs and Projects, (CA Standard Practice Manual) October 2001, p. 18.

[259] CA Standard Practice Manual, p. 21. "Since this test treats incentives paid to participants and revenue shifts as transfer payments *(from all ratepayers to participants through increased revenue requirements),* the test results are unaffected by the uncertainties of projected average rates, thus reducing the uncertainty of the test results" (emphasis added).

[260] CA Standard Practice Manual, p. 18.

[261] CA Standard Practice Manual, p. 8. The Participant Test (commonly referred to as the Participant Cost Test) measures the benefits and costs to a customer due to participation in a program. The benefits are the reduction in utility bill, incentives received, and tax credits. The costs are the out-of-pocket expenses incurred to participate in program, such as the costs of the PV system, loan, PPA ect. Cost of rooftop solar has declined and is expected to continue to decline, which will show improvements in the PCT.

[262] CA Standard Practice Manual, p. 18.

The benefits used to calculate the TRC are the avoided supply costs and reduction in transmission, distribution, generation, and capacity costs. The costs in the TRC test are the expenses to procure a resource (e.g. the market cost of solar panels). The costs used to calculate the TRC are paid by both the IOU and the participants, including the increase in supply costs for the periods in which load is increased (all equipment costs, installation, operation and maintenance, cost of removal [less salvage value], and administration costs, no matter who pays for them, are included in this test).[263] Thus the TRC value is not impacted by changes in rate design or the tariff value. Any variations in TRC value among parties' proposals for their successor tariff design is solely caused by the lack of uniformity in assumptions in the calculation going into the model that each party has chosen to use. Through the proceeding the Commission should test all party proposals with the same costs of solar panel, benefits (avoided costs), and other key assumptions to demonstrate that the TRC in unimpacted by tariff elements such as export rates and fixed charges.

The RIM test should be used to capture the consequences of the successor tariff on non-participants to ensure it is equitably designed. The RIM test looks at participants' bill savings and at the impact on non-participants relative to what costs would have occurred without the program. The California Standard Practice Manual states that the benefits calculated in the RIM test are the savings from the avoided supply costs (including the reduction in transmission, distribution, generation, and capacity costs for periods when load has been reduced and the increase in revenues for any periods in which load has been increased). The costs calculated in RIM test are the utility/program administrator program costs, the incentives paid to the participant, and "decreased revenues for any periods in which load has been decreased and increased supply costs for any periods when load has been increased." These costs include initial and annual costs, such as the cost of equipment, operation and maintenance, installation, program administration, and customer dropout and removal of equipment (less salvage value). The costs in the RIM test capture the decreased revenue of the IOU due to decreased load caused by bill savings (energy savings) by the program participants.[264]

[263] CA Standard Practice Manual, p. 18.

[264] CA Standard Practice Manual, p. 13.

This Proposal demonstrates that the cost burden is not aligned with numerous statutes or guiding principles. The RIM test is the only test to capture this cost burden for non-participants caused by NEM and therefore test for compliance with the guiding principle.[265] To adequately evaluate the trade-offs inherent in customer-sited generation, the Commission must evaluate the successor tariff with the RIM test, with the inclusion of onsite energy consumption, to ensure that "wealthier than average" participants do not benefit from onsite consumption at the cost of non-participants do not simply pay the cost.[266] Programs with RIM test scores closer to 1.0 show that the programs result in minimal cost burdens to non-participants. The lower the RIM test score, the higher the cost burden associated with the program.[267] The NEM 2.0 Tariff has a RIM test score of 0.37, indicating a cost burden to non-participants is occurring as a result of the NEM 2.0 program. Closing the cost burden and thus increasing the RIM test score to a value closer to 1 is necessary to ensure the successor program is equitable to ratepayers unable to participate in the successor tariff.

[265] CA Standard Practice Manual, p. 14.

[266] Borenstein, S. Can Net Metering Reform Fix the Rooftop Solar Cost burden? https://energyathaas.wordpress.com/2021/01/25/can-net-metering-reform-fix-the-rooftop-solar-cost-shift/.

[267] Lookback Study, p. 8. "RIM benefit-cost ratio less than 1.0 indicates the NEM 2.0 program will result in an increase in rates for all customers and an increase in bills for non-participating customers."

5 IMPLEMENTATION TIMELINE

The Commission should reform the existing NEM tariffs as quickly as possible, in the timeline specified below. The current limitations of the existing NEM tariff threaten the timely achievement of the state's climate and equity goals and must be addressed immediately.

While California should be leading the adoption of cost-effective, equitable DER policy, it currently lags behind states like Arizona,[268] Hawaii,[269] Indiana,[270] Michigan,[271] New York,[272] and North and South Carolina,[273] which have already engaged in NEM reform efforts.

The Commission should take the lead again by adopting a sustainable and equitable NEM tariff as quickly as possible. The Scoping Memo states that a proposed decision determining the major aspects for a successor tariff will be released no later than October 17, 2021, with a Commission decision at least a month afterwards. Cal Advocates' Proposal does not need multiple implementation phases, which could further delay NEM reform. Instead, the IOUs should file advice letters within 3 months to implement the proposed policy reforms. Through this process, the IOUs should be able to begin accepting new customers on the successor tariff by January 31, 2022.

NEM reform should be implemented quickly, as Section 3 of this Proposal details the strong DER industry and ensured growth for years to come through state mandates and incentive programs. A glidepath to the successor tariff should not span beyond January 31, 2025. If the Commission chooses to adopt our policy proposal incenting NEM 1.0 and 2.0 customers to

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[268] Arizona Corporation Commission, Decision No. 75859, Docket E-00000J-14-0023, In the matter of the Commission's Investigation of Value and Cost of Distributed Generation (January 3, 2017). See https://docket.images.azcc.gov/0000176114.pdf.

[269] Hawaii PUC Docket No. 2014-0192, Decision and Order No. 33258 (November 3, 2015). See https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A15J13B15422F90464.

[270] Indiana SB 309 (Signed May 2, 2017). See http://iga.in.gov/legislative/2017/bills/senate/309/.

[271] Michigan Public Service Commission, "Distributed Generation." See https://www.michigan.gov/mpsc/0,9535,7-395-93308_93325_93423_93502_94989-506586--,00.html.

[272] New York Department of Public Service, "The Value Stack." See https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources.

[273] Trabish, Herman, September 16, 2020. "Duke-solar Industry breakthrough settlement aims to end rooftop solar cost shift debates". https://www.utilitydive.com/news/duke-solar-industry-breakthrough-settlement-aims-to-end-rooftop-solar-cost/585124/ Accessed January 19, 2021.

transition to the successor tariff, all NEM 1.0 and 2.0 customers should be transitioned to the successor tariff by January 31, 2027.

6 CAL ADVOCATES' POLICY PROPOSAL COMPARISON TO WHITEPAPER

I. SIMILARITIES TO WHITEPAPER

This Proposal largely aligns with the Whitepaper. Cal Advocates agrees with the Whitepaper when it notes "the compensation given to participating NEM customers for load reductions and grid exports greatly exceeds the incremental benefits," and that "this misalignment leads to higher bills for non-NEM customers, as retail rates must increase to make up for the unrecovered utility costs."[274] Cal Advocates further agrees that to reform NEM, "compensation to customer-generators will need to be reduced," but in a way that aligns with statute.[275]

The Whitepaper and this Proposal offer largely similar policy components. Both recommend net billing at avoided cost to fairly and accurately compensate successor tariff participants.[276] Both also recommend GBCs[277] to ensure participating customers are paying their fair share for grid services, although Cal Advocates' levels are much lower. Lastly, both offer a glidepath for transitioning customers to the new successor tariff.[278]

II. DIVERGENCES FROM WHITEPAPER

Although the major policy components align, Cal Advocates disagrees with the Whitepaper's options for the length of a glidepath to a successor tariff. The Whitepaper models a 10-year glidepath, which misses the urgency to reform NEM, prolonging the harm to California's ability to attain its climate and equity goals. The Commission should require the IOUs to begin accepting successor tariff customers in January 2022, end any successor tariff glidepath by January 2025, and transition all NEM 1.0 and 2.0 customers to the successor tariff by January 2027.

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[274] Whitepaper, p. 8.

[275] Whitepaper, p. 10.

[276] Whitepaper, p. 16.

[277] Whitepaper pp. 20-21. Instead of using the term grid benefits charge (GBC), the Whitepaper uses the term grid access charge.

[278] Whitepaper pp. 26-32.

Unlike the Whitepaper, Cal Advocates' Proposal specifically incents BTM generation adoption in disadvantaged communities,[279] directly incents the adoption of paired storage,[280] and offers incentives to transition current NEM customers onto the successor tariff that also maximize grid benefits.

[279] The Whitepaper vaguely states "[t]he MTC can be calibrated for different geographic, income-based, or other populations depending on policy goals." Whitepaper, p. 17.

[280] The Whitepaper notes TOU demand charges can "also increase the value proposition of both demand response and energy storage."

APPENDIX A
LIST OF ACRONYMS

Acronym	Description
ACC	Avoided Cost Calculator
ALJ	Administrative Law Judge
AB	Assembly Bill
BTM	Behind the Meter
CAISO	California Independent System Operator
CARE	California Alternative Rates for Energy
CSGT	Community Solar Green Tariff
COS	Cost of service
D.	Decision
DACs	Disadvantaged Communities
DAC-GT	Disadvantaged Communities Green Tariff
DAC-SASH	Disadvantaged Communities - Single-family Solar Home
E3	Energy and Environmental Economics, Inc.
ECR	Exports compensation rates
EV	Electric vehicle
FERA	Family Electric Rate Assistance
GBC	Grid Benefits Charge
GHG	Greenhouse gas
GRC	General Rates Case
IDER	Integrated Distributed Energy Resource
IOUs	Investor-owned utilities
IRP	Integrated Resource Planning
ITC	Investment Tax Credit
kWh	Kilowatt-hour
NBCs	Non-bypassable charges
NEM	Net Energy Metering
PD	Proposed Decision
PG&E	Pacific Gas and Electric
PV	Photovoltaic

Acronym	Description
R.	Rulemaking
RIM	Ratepayer Impact Measure
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric
SGIP	Self-Generation Incentive Program
SMUD	Sacramento Municipal Utility District
SOMAH	Solar on Multifamily Affordable Housing
TRC	Total Resource Cost test

APPENDIX B
PROPOSALS FROM OTHER PARTIES THAT ALIGN WITH CAL ADVOCATES' GOALS

	Cal Advocates	NRDC	Coalition of California Utility Employees (CUE)	The Utility Reform Network (TURN)	California Wind Energy Association (CalWEA)
Net Billing	X	X	X	X	X
Grid Benefits Charge	X	X	X	X	X
Equity Charge	X	X			X
Storage Rebate for NEM 1.0 and 2.0 Transition	X	X			
Upfront Incentives	X	X	X	X	X

APPENDIX C
CARE/NEM ADOPTION RATES

See below for a summary of Cal Advocates Data Requests PGE-4, SCE-6, and SDGE-5 regarding the average payback period for NEM 2.0 customers.

Install Year	SDG&E Payback Period for NEM 2.0 Customers (years)	PG&E Payback Period for NEM 2.0 Customers (years)	SCE Payback Period for NEM 2.0 Customers (years)
2016	4.3		
2017	4.0	5	
2018	3.1	5	8
2019	3.1	5	8

See below for a summary of Cal Advocates Data Requests PGE-3, SCE-3, and SDGE-3.

Total CARE/NEM customers indicates customers who were enrolled in CARE and NEM in the identified year. 2009-2014 may be slight over-estimates, as the data from PG&E includes all customers who were *ever* receiving CARE subsidies and NEM tariffs at the same time.

Year	Total CARE/NEM Customers	Total CARE/NEM kW	Total kW installed, all customers	Total NEM customers
2009	3136	11,387	207250	47440
2010	4231	15,772	291990	64819
2011	6360	25,365	403140	88654
2012	9788	40,878	567300	122507
2013	15357	66,149	865380	181143
2014	26708	115,034	1323890	267344
2015	41746	188,400	2094660	408068
2016	63950	294,575	2921420	553482
2017	74577	344,916	3593070	666695
2018	84634	392,159	4346710	791533
2019	93871	438,036	5210980	934813
2020	103060	475,401	5968290	1059608