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BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Revisit Net Energy Metering Tariffs Pursuant to Decision D.16-01-044, and to Address Other Issues Related to Net Energy Metering.	Rulemaking 20-08-020 (Filed August 27, 2020)

THE PROTECT OUR COMMUNITIES FOUNDATION NET ENERGY METERING 3.0 TARIFF PROPOSALS A-E

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Pursuant to the February 8, 2021 the *Administrative Law Judge's Email Ruling Introducing White Paper, Noticing Workshop on White Paper, and Providing Instructions for Successor Proposals* ("Ruling"),[1] The Protect Our Communities Foundation ("PCF") provides NEM 3.0 tariff components in Proposals A-E.

I. INTRODUCTION

PCF offers the following proposals for use in creation of, and transition to, NEM 3.0.

List of Proposals: (each proposal should be used as a component of the NEM 3.0 tariff)

- Proposal A: "NEM 3.0 Community Storage" require the new NEM customer to pay a fee that will be used for community storage.
- Proposal B: "Minimum Generation" sets a minimum annual generation requirement for all new NEM installations.
- Proposal C: "NEM 2.0 Carve-Out for Low-Income Customers and Renters" details an equity as a needed component of the transition from NEM 2.0 to NEM 3.0 and sets a minimum equity threshold for the transition.

[1] R.20-08-020, *Administrative Law Judge's Email Ruling Introducing White Paper, Noticing Workshop on White Paper, and Providing Instructions for Successor Proposals* ("Ruling"), (February 8, 2021).

- Proposal D: "NEM 2.0 Community Solar, An Equitable Transition" sets out the most equitable transition pathway between NEM 2.0 and NEM 3.0 by level-setting NEM benefits across customer classes.

- Proposal E – "NEM 3.0 Time of Use Rates" revises the TOU rates such that they align with California energy policy and wholesale electricity prices.

II. PROPOSAL A: NEM 3.0 COMMUNITY STORAGE

To establish NEM conformance with Public Utilities Code § 2827.1(b)(4), the Commission must "[e]nsure that the total benefits of the standard contract or tariff to all customers and the electrical system are approximately equal to the total costs" as required by the Public Utilities Code.[2] The Commission hired Verdant Associates, LLC ("Verdant") to complete a NEM 2.0 Lookback Study ("Study"). The Study failed to include all benefits to the energy system or society making it difficult for parties to determine if the NEM tariff needs to include more costs or benefits to achieve a cost/benefit balance in comparison to NEM 2.0. Thus, to eliminate the possibility of skewing the proposal too far toward either costs or benefits, the Commission can calibrate PCF's Community Storage proposal, such that the Commission can either increase or decrease benefits to the electrical system.

The Community Storage proposal will add minimal costs for NEM customers while providing a large benefit to the electrical system. The proposal starts with recommended revisions to the cost and benefit analysis followed by the community storage proposal.

[2] Public Utilities Code § 2827.1(b)(4); Unless otherwise noted, all code references in these comments will refer to the California Public Utilities Code.

A. The Commission must incorporate all costs and benefits when evaluating NEM 3.0 proposals.

The Verdant study reviewed the costs and benefits of NEM 2.0.[3] However, Verdant, by its own admission,[4] neglected to include several electrical benefits to all-customers in its calculations. These missing benefits – identified by Vote Solar and the Solar Energy Industries Association ("VS/SEIA") – would have increased the calculated value of NEM for ratepayers as a whole.

VS/SEIA provided comments on the Draft Lookback Study highlighting five values that distributed renewables provide: "Health Benefits from Reduced Criteria Air Pollution… $6/MWh"; "Social Cost of Carbon… $417 per metric tonne"; "Out-of-state methane Leakage … 11.5 times [instate leakage quantities]"; "Land use benefits… $2.20 per MWh"; "Reliability and Resiliency … $104 per kW-year."[5] Verdant excluded each of those societal benefits. By excluding those benefits, the Study artificially lowered the true value of NEM generators.

In a similar fashion to the omitted societal benefits, Verdant excluded the full benefit for utility customers gained through the NEM program. VS/SEIA provided information to Verdant showing that the avoided transmission costs in the Study's cost-of-service were artificially low. VS/SEIA stated that:[6]

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[3] R.20-08-020, *Administrative Law Judge's Ruling Presenting Final Verdant Study and Instructing Parties to Respond, Attachment* ("Study"), (January 21, 2021).

[4] Study, Comment # 77 response, p. 132, (Verdant's response "While we appreciate your comments, the CPUC has provided guidance that the Societal Cost Test (SCT) is not approved for use in the NEM Lookback Study. This analysis will maintain what we are calling the Societal Total Resource Cost (sTRC) test, which only differs from the TRC in the lower discount rate.").

[5] Study, Comments # 77-81 response, p. 132-135, (VS/SEIA noted specific sources and cited exact metrics to be used for each of the five values that NEM installations provide. The following lists the values for each resource: "Health Benefits from Reduced Criteria Air Pollution… $6/MWh"… "Social Cost of Carbon… $417 per metric tonne" … "Out-of-state methane Leakage … 11.5 times [instate leakage quantities]" … "Land use benefits… $2.20 per MWh" … "Reliability and Resiliency … $104 per kW-year.").

[6] Study, Comment #83, p. 136.

> The Study's cost-of-service analysis assumes that FERC-regulated transmission costs are a pass-through on a $ per kWh basis for residential customers. This effectively assumes that the transmission cost of service is the same in every hour. However, transmission costs are driven by peak transmission system loads, which occur in the mid-to-late afternoon when there is significant solar output. Recognizing this, in Resolution E-5077, at pp. 23-24, the Commission adopted transmission PCAFs to allocate avoided transmission costs in the 2020 ACC. Thus, the cost-of-service for transmission costs should be focused on the afternoon hours with peak transmission loads, and the Study's cost-of-service analysis over-allocates transmission costs to customers post-solar.

In response to the VS/SEIA comment Verdant stated "While we recognize that there may be opportunities to improve that portion of the analysis, they are not in our scope here."[7] Thus, Verdant acknowledged that its cost-of-service analysis failed to correctly account for the transmission cost reductions gained from the addition of distributed renewable generation yet declined to correct the transmission benefits calculation.

VS/SEIA made a compelling argument for varying transmission costs based on time of transmission. The same argument would apply to the distribution grid. Because Verdant admitted that its analysis of transmission costs fails to accurately capture transmission cost reductions from NEM generators, the point deserves further development.

First, CAISO recently reported billions in transmission savings due to an increased use of distributed energy resources. The CAISO board, in approving its 2017-2018 Transmission Plan, approved the elimination of transmission projects totaling $2.6 billion.[8] CAISO stated that "The changes were mainly due to changes in local area load forecasts, and *strongly influenced by energy efficiency programs and increasing levels of residential, rooftop solar generation*" [emphasis added].[9] Programs like NEM that produce electricity within the distribution grid

[7] Study, Comment #83 response, p. 136.
[8] CAISO press release, Board approves 2017-18 Transmission Plan, (March 23, 2018), http://www.caiso.com/documents/boardapproves2017-18transmissionplan_crrrulechanges.pdf .
[9] *Ibid.*

significantly cut down on transmission needs by reducing the need to transmit the electricity from a central generation point to an end user. Behind-the-meter ("BTM") generation also decreases the congestion on *existing* transmission lines during times of peak use.

In addition to transmission benefits, BTM generation and storage decrease the needed distribution infrastructure. In reply comments to the guiding principles ruling, PCF highlighted a SCE analysis completed for a proposed distributed renewable program within its distribution grid.[10] SCE stated that it could add thousands of megawatts of distributed resources into its distribution grid without grid upgrades.[11] Typically NEM system are much smaller than SCE's proposed warehouse solar arrays and could be more easily integrated into the distribution system.

Other state energy agencies have also highlighted the savings from more fully utilizing the distribution assets just as SCE recommended. In 2016 the Massachusetts Department of Energy ("MDE") found that "energy costs are heavily skewed to a few high-cost hours which have a significant impact of the total annual energy cost to ratepayers." It went on to state that "the top 10% of hours… accounted for 40% of annual electricity spend[ing]."[12] The MDE report also stated that "[t]he need to size all grid infrastructure to the highest peak results in system inefficiencies, underutilization of assets and high cost to ratepayers." The electricity system,

[10] R.20-08-020, The Protect Our Communities Foundation Reply Comments On The Administrative Law Judge Ruling Directing Comments On Proposed Guiding Principles, (December 11, 2020), pp. 2-4.
[11] A.08-03-015, SCE Application, *Solar Photovoltaic (PV) Program Testimony*, (March 27, 2008), p. 44, ("SCE has identified numerous potential (rooftop) leasing partners whose portfolios contain several times the amount of roof space needed for even the 500 MW program." [p. 44] …"SCE can coordinate the Solar PV Program with customer demand shifting using existing SCE demand reduction programs on the same circuit. This will create more fully utilized distribution circuit assets. Without such coordination, much more distribution equipment may be needed to increase solar PV deployment. SCE is uniquely situated to combine solar PV Program generation, customer demand programs, and advanced distribution circuit design and operation into one unified system." [p. 9])
[12] Massachusetts Department of Energy, State of Charge, Massachusetts Energy Storage Initiative, (2016), p. 28, ("[E]nergy costs are heavily skewed to a few high cost hours which have a significant impact of the total annual energy cost to ratepayers. Over the last three years from 2013 – 2015, on average, the... top 10% of hours during these years, on average, accounted for 40% of annual electricity spend or over $3 billion in cost to ratepayers per year."), available at https://www.mass.gov/doc/state-of-charge-report/download.

including both transmission and distribution systems, is built to handle system demand that far exceeds even the highest demand hours each decade. Over the last two decades the highest peak demand in the CAISO balancing area occurred on July 24, 2006.[13] Since 2006 the IOUs have spent billions on the transmission system. Between 2016 and 2019 alone, the IOUs have spent on average $1.875 billion per year on transmission.[14] That additional annual spending indicates that the transmission and distribution (T&D) system can accommodate much higher load than it could during the 2006 peak. The Commission can reduce total energy costs by continuing to minimize spending on T&D. One of the best ways to eliminate T&D costs is to minimize and reduce peak demand.

The utilities oppose BTM generation. One possible reason could be that because new utility owned infrastructure leads to utility profits. BTM generation that primarily serves on-site load and local load will continue to decrease the stress on the existing system and will continually reduce the need for building new T&D infrastructure built by the IOUs. Figure 1 shows SDG&E profits over the last two decades. One can see that an increase in newly built utility infrastructure has caused utility profits to skyrocket.

[13] CAISO, California ISO Peak Load History 1998 through 2020, [accessed on March 12, 2020], available at https://www.caiso.com/Documents/CaliforniaISOPeakLoadHistory.pdf .
[14] California Public Utilities Commission, SB 695 report, Utility Costs and Affordability of the Grid of the Future, (February 2021), p. 39.

Figure 1: SDG&E profits reported in Sempra Energy's SEC filings.[15]

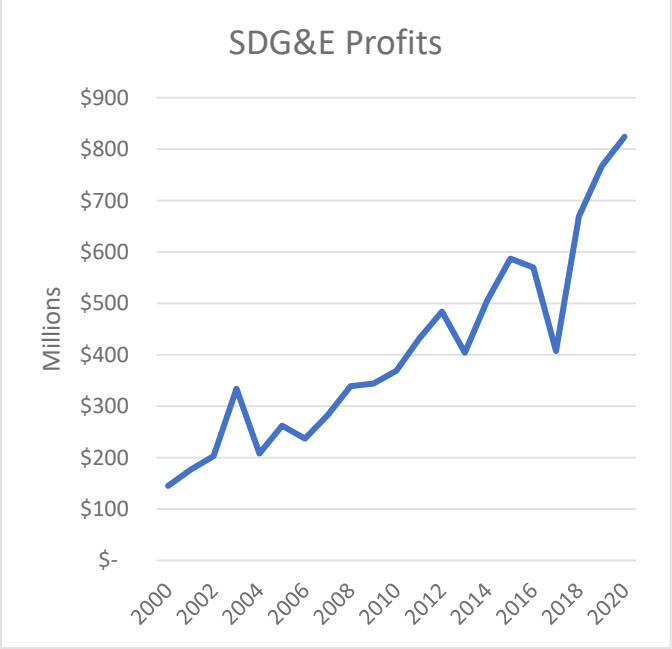


Figure 1 shows that SDG&E's profits have increased from $145 million in 2000 to $824 million in 2020.[16] SDG&E's profits in 2020 were 5.6 times higher than they were in 2000. Even during the COVID-19 pandemic, SDG&E recorded record profits. NEM is one way for the Commission to reduce IOU justification for new utility infrastructure.

The NEM participants help to more efficiently use the capacity in the transmission and distribution ("T&D") systems by reducing their T&D infrastructure use. Additionally, every NEM 2.0 customer must use time of use ("TOU") rates that increase electricity rates during the hours when system peaks occur. Non-NEM customers can opt-out of the TOU rates. The peak TOU rates are a major incentive to avoid using grid provided electricity during the peak rate

[15] PCF created Figure 1 using SDG&E profits reported in Sempra Energy's Securities and Exchange Commission 10K filings for the years 2000-2020, available at https://investor.sempra.com/sec-filings?field_nir_sec_form_group_target_id%5B%5D=471&field_nir_sec_date_filed_value=#views-exposed-form-widget-sec-filings-table .
[16] *Ibid.*

window. For instance, SDG&E set its current summer peak TOU rate at 60 cents per kWh.[17] The average electricity price in the United States according the EIA is 10.54 cents per kWh making the SDG&E's summer peak rate 5.69 times higher than the national average during the peak TOU window.[18]

The high-cost hours incentivize NEM participants to shift demand outside of those peak hours. Further, NEM participants have increasingly been pairing storage with their renewable energy systems – a trend that will continue as storage prices continue to drop.[19] Any systems paired with storage will have the storage configured to serve BTM demand during high cost/high demand hours, thus eliminating the NEM participant's use of the T&D system during the hours that the MDE found to be the cause of 40% of its system spending.

The fact that the Study fails to account for the peak-shaving benefits of NEM systems under TOU rates on T&D infrastructure costs – especially NEM solar plus battery systems under TOU rates – represents a deficiency in the Study. To assure that NEM total benefits are approximately equal to the total costs as required by statutory mandate,[20] the Commission should revise upward the T&D benefits produced by NEM systems including the societal costs as calculated by VS/SEIA.

[17] SDG&E, Schedule TOU DR-1, page 2, see http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_TOU-DR1.pdf.
[18] United States Energy Information Administration, State Electricity Profiles, (November 2, 2020 release date), (Average retail price 10.54 cents/kwh), see https://www.eia.gov/electricity/state/.
[19] BloombergNEF, Battery Pack Prices Cited Below $100/kWh for the First Time in 2020, While Market Average Sits at $137/kWh, (December 16, 2020). Available at https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/ .
[20] Public Utilities Code § 2827.1(b)(4)

B. NEM 3.0 Community Storage: The Commission should require the NEM 3.0 tariff to include NEM 3.0 Community Storage contributions.

Just at the Commission requires NEM customers take service under TOU rates to qualify for NEM, the Commission should require the owner of each new NEM system to pay a fee used to purchase Community Storage.

NEM 3.0 Community Storage - Proposal Components:

- The solar installer shall assess the owner of a NEM system an additional 20% fee based on the total NEM system cost. The NEM system installer will pay the fee to the utility as part of the interconnection cost. The utility then passes 100% of the fee onto the Community Storage program manager.
- The local CCA functions as the program manager of the Community Storage fund and will own all storage assets purchased by the fund.
    - If the area is not served by a CCA then the local government (city or county) will manage the fund and invest in local storage just as the CCA would have.
- The Community Storage fund will be used to build Community Storage within the local distribution grids no more than 5 miles away from the census track where the NEM system is located.
- Each Community Storage system shall be no smaller than 3 MWh.
- Each utility shall make space available for Community Storage of up to 20 MWh at each substation within the distribution grid and substations connecting the transmission grid to the distribution grid.

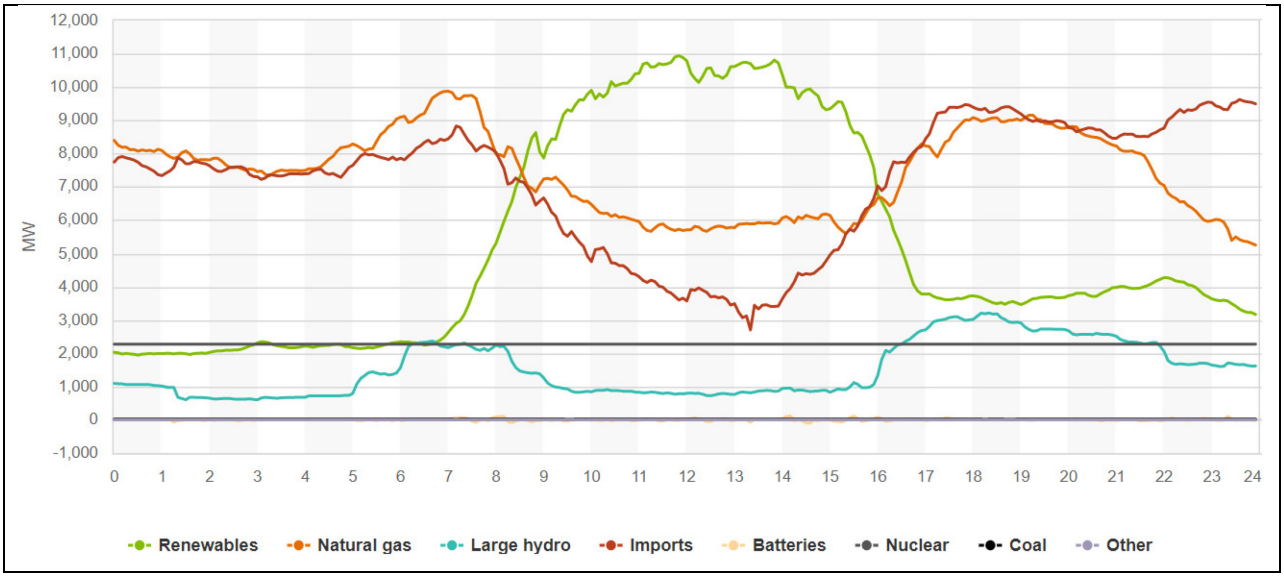
The Commission should implement the proposed Community Storage program because it aligns with California clean energy policy; provides benefits to the electrical system; reduces utility investment requirements; reduces pollution in population centers; and flattens the demand curve.

In its simplest form, California energy policy requires the Commission to "achieve carbon neutrality as soon as possible."[21] The most recent numbers published by the California Energy Commission ("CEC"), report that California uses 44% unspecified and fossil-based

[21] California Executive Order B-55-18 (September 10, 2018) (establishes a "new statewide goal…to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter"). Available at https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf .

electricity.[22] The vast majority of the fossil-based electricity comes in the form of gas fired generators. Figure 2, below, shows that the highest supply hours of gas-fired generation occur at night between 5 p.m. and 8 a.m.

Figure 2: Reprint of CAISO's Daily Supply Trend (January 24, 2020)[23]



For California to eliminate fossil fuel use, it will need to more than double its renewable energy generation. Regarding storage, the California Draft 2021 SB 100 Joint Agency Report stated in the Study Scenario that California would need 55,000 MW of storage.[24] However, even the Study Scenario falls short of carbon neutrality because it still would allow for some carbon emissions. Thus, California needs large quantities of storage to reach its goal of carbon neutrality. A Community Storage requirement for the NEM tariff would contribute to the needed

[22] California Energy Commission ("CEC"), 2019 Total System Electric Generation, [accessed March 12, 2020], (Coal 2.96% + Natural Gas 34.23% + Oil 0.01%, + Other 0.15% + Unspecified 7.34% = 44.69%), see https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2019-total-system-electric-generation#:~:text=In%202019%2C%20total%20generation%20for,to%2055%20percent%20in%202018.
[23] California Independent System Operator ("CAISO"), Today's Outlook – Supply Trend, (January 24, 2020), see https://www.caiso.com/TodaysOutlook/Pages/supply.html.
[24] 19-SB-100, SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future, (December 3, 2020), p. 87, see https://www.energy.ca.gov/sb100/sb-100-events-and-documents.

infrastructure and would provide a significant additional community benefit through the NEM program.

A Community Storage program would provide benefits to the local system because as BTM generation grows, more and more local clean energy will need to be stored for later use during peak demand times. Additionally, by organizing the ownership structure such that the CCA or the local government owns the new storage, the Commission will reduce the utility assets needed for the transition to carbon neutrality. As Figure 1 shows, the investor owned utilities' profits have grown astonishingly quickly in recent years and cannot be allowed to continue growing – especially while electricity use continues to fall. If utility profits continue to grow, soon no one in California will want to transition to a fully electric future despite the fact that a joint group of California agencies has determined that California climate change costs exceed $110 billion per year or $1 trillion per decade.[25] Climate change cost are an externalized cost were as electricity bills are internalized costs. While the individual energy user does not receive a bill for the damage caused to California by climate change, that damage still exists.

Figure 3 shows the minimal costs of PCF's Community Storage proposal on an individual project basis.

[25] 2018 Statewide Summary Report California's Fourth Climate Change Assessment ("Climate Change Assessment"), Publication number: SUM¬CCCA4-2018-013, Table 6, p. 42 (110 billion per year x 10 years = 1.1 trillion per decade). Available at https://www.climateassessment.ca.gov/.

Figure 3: NEM solar array cost with Community Storage contribution[26]

Solar Array Cost				Community Storage Configurations		
Solar Size (kW)	Est. Price $/watt	Solar array total cost	Annual Output, kWh (PV Watts)	Total System after 26% tax credit	Community Storage Contribution (20%)	Total System + Community Storage Contribution
1	$ 2.50	$ 2,500	1,670	$ 1,850	$ 500	$ 2,350
4	$ 2.50	$ 10,000	6,680	$ 7,400	$ 2,000	$ 9,400
6	$ 2.50	$ 15,000	10,020	$ 11,100	$ 3,000	$ 14,100
8	$ 2.50	$ 20,000	13,360	$ 14,800	$ 4,000	$ 18,800
10	$ 2.50	$ 25,000	16,700	$ 18,500	$ 5,000	$ 23,500
12	$ 2.50	$ 30,000	20,040	$ 22,200	$ 6,000	$ 28,200
14	$ 2.50	$ 35,000	23,380	$ 25,900	$ 7,000	$ 32,900
16	$ 2.50	$ 40,000	26,720	$ 29,600	$ 8,000	$ 37,600

The Community Storage contribution will increase the cost of NEM systems but will still allow for a short-term payback to the NEM customer. Moreover, the Community Storage contribution can quickly and easily be used to balance the costs and benefits from NEM 3.0. If the Commission's calculations show that the costs of NEM 3.0 outweigh the benefits or vise versa then the Community Storage contribution percentage can be increased or decreased as needed to achieve a balance. This fine-tuning ability that the Community Storage proposal provides to any NEM 3.0 tariff serves a critical function allowing Commission to meet the statutory requirement of equalizing the costs and benefits of the NEM program. Additionally, because the Community Storage would be owned by the community instead of the utilities, then the benefits to the electrical system would be retained by the community instead of leading to a privatization of profits. On the other hand, each utility owned storage facility results in profits for utility shareholders.

[26] PCF used the National Renewable Energy Laboratory's PV Watts calculator to estimate the array output. See https://pvwatts.nrel.gov/. The per watt capital cost of $2.50 in Figure 3 is lower than the national average price reported by SEIA, but PCF assumes the cost of residential solar will continue to decline between now and 2030. For the SEIA reported national average, see https://www.seia.org/research-resources/solar-market-insight-report-2020-q4.

By requiring the Community Storage to be located close to the NEM system, then the need for local storage will be filled in conjunction with local clean energy growth. Increasing local renewables and local storage in tandem will allow the Commission to more quickly remove requirements placed on LSEs to sign contracts with local fossil fuel generators.

Community Storage reduces the cost of electricity for non-NEM customers by enabling a shift in energy demand from the evening hours of 5 p.m. to 10 p.m. to the middle of the day when wholesale electricity is the least expensive and occasionally even negative.[27] While individual NEM customers can install energy storage behind the meter those devices are rarely optimized to maximize return on investment or maximize use of renewable energy. In contrast, Community Storage owned and operated by CCAs will be maximized for both clean energy use and return on investment.

To understand how significant the Community Storage contribution will be to the electrical system one must look at the anticipated growth in BTM solar in California. The CEC's 2020 Integrated Energy Policy Report ("IEPR") projects that BTM solar in California will grow by 160% from January 2020 to the end of 2030.[28] NEM solar installations up to 2019 equaled 8,019 MW. Thus, the CEC forecast of a 160% growth of BTM solar by 2030 would result in 20,849 MW by 2030 equaling approximately 1,166 MW per year.[29] Figure 3 shows the contribution from 1 kW at $500. That means if the Commission adopts the Community Storage

[27] EIA, Rising solar generation in California coincides with negative wholesale electricity prices, (March 11, 2017), see https://www.eia.gov/todayinenergy/detail.php?id=30692.
[28] CEC, *Proposed Final 2020 Integrated Energy Policy Report Update Volume III California Energy Demand Forecast Update*, (February 25, 2021), p .18, ("In 2019, an estimated 15,800 GWh of electricity was produced by BTM PV in California. By 2030, the CEDU 2020 forecast projects generation from PV to reach about 34,900 GWh, 41,200 GWh, and 47,300 GWh in the high, mid, and low electricity demand cases, respectively." ; (41,200 / 15,800) – 1 = 1.607 = 160%).
[29] (20,849 MW – 8,010MW)/11 = 1,166 MW.

contribution requirement at the proposed 20% level, then the resulting Community Storage over the 9 years from 2022 to 2030 equals $5.2 billion worth of Community Storage.[30]

The Commission should continue to incentivize BTM storage for resiliency purposes while launching the proposed NEM 3.0-based Community Storage program. The Commission should use Community Storage as an easily calibratable option to benefit the electrical system, benefit all energy customers, and align with California's clean energy policy. Community Storage contributions will allow for continued growth of BTM renewable energy and the BTM renewable energy industry.

III. PROPOSAL B: MINIMUM GENERATION

PCF's Proposal B details a new requirement for BTM systems in order for those customers with BTM systems to access the NEM tariff. Similar, to the way that the Commission mandates that NEM customers must use the default TOU rates, the Commission should set a minimum capacity requirement for BTM systems. The following will use solar as an example, but any renewable energy system should also be required to meet the same minimum capacity as described for solar.

Community Storage Proposal Components:

- All NEM 3.0 solar arrays must be sized for a transition of the building to 100% electric power (the array sizing calculation must assume zero gas appliances and zero gasoline vehicles).
    - Exception: if the home does not have enough flat roof space, plus roof space facing south, south east, and south west, to achieve 100% of the capacity requirement, then the NEM customer must simply maximize their array for the available roof space.
    - Exception: any roof surface that cannot fit at least 3 standard full-size panels does not count as an array mountable roof surface.

[30] 1,166,000 kW/year x 9 years x $500/kW = $5,247,000,000.

    - Exception: in the case of a BTM wind based NEM project the Commission should apply a similar exception. If there is not enough space on the property to accommodate enough wind turbines to serve 100% of future electric demand, then the project must simply build as many turbines as feasible for the available area.
- For the first 5 years of system true-up after the system starts producing electricity, the NEM 3.0 customer receives twice the wholesale rate for excess generation.[31]
- After the first 5 years, the compensation rate paid for excess generation will be reduced to the current wholesale rate compensation received by NEM 2.0 customers or a revised value the Commission determines more accurately reflects the value of excess BTM solar production.

The Minimum Generation requirement aligns NEM 3.0 with California clean energy policy to achieve carbon neutrality as soon as possible. Sizing every BTM system such that its capacity can provide 100% of the needed electricity for and all electric building and all electric transportation encourages the transition away from burning methane for water heat, space heat, dryers, stoves, ovens, as well as all commercial gas uses. Additionally, because the true-up compensation drops dramatically after 5 years, the tariff will incentivize building owners to upgrade to electric appliances and vehicles every time that a piece of fossil-fuel-powered equipment is replaced.

The Commission should adopt the requirement for additional solar generation capacity per residential appliance according to the capacities listed in Figure 4 below. The capacities for commercial appliances should be required to be calculated on a per project basis. Non-solar NEM systems can use the energy from Figure 4 to calculate the appropriate capacity for the alternative renewable generation system.

[31] Twice the wholesale rate aligns with the true-up compensation already granted by some CCAs such as MCE, see https://www.mcecleanenergy.org/wp-content/uploads/2021/02/MCE-Vallejo_Notice1_NEM_letter.pdf

Figure 4: Additional NEM Capacity Requirement by Equipment Type

Existing Gas Equipment in the Building	Annual average energy use for new electrical equpment (kWh)	System capacity requirement above existing load addition (kW)
Clothing Dryer	150	0.09
Range + Oven	540	0.32
Furnace (to Heat Pump)	4000	2.40
Water Heater (to Heat Pump)	1300	0.78
per Vehicle	3250	1.95

While Figure 4 includes some annual energy use figures that will be high for coastal climates, the Commission should adopt a single annual energy use per appliance rather than attempt to accurately estimate for every conceivable scenario. The annual average energy use for each appliance that needs to be converted to electricity should be combined with the electricity use for the building in the previous year to determine the minimum solar array capacity installation requirement.

The 5-year transition period strikes a balance between fast and slow upgrades of a building's gas equipment to electrical equipment. In the case of a house, about half of the appliances will likely have 5 years or less of remaining useful life based on typical lifespans for equipment.[32] Because the size of the installed NEM 3.0 generation system, the building owner would know that all of the other appliances will cost less to fuel if they are replaced. That knowledge will incentivize NEM 3.0 customers to transition to electric appliances sooner than

[32] Consumer Reports, ("assume any new major appliance will last about 10 years. 'Consumer expectations across major appliances are remarkably consistent'…") see https://www.consumerreports.org/appliances/how-long-will-your-appliances-last/; Consumer Reports, (Water heaters: 3-12 year warranties)see https://www.consumerreports.org/cro/water-heaters/buying-guide/index.htm; Consumer Reports, (expect a…dryer to last 10 years), see https://www.consumerreports.org/laundry-cleaning/how-to-make-your-washer-and-dryer-last/; Consumer Reports, (Furnace lifespan 15-20 years), see https://www.consumerreports.org/cro/gas-furnaces/buying-guide/index.htm;

they otherwise would, but at the very least, it will encourage the transition to new electrical equipment any gas equipment needs to be replaced.

If a building owner with a NEM 3.0 tariff that includes the Minimum Generation requirement decides not to switch to 100% electric power then they will be exporting a substantial amount of electricity to the grid at wholesale rates. Those exports will reduce the need for additional electrical system transmission capacity and should minimize the stress on the distribution grid as well. Thus, the Minimum Generation requirement will provide a benefit to the electrical system.

The Minimum Generation requirement also minimizes the cost of NEM solar arrays for the NEM customer. First, larger arrays are less expensive on a cost per watt basis.[33] Second, by installing the maximum system size that the building will ever need, no future capacity upgrades will be needed. Increasing solar array capacity can result in significant additional costs due to the need to replace inverters, new project staging, new conduit runs and possibly electrical panel upgrades. Thus, a single installation that accounts for all future electrical needs will be best for the consumer and for California.

Incentivizing full size systems upon initial installation also leads to California receiving more federal incentives through the ITC during 2022 and 2023. The ITC steps down from 26% to 22% in at the end of 2022. Then at the end of 2023 the ITC step down from 22% to either 10% (commercial) or 0% (residential). Thus, the Commission should attempt to incentivize increasing BTM solar in the near-term to take advantage of the larger tax credits through 2023.

[33] California Distributed Generation Statistics, [accessed on March 11, 2020], (The data show the cost of solar more expensive for systems smaller than 10 kW compared to larger than 10kW.) See https://www.californiadgstats.ca.gov/charts/.

The Minimum Generation requirement proposal increases California solar capacity, incentivizes building electrification, and leads to increased federal tax credits for the state. Additionally, the Minimum Generation requirement will result in more local generation that will enable a quicker transition away from community-based gas-fired generators. Inevitably there will be a few NEM customers that do not use the full capacity of their arrays which will lead to more low-cost local generation than would otherwise occur. The Commission should adopt a Minimum Generation requirement for all NEM 3.0 systems as part of the NEM 3.0 tariff.

IV. PROPOSAL C: NEM 2.0 CARVE-OUT FOR LOW-INCOME CUSTOMERS AND RENTERS

Other than for a handful of small, specialized programs, only building owners have had access to the NEM program during NEM 1.0 and NEM 2.0. By the end of 2021, NEM solar projects alone will exceed 10,000 MW of capacity.[34] Some intervenors will likely attempt to end net metering entirely because, up to this point, low-income customers and renters have been restricted from accessing NEM benefits due to those customers' lack of building ownership. And the utilities will likely propose ending NEM because they are concerned that BTM generators endanger their monopoly energy business. The more customers self-generate energy and self-consume that energy, the less need there is for new transmission and distribution infrastructure and the less justification the Joint IOUs have for building the additional infrastructure that would lead to increased IOU profits.[35]

[34] California Distributed Generation Statistics, [accessed on March 11, 2020], (According to data current through November 30, 2021, 9,106 MW of NEM participating solar had been installed. In 2019, the last full year of installations, 1,176 MW of additional capacity was installed. The installation capacity since the end of 2014 has exceeded 1,000 MW each year. Thus, by the end of 2021 California will likely see at least 10,000 MW of total capacity.) See https://www.californiadgstats.ca.gov/charts/ .
[35] See Figure 1 SDG&E's skyrocketing profits.

However, the answer is *not* to change the NEM tariff such that it eliminates all future possibility for low-income customers and renters to access the benefits of NEM 2.0. Such a change would lock in the inequities thus far visited on that customer class. The answer is to extend NEM 2.0 benefits for low-income customers and renters such that the NEM 2.0 tariff provides an equal installed capacity for low-income customers and renters as NEM 2.0 has provided for building owners.

At a minimum, low-income customers and renters should retain access to NEM 2.0 until those customers reach 10,000 MW of installed solar capacity, a capacity approximately equal to the amount of NEM project that will have been built before the transition to NEM 3.0.[36] The Commission should reject any cliff-edge transition to NEM 3.0 that ignores an equitable transition.

While this proposal, the NEM 2.0 Carve-Out proposal, recommends a 10,000 MW carve-out for low-income customers and renters, it should be seen as a minimum requirement, but a requirement that will not achieve complete equity between customer classes. To actually achieve equity, the Commission should adopt PCF's Proposal D, NEM 2.0 Community Solar.

V. PROPOSAL D: NEM 2.0 COMMUNITY SOLAR, AN EQUITABLE TRANSITION

The NEM 2.0 Community Solar proposal is split into two parts. The first section highlights the disparity between customer classes with regards to NEM. The second section details the need for a NEM based community solar program as a component of NEM 3.0 and a component of the transition to the NEM successor tariff.

[36] The 10,000 MW capacity estimate assumes that the Commission will order the transition to NEM 3.0 to occur in January of 2022.

A. The Commission must maintain NEM 2.0 benefits for low-income customers and renters to achieve equity.

Public Utilities Code § 2827.1(b)(1) states that the Commission shall "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*" [emphasis added].[37]

The existing programs and tariff fall short of providing equitable NEM alternatives for disadvantaged communities. In the Lookback Study, Verdant stated that, "the VNEM population represents a small proportion of the overall NEM population…" and was considered outside the scope of the study.[38] Thus according to Verdant, virtual net energy metering ("VNEM"), one of the few ways that low-income customers can access NEM benefits, was deemed so small as to be too insignificant to review in the Lookback Study. The Figure 5 below shows the breakdown of the participation in the NEM program by low-income customers and customers who are renters versus total participation.

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

[38] Study, Comment 29 Response, pp. 117-118, ("We agree that VNEM is important and provides a valuable resource to multifamily customers. Based on the 2020 CPUC California Solar Initiative Annual Program Assessment, the VNEM population represents a small proportion of the overall NEM population. However, this study had limited resources and Energy Division chose to focus efforts on the aspects of California's Net Metering policy that have the largest participation and therefore impact on ratepayers. VNEM is outside the scope of this evaluation, though it is an interesting area that deserves additional research.").

Figure 5: NEM Program Installations Serving Renters and Low-Income:[39]
(Installations as of Dec 31, 2019 and Forecast Installations for 2030)

BTM Segment	NEM Solar Programs	2019 installed (MW)	Program Cap or 2030 est. (MW)	Comments
Building Owner Installed solar	All programs (large IOU territories)	8,019	20,849	2030 estimate based on 2020 IEPR of 2.60 times more Energy in 2030 than 2019 (mid electricity demand case)
Historical: multi-unit and low income	VNEM (MW) (Projects outside of MASH Program)	30	60	2030 estimate by PCF assumes no changes in the VNEM program and thus similar VNEM participation over the next 10 years.
	SASH 1.0 (MW)	16	16	As of 2021, Closed.
	SASH 2.0 (MW)	9.2	12	As of 2021, only open in SCE territory (PCF assumes minimal additional MW additions)
	MASH 1.0 (MW)	27.4	27.4	As of 2021, closed to new applications
	MASH 2.0 (MW)	20.4	20.4	As of 2021, closed to new applications
Recently launched programs: multi-unit and low income	DAC - SASH	1	40	DAC-SASH: total estimated with 2019 results of 900 kW installed using $2.7 million in incentives of the total $120 million allocated to the program.
	SOMAH	0	300	SOMAH: based on AB 693 (Eggman, 2015), has a goal of installing 300 MW on affordable housing by 2030
	DAC - GT	0	158	Program Cap
	CSGT	0	41	Program Cap
		Total, 2019	**Total 2030**	
		104	**674.8**	
		1.3%	**3.2%**	Percent of NEM solar serving low-income customers and customers renting their residences

The Figure 5 shows that through 2019 only 1.3% of NEM installations benefitted low-income customers or customers renting their residences ("renters"). It also demonstrates that despite the legislature allocating over a billion dollars to NEM for low-income customers,[40]

[39] 2020 California Solar Initiative Annual Program Assessment, (June 2020), p. 43-45, 47; CPUC Solar in Disadvantaged Communities webpage [last accessed March 10, 2021], available at https://www.cpuc.ca.gov/SolarInDACs/ ; California Energy Commission, Proposed Final 2020 Integrated Energy Policy Report Update Volume III: California Energy Demand Forecast Update, (February 2021), p. 18 ("In 2019, an estimated 15,800 GWh of electricity was produced by BTM PV in California. By 2030, the CEDU 2020 forecast projects generation from PV to reach about 34,900 GWh, 41,200 GWh, and 47,300 GWh in the high, mid, and low electricity demand cases, respectively.").

[40] AB 693, (Eggman 2015-2016), available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB693 (AB 693 establishes spending of $100 million per year. Thus, the SOMAH program alone will result in over a billion dollars of funding).

those funds are forecast to only increase the NEM participation by low-income customers and renters to 3.2%. by 2030.

Figure 5 illustrates a clear case of structural bias within the NEM program framework. Electricity rates in California are higher than all but two other states in the continental United States.[41] BTM solar reduces electricity costs by substantially eliminating delivery costs and generation costs. As noted in the previous section only building owners have had access to the NEM program thus far and by the end of 2021 will achieve approximately 10,000 MW of solar through either NEM 1.0 or NEM 2.0.[42] Almost no renters or low-income customers have had access to NEM 1.0 or NEM 2.0. The Commission should correct this inequity by leaving NEM 2.0 open to renters and low-income customers.

Because state statute requires growth, specifically growth in disadvantaged communities,[43] and because thus far NEM in disadvantaged communities has been an insignificant portion of the NEM program, the Commission should update the NEM program with a tariff and accompanying program to allow access to NEM for all ratepayers rather than primarily just building owners.

To accomplish growth within disadvantaged communities, low-income communities and among people who rent their housing, specific changes should be considered. First, the Commission has rolled out several programs designed for disadvantaged communities. Most of these programs have enrollment or capacity caps. Section 2827.1(c) states that "…There shall be

[41] U.S. Energy Information Administration, Electric Power Monthly, *Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, December 2020*, [accessed on March 11, 2020], (Massachusetts and Rhode Island are the only two states with higher average costs.)
[42] California Distributed Generation Statistics, [accessed on March 11, 2020], (According to data current through November 30, 2021, 9,106 MW of NEM participating solar had been installed. In 2019, the last full year of installations, 1,176 MW of additional capacity was installed. The installation capacity since the end of 2014 has exceeded 1,000 MW each year. Thus, by the end of 2021 California will likely see at least 10,000 MW of total capacity.) See https://www.californiadgstats.ca.gov/charts/ .
[43] Public Utilities Code § 2827.1(b)(1).

no limitation on the amount of generating capacity or number of new eligible customer-generators entitled to receive service pursuant to the standard contract or tariff after July 1, 2017."[44] Thus, the Commission should use the lessons learned from its current NEM programs for disadvantaged communities and design a program or programs that works for disadvantaged communities within the new NEM 3.0 tariff. This program must meet Section 2827.1(c) requirements and provide an un-capped NEM participation opportunity for disadvantaged communities, low-income communities, and among people who rent their housing. NEM participation levels have been decreasing in disadvantaged communities since 2017[45] in direct violation of Public Utilities Code § 2827.1(c). The Commission must reverse this trend when launching NEM 3.0.

B. NEM 3.0 Community Solar Proposal

Building owners have added 9,106 MW of NEM solar capacity to their buildings.[46]At the current pace that low-income customers and renters are adding NEM solar capacity, it would take 87 years[47] for those customer classes to catch up with the current installed solar capacity of building owners. However, because the NEM benefit gap widens between building owners and

[44] Public Utilities Code § 2827.1(c)
[45] Study, Figure 3-13, p. 38.
[46] California Distributed Generation Statistics, [accessed on March 11, 2020], (The total cumulative capacity was listed at 9,106 MW as of November 30, 2020. Three months of capacity have yet to be recorded. Installations are occurring at approximately 100 MW per month. Figure 5 of this PCF proposal document details how only 104 MW of capacity have been installed benefitting low-income customers and renters. Thus, it can be assumed that the full 9,106 MW reported to date have been installed) As per See https://www.californiadgstats.ca.gov/charts/.

[47] Assuming that all 104 MW of NEM capacity benefitting low-income customers and renters was built within the last 10 years the pace of installation 10.4 MW per year. Thus, 9,106 MW / 10.4 MW = 87.6 years.

non-building owners every day,[48] the NEM equity gap will never close. The Commission should make significant changes to open NEM to non-building owners.

To provide equity within the NEM tariff, the Commission should allow low-income customers and renters to retain access to NEM 2.0 indefinitely and should implement a program that streamlines access to NEM for those customers. California does not want to look back in 87 years and realize that low-income customers and renters *still* have not achieved access to 9,106 MW of NEM capacity. Thus, PCF proposes that the Commission launch a NEM 2.0-tariff-based community solar program to rapidly bring the benefits of NEM to the communities that, thus far, have been locked out of the net metering revolution. PCF's community solar program will be referred to as NEM 2.0 Community Solar.

NEM 2.0 Community Solar allows most customers who have not previously had access to NEM benefits to finally access those benefits. Most of the previous or current Commission programs that have been designed to allow CARE customers or renters to access the NEM program were thoughtfully considered but were ultimately compromised by launching with overly complex requirements that stifled capacity growth. NEM 2.0 Community Solar has been designed for simplicity and open access as the highest priorities.

<u>NEM 2.0 Community Solar Proposal Components:</u>

- The NEM 2.0 Community Solar shall serve only CARE customers and multi-unit dwelling residential customers. Multi-unit dwelling customers will be referred to as "renters." While there are some customers who live in multi-unit dwellings that are not renters and there are some renters that do not live in multi-unit dwellings, NEM 2.0 Community Solar will refer to multi-unit dwelling customers as renters for the sake of language simplicity program simplicity.[49]

[48] Low-income customers and renters have gained access to approximately 10.4 MW of capacity per year. Building owners install over 1,000 MW of capacity per year.

[49] Owners of rental properties that are single family homes will have to install rooftop solar for their customers in order to compete in the market. Installation of rooftop solar on single family homes is a

- NEM 2.0 Community Solar: ownership and organization
    - NEM 2.0 Community Solar arrays shall use the NEM 2.0 tariff as though the arrays were producing the electricity behind the meter at the renter or CARE customer's residence.
    - Program administrators shall be required to give first priority to projects proposed for sites at multi-unit dwellings because the optimal configuration for a NEM 2.0 Community Solar array would be behind the meter at a community solar customer's location.
    - The Community Solar arrays shall be owned and operated by the local CCA.
        - When a CCA has not yet been formed in a region, the local government shall own the array and shall contract with a CCA to operate and maintain the array.
        - The owner and operator of the array shall be the "program administrator."
        - In the case of future municipalization of the electricity system in an area, the ownership of the NEM 2.0 Community Solar arrays shall be transferred to the newly formed municipal utility.
    - The solar arrays shall be sized from 50 kWs and 5 MWs in capacity and shall be developed on existing rooftops and parking lots.
    - Array location:
        - Each IOU shall provide the total CARE customer load in each census tract in its service territory. The IOU shall provide updated load figures every 5 years.
        - Each IOU shall provide the total residential renter customer load in each census tract in its service territory. The IOU shall provide updated load figures every 5 years.
        - All community solar arrays shall be within a 5-mile radius of the census tract served by the array.
        - Each community solar array that is built shall have its capacity assigned by the program administrator to a census tract until the full annual CARE customer and renter demand in each census tract has been fully served by corresponding community solar arrays.
        - The program administrator shall post the open capacity by census tract for the use of developers.
- Developer requirements
    - The program administrator may accept any solar project by any developer that meets the program requirements.
    - The program administrator shall approve the project after the program administrator has secured financing for the project.
    - The program administrator may set addition requirements for the projects.

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simple and straight forward process compared to multi-unit dwellings. Thus, while the NEM 2.0 Community Solar proposal does not address single family rental homes, the segment of the population that lives in a rented single-family home will have access to NEM either by moving to a multi-unit dwelling or by convincing the landlord to install rooftop solar on the rental home.

- The developer must warranty its projects' labor and materials for 25 years excluding the inverter equipment which must be warrantied for the industry maximum period.
- The developer is required to propose a rooftop or parking lot solar array within a 5-mile radius of a census tract that still has open CARE customer or rental customer capacity.
- The developer is required to have received an approval from the site owner that the site owner will allow the construction of the solar array and shall provide an unlimited lease term in exchange for the monthly lease payments as set by the program payment process listed below.
- The developer must agree to build the project for the cost of the "non-residential" project price reported in the most recent Solar Energy Industries Association's ("SEIA") *Solar Market Insight Report*[50] released prior to the date of the program administrator's approval of the project. However, at the program administrator's discretion, the program administrator may accept prices up to 25% above the previous quarter's Solar Market Insight Report price.
- Before the project qualifies as a NEM 2.0 Community Solar project and qualifies for the NEM 2.0 tariff, the developer must sell the project to the program administrator.

- NEM 2.0 Community Solar tariff payment process
  - Monthly, the program administrator shall be paid by the territories' IOU the full TOU retail rate based on the NEM 2.0 tariff for the electricity produced by the array based on the time the electricity is produced. The full retail rate is paid to the program administrator even for arrays serving CARE customers because the IOUs collect the CARE subsidy to in order to cover CARE customer costs.
  - The program administrator then distributes the payment as follows:
    - Pays the site owner 5%. This shall be the standard lease payment for the NEM 2.0 Community Solar arrays
    - Retains 10% of the payment for administrative purposes to administer all the projects in the program administrator's service area. The total retained value shall be capped at $2 million regardless of total revenue received.
    - Pays the remainder of the value to the financer until the project loan has been paid in full.
  - After the array's loan has been paid in full, the incoming funds – other than the site owner payment and the program administrator payment – shall be used to pay any remaining loan amounts on any NEM 2.0 Community Solar arrays under the program administrator.
  - When all CARE customers' annual load and all renters' annual load has been offset by community solar arrays within the program administrator's service territory, then the Program Administrator must use the incoming program

[50] SEIA's Solar Market Insight Reports are release quarterly. The latest report can be found here https://www.seia.org/research-resources/solar-market-insight-report-2020-q4.

funds to provide a 20% discount on all renters' bills and an *additional* 20% discount on CARE customers' bills (beyond the CARE 35% discount already being provided through the IOU CARE subsidy collection).[51]

- The remaining 80% of funds[52] that continue to flow to the program administrator shall be used to build additional community-based infrastructure to lower the communities' electricity costs such as:
  - Free Smart Thermostat programs that provide annual benefits through demand response programs
  - Community Storage projects
  - Community Electric vehicle chargers

This a defining proceeding for the Commission on how it addresses issues of equity. NEM 2.0 Community Solar provides California the tool it needs to transition to NEM 3.0 without banning low-income customers and renters from ever accessing the benefits of NEM 2.0. Any NEM 3.0 tariff that neglects to provide a NEM 2.0 carve-out for low-income customers and rental customers will effectively cement in place the institutional bias that has defined the NEM program to date. The Commission should pair NEM 2.0 with community solar because community solar is the only tool that makes NEM accessible to the renter community in a timely manner. The Commission should adopt PCF's NEM 2.0 Community Solar program and confirm that the program will be allowed indefinite access to the NEM 2.0 tariff.

VI. PROPOSAL E: NEM 3.0 TIME OF USE RATES

D.16-01-044 stated that "all NEM successor tariff customers must be on a TOU rate with no option to opt out to a rate that is not time-differentiated."[53] Thus, TOU rates exist as a component of the NEM tariff. As a component of the NEM tariff, TOU rates can be reviewed

[51] The CARE customer 35% discount will be administered by the IOU's billing system such that the CARE customers will not see any changes to their required payment until the additional 20% discount is applied.

[52] The 5% lease payment and the 10% program administration fee will still be removed from the available funds. Thus the true remainer will be 100% - 20% (ratepayer discount) – 5% (lease payment) – 10% program administration fee = 65% minimum remainder. PCF anticipates most programs will see the program administration free capped at the $2 million maximum limit.

[53] D.16-01-044, p. 91.

and changed within the NEM 3.0 proceeding (R.20-08-020). The TOU rates can and should be changed.

The current TOU rates fail to align with consumer incentives with California policy goals and fail to align wholesale electricity prices with retail electricity prices. The following proposal updates the TOU rate so that it aligns with Public Utilities Code's NEM requirement in Section 2827.1(b)(4) that states that the Commission shall "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."[54] The following TOU proposal also aligns with California policy to "achieve carbon neutrality as soon as possible."[55]

NEM 3.0 Time of Use Proposal Components:

- TOU rates shall generally align with wholesale rates for electricity unit pricing
- TOU rates shall minimize retail prices during the highest renewable energy production hours.
- TOU rates shall be consistent year-round to simplify the rate structure and increase rate transparency.
- TOU rates shall maintain a structure with three different prices for three different blocks of the day.
- The price blocks shall be referred to (high, medium, and low)
- Price block differentials shall correspond to the following:
    - The medium block price shall be 20% higher than the low block price.
    - The high block price shall be 30% higher than the low block price.
- The price block times shall be set based on renewable energy usage.
    - The low price block shall align with the 7 hours in a day with the highest renewable energy generation (annual average).
    - The high price block shall align with the 5 hours in a day with the highest gas-fired generation production (annual average).

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55 California Executive Order B-55-18 (September 10, 2018) (establishes a "new statewide goal…to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter"). Available at https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf .

        - The 7 hours determined to be the highest renewable energy generation hours will be excluded from consideration.
    - The medium price block shall align with the remaining 12 hours that were not selected as either the low price block or the high price block.
- There shall be only one TOU rate structure for all utilities.
- The TOU rate shall continue to be the mandatory rate structure for NEM customers.
- The TOU rate shall become mandatory for all customers to align TOU use with California clean energy policy across all customer classes.

The following explanation for the TOU rate revisions will use SDG&E's TOU tariff "Schedule TOU-DR1, residential time-of-use" ("default rate") as an example of the standard IOU TOU tariff.[56] According to the tariff, SDG&E's Schedule TOU-DR1 is the "default Time-of-Use (TOU) rate for eligible residential customers."[57] To quickly understand the rates charged at the times of day and times of year in the SDG&E default rate, PCF has created Figure 6 and Figure 7 using the information from the default rate schedule.

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[56] SDG&E, Schedule TOU-DR1, see http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_TOU-DR1.pdf.

[57] *Ibid.*

Figure 6: SDG&E Summer Default TOU Rates (June 1 to October 31)[58]

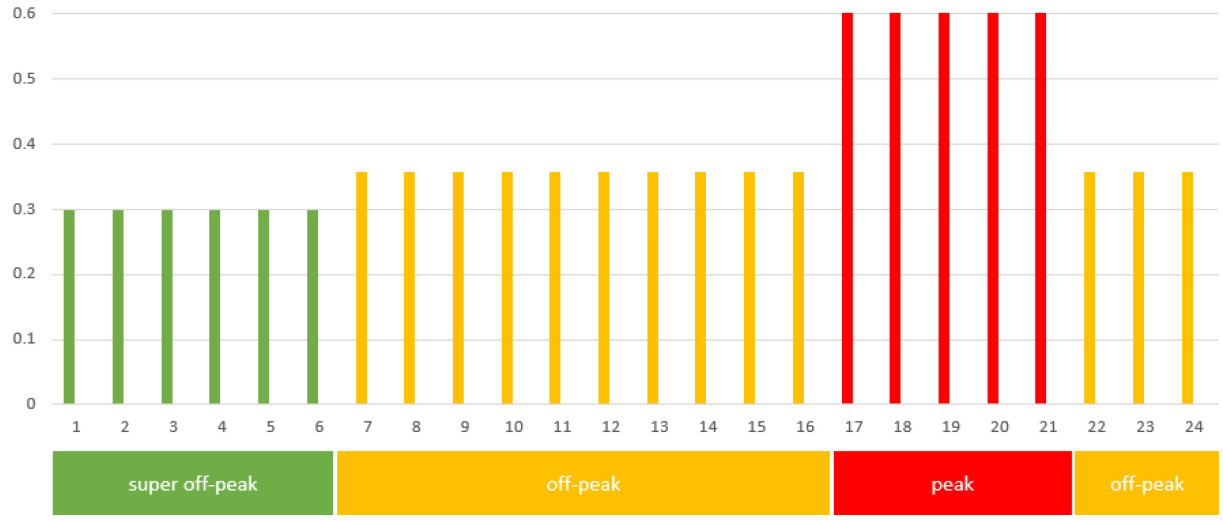
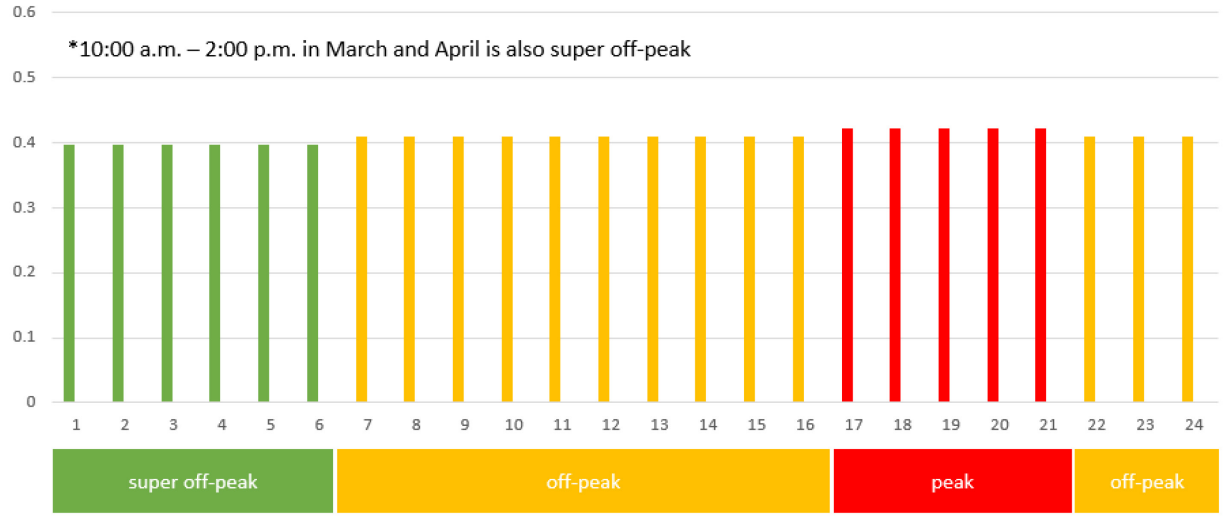


Figure 7: SDG&E Winter Default TOU Rates (November 1 to May 31)[59]



Figures 6 and 7 highlight some clear conflicts between SDG&E's TOU pricing and California's policy to "achieve carbon neutrality as soon as possible."[60] First, when comparing Figures 6 and 7 with Figure 2 one can see that SDG&E has structured its TOU rates to incentivize energy use during super off-peak hours – a time when Figure 2 shows a high amount

[58] *Ibid.*

[59] *Ibid.*

[60] California Executive Order B-55-18.

of fossil fuel generation. Second, the mid-day "off peak" rate – the time when renewable energy generation is the highest and the wholesale energy costs are the lowest – is inexplicably assigned the middle price point. SDG&E should have assigned the mid-day time the lowest energy prices if it were intending to align the time of use rates with California clean energy policy and wholesale electricity prices. Finally, despite the fact that renewable energy generation in the summer and the winter both conform to the pattern of high renewable energy generation during mid-day and low renewable energy generation after dark,[61] SDG&E has essentially eliminated TOU pricing in the winter. The difference between SDG&E's winter TOU super off-peak pricing and SDG&E winter TOU on-peak pricing is only 6%.[62]

SDG&E's other TOU rates are even less well aligned with California energy policy. SDG&E's EV-TOU-5 rate, a rate specifically for electric vehicle ("EV") owners, encourages the largest fleet of batteries in California – EV batteries – to charge during a time of high fossil fuel generation by setting the cost of electricity between midnight and 6 a.m. at less than 10 cents per kWh.[63] In fact, SDG&E, through each of its TOU rates, incentivizes fossil use. This incentivization of fossil fuel use aligns with SDG&E's CEO's position on methane when she states that California should "reject the false narrative around natural gas — that it's antithetical to a clean energy future."[64]

A diverse set of highly regarded researchers and authorities disagree with SDG&E CEO's position on methane. Regarding methane's effect on climate change, the United Nations'

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[61] See Figure 2.

[62] ($0.39793 / $0.42128) – 1 = 0.0586 = 6%

[63] SDG&E, Schedule EV-TOU-5, see http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_EV-TOU-5.pdf.

[64] San Diego Union Tribune, *Your Say: Heat waves. Blackouts. Renewable energy. What does it all mean for California's future?,* (August 28, 2020), see https://www.sandiegouniontribune.com/opinion/letters-to-the-editor/story/2020-08-28/your-say-how-is-california-handling-the-heat.

Intergovernmental panel on Climate Change states that methane is a greenhouse gas with 86 times the warming potential of carbon.[65] A Harvard researcher noted in the LA times that the methane blowout at Aliso Canyon caused "one of the worst environmental disasters in U.S history."[66] Moreover, burning fossil fuels such as methane causes negative health outcomes. Harvard researchers found that there is a "global total of 10.2…million premature deaths annually attributable to the fossil-fuel component of PM2.5."[67] Methane also causes much higher rates of asthma in children when used in cooking. UCLA's Fielding School of Public Health recently cited[68] a meta study finding that children in homes with gas cooking were 42% more

[65] United Nations, Intergovernmental Panel on Climate Change, *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2013) Table 8.7, at p. 714. Available at https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf (Methane is a greenhouse gas with a global warming potential 86 times more potent than CO_2 over a 20 year time horizon).

[66] Los Angeles Times, *Op-Ed: The Aliso Canyon gas leak was a disaster. There are 10,000 more storage wells out there just like it*, (May 14, 2018), see https://www.latimes.com/opinion/op-ed/la-oe-michanowicz-aliso-canyon-gas-leak-20180514-story.html.

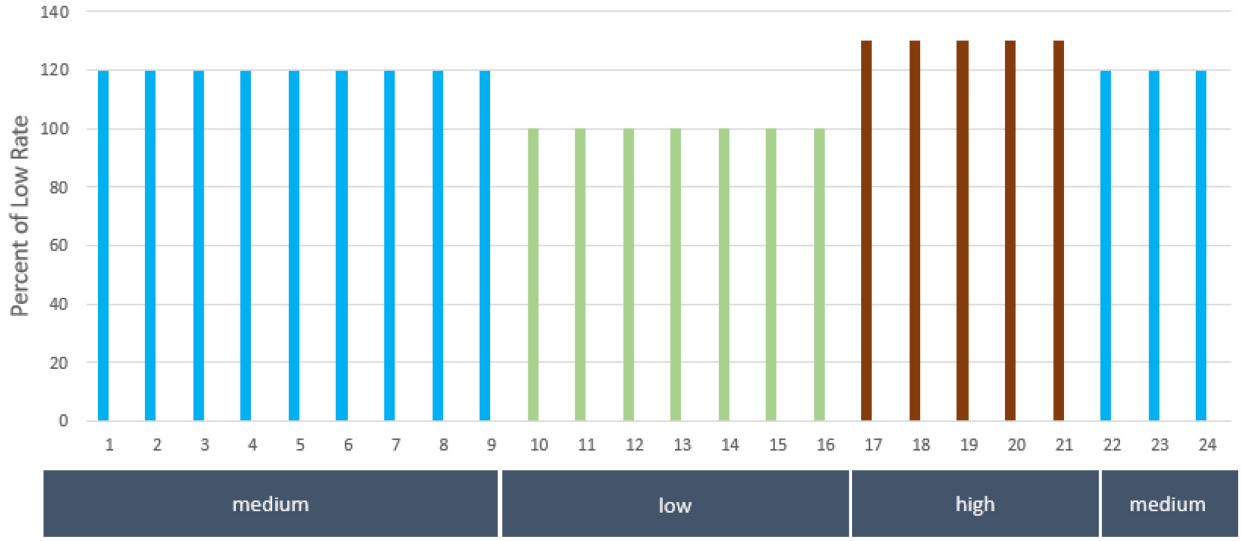
[67] Environmental Research, *Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem*, (April 2021), ("We estimate a global total of 10.2 (95% CI: −47.1 to 17.0) million premature deaths annually attributable to the fossil-fuel component of PM2.5.") see https://www.sciencedirect.com/science/article/abs/pii/S0013935121000487.

[68] UCLA, Effects of Residential Gas Appliances on indoor and Outdoor Air Quality and Public Health in California, (April 2020), p. 18, ("…one meta-analysis reporting that children living in homes using gas for cooking have a 42% higher risk of having asthma.") see https://ucla.app.box.com/s/xyzt8jc1ixnetiv0269qe704wu0ihif7.

likely to have asthma.[69] Finally, as cited earlier in these proposals, climate change already costs California more than a trillion dollars each decade.[70]

D.21-02-007 included a guiding principle stating that "[a] successor to the net energy metering tariff should be coordinated with the Commission and California's energy policies..."[71] As a component of the NEM 3.0 tariff the Commission should require all IOUs to set a single TOU rate. Figure 8 represents PCF's proposed TOU rate – a rate that the Commission should require all IOUs to adopt as their *only* available TOU rate.

Figure 8: PCF Proposed TOU Rate Price Blocks (Low, Medium, High)



[69] Weiwei Lin, Bert Brunekreef, Ulrike Gehring, Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children, International Journal of Epidemiology, Volume 42, Issue 6, December 2013, Pages 1724–1737, ("The meta-analysis of findings from 19 studies on the association between gas cooking and asthma… demonstrates an increased odds of current asthma [random effects meta-odds ratio (OR) 1.42; 95% CI, 1.23–1.64, P = 0.000, n = 11 studies) and lifetime asthma (1.24; 95% CI, 1.04–1.47, P = 0.014, n = 8 studies) in children exposed to gas cooking.") see https://doi.org/10.1093/ije/dyt150.

[70] 2018 Statewide Summary Report California's Fourth Climate Change Assessment ("Climate Change Assessment"), Publication number: SUM¬CCCA4-2018-013, Table 6, p. 42 (110 billion per year x 10 years = 1.1 trillion per decade). Available at https://www.climateassessment.ca.gov/.

[71] D.21-02-007, guiding principle (e), p. 34.

The PCF TOU rate proposal: simplifies the TOU pricing structure by eliminating summer and winter differences; aligns the cost of retail electricity pricing with the cost of wholesale electricity pricing; aligns the low cost electricity pricing with the times of highest renewable energy production; aligns the highest cost electricity with the times of highest fossil fuel generation and highest T&D congestions; and creates enough of a price differential between the pricing blocks to incentivize behavior change.

Few customers will be able to use electricity only during the low price block however, many customers will be able to shift much of their electricity use into the low price block. For instance, anyone home during the day can shift their primary electricity use into the middle of the day such as: people who work evenings and nights, people who do not work, and people who work from home. Additionally, many commercial and government entities can focus their primary energy use into the middle of the day. These electricity users include: schools, office buildings, government buildings, many service industry businesses and other businesses. The PCF TOU proposal will also encourage businesses that operate during mid-day to install electric vehicle charges for their employees, and it encourages employees to ask their employers for access to electric vehicle charging at work.

The TOU proposal, just like PCF's Community Storage proposal, allows the opportunity for the Commission to calibrate the TOU rate structure to align with the statutory requirement to balance costs and benefits. If the Commission determines that the high pricing block should be a few percentage points higher or lower, then those adjustments can be made in order to properly balance costs and benefits.

The purpose of TOU pricing is to guide consumer behavior so that retail rates better align with wholesale costs and so that electricity demand increases during times of high renewable

generation. However, creating *extreme* TOU price differentials simply penalizes consumers who cannot shift their electricity use behavior. For instance, there are single parents who works seven days a week in the service sector and pick up their kids from daycare just as the high price block TOU rate goes into effect. Dramatically increasing the TOU price differentials will simply punish those single parent families and other who have no option for shifting their electricity use. The Commission should use TOU pricing as a guide for those who can change their electricity use behaviors rather than a bludgeon punishing the unlucky people within of our communities that must use electricity during small and specific time windows.

The Commission should adopt the PCF TOU rate proposal as a component of the NEM 3.0 tariff and require all IOUs to replace all existing TOU rates with the PCF's proposed TOU rate.

VII. CONCLUSION

For the reasons stated above, the Commission should adopt PCF NEM 3.0 proposals A through E as components of the NEM 3.0 tariff. The proposals will aid NEM 3.0 in conforming to statutory requirements, align with California energy policy, and optimize NEM costs and benefits of the good of all communities.

Respectfully submitted,

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