Net Energy Metering Fact Sheet

Introduction

Net Energy Metering (NEM), rooftop solar and distributed energy are all part of a larger set of issues related to how to accelerate the transition from greenhouse gas emitting fossil fuels to renewable energy. This fact sheet provides a framework for objective analysis and discussion of the role of NEM in that larger context.

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1. What is Net Energy Metering?

Net Energy Metering (NEM) is a California state public policy designed to hasten the transition from fossil fuel energy to renewable energy by promoting private investment in rooftop solar. NEM is part of a suite of public policies that address the dangers to health and safety posed by climate change.

The NEM program was established by Senate Bill (SB) 656 (Alquist), in 1995, and codified in Section 2827 of the Public Utilities Code. The current version of NEM was adopted by the California Public Utilities Commission (CPUC) in January 2016 by Decision (D.)16-01-044.

NEM applies to customer generators in Investor Owned Utilities (IOU's) like PG&E, So Cal Edison and San Diego Gas and Electric. Although municipal (public, non-profit) utilities like Los Angeles Department of Water and Power, Pasadena Water & Power, and the Sacramento Municipal Utilities District, offer NEM to customer generators, they are not regulated by the CPUC.

The NEM program currently under effect is referred to as NEM 2.0. In 2021, the CPUC proposed a major revision that is referred to as NEM 3.0.

2. How does NEM work?

The way that NEM 2.0 works currently is neatly summarized in the CPUC decision ((D.)16-01-044) that established the program:

> "Under NEM, customer-generators [customers who have rooftop solar] offset their charges for any consumption of electricity provided directly by their renewable energy facilities [their rooftop solar system] and receive a financial credit for power generated by their on-site systems that is fed back into the power grid for use by other utility customers over the course of a billing cycle. The credits are valued at the "same price per kilowatt hour" (kWh) that customers would otherwise be charged for electricity consumed. Net credits created in one billing period carry forward to offset customer-generators' subsequent electricity bills. At the end of every year that a customer-generator has been on the NEM tariff, the credits and charges accrued over the previous 12-month billing period are "trued-up."[1]

The word "metering" refers to the bidirectional meter that is installed in the home and measures electricity flow going into the home and out of the home to the grid. "Net" refers to the fact that the difference between the in-flow and the outflow of energy is the amount of the credit.

For example, if the NEM customer uses 50 kilowatts of electricity, but his rooftop solar system generates only 40 kilowatts, the customer imports 10 kilowatts of electricity from the grid, and pays the full rate for that electricity, like a customer that does not have an installed solar system. This is called the "retail rate."

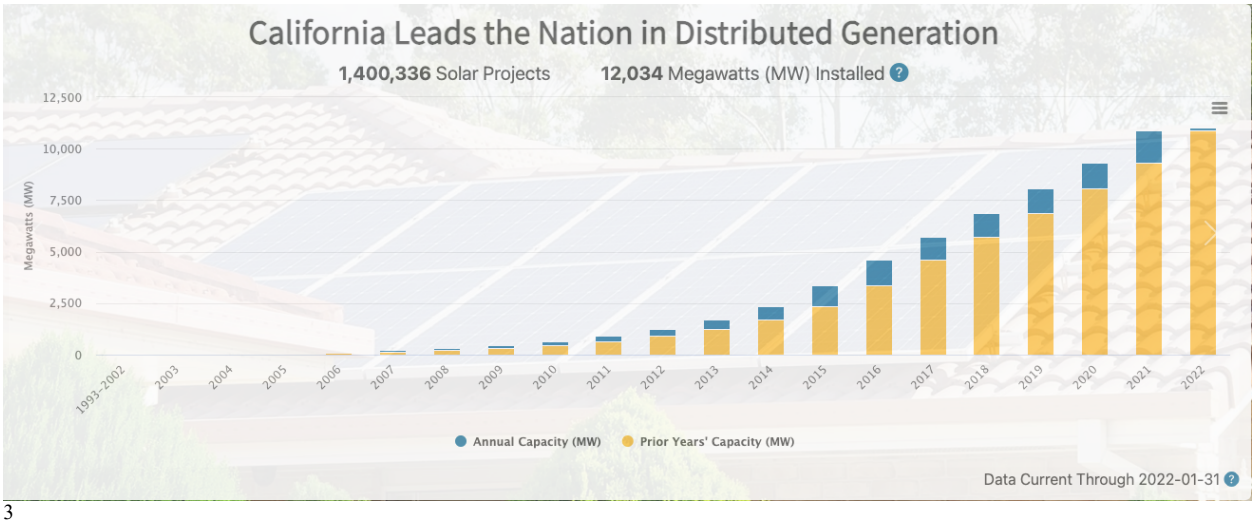
But if that customer's rooftop solar system generates 50 kilowatts in one day, and the household uses only 40, the surplus 10 kilowatts of electricity flows to the grid. In that case, the utility company either sells that 10 kilowatts to other customers at the retail rate or stores it using a variety of storage means.[2] The NEM customer is a "generator" and receives a credit (not a payment) on his bill of 10 kilowatts.

3. ***Why NEM?***

NEM is a policy tool to promote the transition from fossil fuel energy to renewable energy, in particular by means of Distributed Generation (DG) of energy. Customers with rooftop solar make DG energy. Experts acknowledge that both DG and Centralized Generation (large scale generation of electricity at facilities located away from end-users and connected to a network of high-voltage transmission lines) are both essential if we are to make the necessary transition in time to save the planet from climate catastrophe.

Another objective of NEM as a policy tool is to support the growth and development of domestic solar technology and industry.

The success of NEM as a policy tool is evidenced by the data in this chart:



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Public policy has favored NEM because the climate crisis necessitates a massive and urgent response by the private sector as well as the public sector. Without global adoption of renewable energy in the next 10 years, we will experience catastrophic climate changes. The floods, sea level rise, water scarcity, fires, heat, species extinction, population migration and other consequences will disproportionately harm poor people, communities of color and populations at or close to sea level.

Centralized generation alone is not moving fast enough to achieve the renewable energy transition that is needed to avert an increase of 2 degrees centigrade, an increase that would cause human and economic catastrophe.

Conservation, efficiency and lifestyle changes, which were strategies favored in the late 20th century, are not sufficient to reduce consumption of fossil fuel energy and avert climate catastrophe.

4. Are public policy incentives appropriate in a market economy?

There are many precedents for government policy tools to promote technology development and adoption. One of the most conspicuous is the subsidy for the semiconductor industry from the 1980s with the creation of SEMATECH to the present multi-billion-dollar funding by the federal government.[4]

Another precedent is the industry policy of subsidizing fossil fuel industry to lower the cost of production and incentivize exploration. These include but are not limited to the intangible drilling costs deduction, percentage depletion accounting, "clean coal" credit, unconventional fuels tax credit, LIFO accounting, foreign tax credit, and the DOE Advanced Fossil Loan Programs Office.[5] Current fossil fuel subsidies are valued at approximately $20 billion per year.[6] A recent International Monetary Fund study estimates the current value of global fossil fuel incentives at $5.9 trillion as of 2020.[7] In addition, from 2019 to 2023, tax subsidies are expected to reduce federal revenue by around $11.5 billion.[8]

Investor-owned utilities are themselves an example of policy tools at work. In exchange for investment in energy management and distribution infrastructure and acceptance of rate regulation, utilities are granted a monopoly and guaranteed a profit on their capital expenses which include transformers, powerlines, buildings and batteries.

As the Supreme Court of the United States ruled in the Binghamton Bridge case in 1865: "[I]f you will embark, with your time, money, and skill, in an enterprise which will accommodate the public necessities, we will grant to you, for a limited time period or in perpetuity, privileges that will justify the expenditure of your money, and the employment of your time and skill." The very purpose and functioning of regulated utilities are based on secure policy commitments, which the utilities have benefitted from, but are not willing to extend to the solar industry and its customers.

A strong public policy tool, with incentives for distributed generation of renewable energy, is highly appropriate given the existential threat of climate change. The scientific consensus is that we have less than ten years to reduce greenhouse gas emissions or face catastrophic consequences. The recent 2022 IPCC report warns of: "Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought and fire weather (high confidence)."[9]

5. Is NEM used as a policy tool in other countries and in other states of the U.S.?

The following countries use various NEM programs to promote the development of renewable energy technology and adoption of rooftop solar as a form of DG:

- Australia
- Canada (states of Ontario, British Columbia, Nova Scotia, New Brunswick)
- Denmark
- France
- Germany (feed-in-tariff)
- India
- Ireland ("Microgeneration Support Scheme")
- Italy
- The Netherlands
- Norway[10]
- Poland
- Slovenia
- Spain

In the United States, 41 states as well as Washington, D.C., Puerto Rico, American Samoa and the Virgin Islands have net metering laws that require utilities to offer NEM to solar generators.[11]

6. How does NEM affect the operation of the Grid?

Net metering allows the use of what would otherwise be unused solar energy by sending it to the Grid. By using the Grid as a storage resource, the customer generator shares electric energy with the community for flexible use when it is needed. Batteries combined with rooftop solar are good for contributing to the grid because they store electricity from the daytime, when electricity is in great supply in California and is cheap, to the evening, when electricity is in short supply and is expensive. Were customers with rooftop solar to rely exclusively on batteries to store surplus energy, the electricity they generate would remain in a closed loop and not contribute needed electricity to the Grid.[12]

NEM reduces the demand on the overburdened Grid by as much as 25 percent during midday when the sun is shining, and air conditioning systems are in use.[13] The demand for electricity is expected to increase with the growth of electric vehicles and building electrification in the next 10 years, thus increasing the need for more renewable energy generation, both distributed (DG) and centralized (CG).

California investor-owned utilities don't make money selling electricity to customers. They profit by investing in transmission lines to bring utility scale renewable energy to their customers. The more rooftop solar and batteries are embedded in the local distribution system the less transmission is needed, saving ratepayers (customers) money. So, the customers' interest is in more rooftop solar and distributed generation, while the IOUs' interest is in distance generation.

NEM increases DG energy generation on physical spaces that would not otherwise be used. Without NEM, the "space resource" of rooftops exposed to the sun would be less utilized since the economic incentive to install and use rooftop solar would be dramatically decreased.

The national Grid is fragile and outdated. It requires not only massive funding for renovation, but also government and private sector coordination that has not yet been fully planned.[14] Centralized generation with its transmission of electricity over distances can be interrupted by severe weather and by national security crimes. NEM supports the growth of DG as a security alternative and supplement to centralized generation and long-distance transmission.

7. Do customer generators under the current NEM 2.0 contribute to the cost of and operation and maintenance of the Grid?

Investor-owned utilities (I.O.U.s) charge all customers for their operational costs. For example, PG&E bills all customers a minimum bill that includes "components for the generation of electricity (Energy Charge) and the delivery of energy (Minimum Delivery Charge)." The generation portion of the bill (Energy Charge) is used to pay for the electricity itself, while the delivery portion (Minimum Delivery Charge) is used to pay for the transportation of the electricity over PG&E's grid, distribution maintenance, and other charges approved by the California Public Utilities Commission to fund energy efficiency and low-income programs."

8. Are NEM and rooftop solar systems mainly for wealthy customers?

According to the CPUC, in 2019 71% of installed rooftop solar systems in California were in ZIP codes with median household incomes below $100,000. The proportion of rooftop solar installations in California in lower-income areas has increased over time from 60% in 2007.[15]

A 2022 Study from Lawrence Livermore National Lab shows that the solar market is deepening, by appealing to less affluent households, and it is broadening into less affluent states.[16]

Another study shows that since 2014, 59% of residential solar installations were in zip codes with median incomes of $40,000 - $70,000 per year.[17]

9. What are the changes to NEM that the CPUC proposed in 2021?

In December of 2021, the CPUC proposed changes to the current version of NEM (NEM2). It called this proposal NEM 3.0. After public protest, the CPUC withdrew the proposal in early 2022. The proposed changes in NEM 3.0 include:

- A "grid participation charge" on solar customers only. This charge would increase with the size of the rooftop solar system. This charge on the bills of customers with rooftop solar of about $7 to $11 per kilowatt of solar system size. A small solar array with 9 panels would generate about 3 kilowatts, thus the solar customer would have to pay about $30 per month. A middle-sized solar system, say with 20 solar panels, would generate

about 7 kilowatts so the solar customer under NEM 3 would have to pay between $49 and $77 per month to the utility. A larger solar array, with 30 panels, enough panels to charge an EV or 2, and a 3,000 sq. foot structure, would have to pay $70 to $100 extra each month for electricity. This fee would be charged for "grid participation even if the customer used more electricity than he produced and had to buy more at the retail rate.

The grid participation charge would have at least two serious impacts on solar energy in California. First, high monthly charges that increase with the size of the solar system that the customer has installed. This would discourage a homeowner who is considering buying a rooftop solar system from investing in the largest size system he can afford because of monthly charges based on the number of panels he installs. Although the NEM 3.0 proposal also proposes to allow solar systems to be sized to cover 150 percent of a customer's historical load in order to enable future electrification, the size-based grid participation charge is a direct disincentive to do so.

Second, over the estimated 30-year life of an array of solar panels, the total grid participation charge paid to the utility would be comparable to the price the homeowner paid for the purchase and installation of the solar system. So, under NEM 3.0 the solar customer would be expected to generate electricity and contribute it to the grid, plus pay the utility the cost of the system!

- Reduction of the credits that solar generators get for sending unused energy to the grid by as much as 80%.

- Creation of policies to promote purchase of batteries by solar customers including rebates and high differentials between peak and off-peak prices. Higher on-peak prices incent storage usage, while lower off-peak prices make using electric vehicles and appliances more affordable.

Both the monthly surcharge and the grid participation fee would be discounted or eliminated for low (not middle) income customers who could afford to install rooftop solar systems.

10. What models and concepts were used by the utilities to study NEM in 2020?

The utilities proposed a model based on an Export Compensation Rate (ECR) based on an Avoided Cost Calculator (ACC). Avoided cost means: "the marginal costs a utility would avoid in any given hour if the utility uses rooftop solar instead of centralized generation."[18]

Avoided cost is a common concept in the power world and is one of the ways to try to establish a value for non-utility scale power generation. It's part of the debate between proponents of DG vs. CG (distributed energy vs. centralized energy.) Keep in mind that utilities are motivated to use CG because they are legally guaranteed profits, as part of their monopoly status.

The ACC is a complicated set of formulas that tries to figure out the real value of DG as opposed to CG. ACC is used by consultants who are generally employed by utility companies. It is supposed to take into account the value of DG in reducing long distance transmission and

distribution grid costs. But it doesn't always take into account factors like the environmental costs of long-distance transmission, the cost of anticipated strengthening of the Grid (it's in bad shape), and the cost of disasters and losses caused by Grid lapses and collapses. ACC also is based on highly variable calculations which would change the value of roof top solar energy every year. The CPUC proposal for NEM 3.0 uses an ACC model that sets hourly solar export compensation rates (the amount of the credit given to the solar customer), with different rates for different climate zones. The hourly values would be fixed at an average for the first 5 years after the solar customer installs his system, but after that it would get adjusted every year based on the latest ACC calculations. The purpose of all of this is to ensure that "benefits are approximately equal to the total costs".[19]

Of course, no investor makes a major investment with the hope that the benefit will be approximately equal to the cost. And in this case, no homeowner would have any way of anticipating his return on investment since the value of his solar roof top would change every year. And he would have no way of understanding, much less objecting to, a non-transparent and complex mathematical model like the ACC that is wielded by experts in the CPUC, utilities and consultant firms.

ACC does not consider the most important fact: NEM is a policy tool intended to make rooftop solar an *advantage* to private parties who are willing to invest in the public good with the hope of private benefit.

Another problem with ACC is that it is so imprecise, variable and non-transparent that the public cannot anticipate the perfect avoided cost value that ACC is supposed to determine. This would turn the solar industry into an "economic minefield."

As one commentator put it:

> "In a perfect world, using these values would create an optimally organized system, with customers, solar companies, utilities and the state as a whole getting the biggest bang for the buck out of each unit of solar deployed.
>
> But we don't live in a perfect world — we live in a world that faces a tight deadline to deploy as much solar energy as possible. Weighing the risks of overcompensating solar owners for investing in clean energy generation capacity on one hand, and stifling that needed investment on the other hand, it's hard to see the benefits of choosing the latter over the former. Regulators may have, with the best of intentions, positioned a more perfect method of valuing rooftop solar as the enemy of good solar policy."[20]

11. What arguments did the CPUC and the utilities make to support the proposed changes to NEM?

a) The "free ride" argument. Utilities claim that solar customers don't pay the full cost of their use of the Grid.

b) The "cost shift"/hurts poor people argument. Utilities claim that this cost is "shifted" to low and middle-income customers and that wealthy people are the primary beneficiaries of rooftop solar.

c.) The CG is better/cheaper than DG" argument. Utilities claim that the value of customer generated electricity should be determined by the "avoided cost" to the utility of buying energy elsewhere.

d) The "batteries are better" argument. NEM 3.0 would give "price signals" to solar customers to buy batteries which would help even out the highs and lows of energy production during midday sunlight vs. evening.

e) The "NEM has done its job" argument. The utilities argue that there is no longer a need for NEM as a policy tool because rooftop solar has increased and now is the time to level off the benefits afforded to solar customers.[21]

12. What are the rebuttals to the CPUC arguments?

a) Free ride. This ignores the fact that customers with rooftop solar systems have made a very substantial investment to install a solar system on their property ($10,000 to $70,000 or more). They are not on a free ride. On the contrary, the solar customer is making an expensive long-term investment in public welfare with a modest and precarious personal gain after 7-10 years, as long as the CPUC and the utilities don't change the rules, an assumption that seems increasingly precarious. Further, the solar customer is providing value by exporting surplus energy to the grid.

Requiring only solar customers to pay a grid participation fee would destroy any financial incentive to invest in rooftop solar. (See #9 and #13) Moreover, requiring solar generators pay a higher "grid maintenance" fee based on the size of their rooftop solar systems is a disincentive to customer investment in rooftop solar systems. It also discourages full home electrification and the use of electric vehicles (EVs).

The free ride argument underestimates *the value* of the solar generator's contribution to energy supply. It relies on the "avoided cost" calculation that utilities often use in the Avoidable Cost Calculator model (ACC) but doesn't explain the many problems with this model. The ACC is supposed to be a way to determine that exact value (the "avoided cost") from moment to moment of distributed solar energy, as opposed to utility scale energy generation (e.g. electricity purchased from a long distance fossil fuel power plant). However, the ACC doesn't take into account all costs and is too variable.

Even if the avoided cost model were precise, and all data entered into it were correct, the notion that the exact value of solar energy can be determined, and that the customer generator should never receive more benefit than that theoretical value, ignores the whole point of NEM: it is an *incentive* system. *If the customer generator only receives back the exact value of the energy he contributes, why invest in a rooftop solar system?* This is especially problematical since his benefit is so precarious given the constant lobbying of the utilities and the fossil fuel industry and the CPUC changes.

The avoided cost argument is really an argument against distributed generation of energy, a raging debate in which utilities claim that centralized utility scale generation that travels over distance transmission lines is better and cheaper. Not coincidentally, *IOUs gain their profit through distance transmission of electricity,* so their argument is biased. Distributed energy advocates disagree and claim that a mix of distributed and centralized energy is essential to provide adequate electricity, to protect the environment, to protect against extreme climate disruptions on transmission and national security crimes, and for a number of other reasons.

While there may be an argument to charge all utility users the same fixed "grid connection charge" (including both non-solar and solar customers) it should not be dependent on the size of the rooftop solar system, and it should not be permitted to suppress the transition to EVs.. Solar industry advocates/lobbyists have proposed a gradual and predictable "glide path" that would permit utilities to recover actual, measurable and predictable costs over time.

b) Cost shift/hurts poor people. There's no commitment in NEM 3.0 that IOUs will use any $ they gain by charging new fees to solar generators and reducing their credits to give a benefit to low or middle-income customers.

The cost shift argument is based on a false premise, that there is a one-to-one correspondence between NEM and rates. In fact, there is little basis for blaming the difficult finances of the IOUs on NEM 2.0. One of IOUs' costs is related to energy pricing and "legacy contracts" for fossil fuel that are expensive, relative to decreasing costs for solar energy. The IOU's have fought for years to make Community Choice Aggregators (CCAs) pay for part of those legacy costs, and in that context too, they blame CCA's for rising rates!

Is the reason for rising IOU prices imposed on customers:

- competition from the CCA's,
- legacy contracts with high fossil fuel pricing,
- inefficient management,
- the $7.5 billion PG &E bail out,
- wildfires,
- rising fossil fuel prices,
- fires and explosions resulting from negligence and consequent CPUC, tort and criminal penalties?
- the growing costs of infrastructure modernization, technology development,
- fossil fuel market perturbations because of international conflicts,
- cartel manipulations,
- excessive profits taking,

or is the reason NEM 2.0 and rooftop solar?

Note that all three of the California IOU's have been solidly profitable for at least the last decade and in 2019 began a campaign to seek even higher profit margins from the CPUC.[22]

In fact, as utilities continue to rely on fossil fuel and centralized generation--which is likely if the solar industry is damaged and customers no longer have a strong incentive to invest in solar—the utility bills of low and middle income customers will rise. Utilities have shown little inclination to offer income-based discounts on utility bills. Most low and middle income utility customers are experiencing significant increases in utility bills. The utilities blame these increases on NEM, but the actual cause is more complex; the growing costs of infrastructure modernization, technology development and legacy high-cost fossil fuel contracts are significant causes of the increases in customer utility bills.

NEM 3.0 would make it nearly impossible for low-income customers to acquire solar panels for their homes since they have less disposable income to pay for the longer amortization costs that NEM 3.0 would impose.

If the utility companies have a genuine desire to help low-income persons with high utility bills or to help them pay for rooftop solar, there are better ways to do this than imposing high costs on solar customers. Virtual net metering, community solar and subsidies for low income rate payers are all direct ways to help. See answer to Fact Sheet #15.

The investor-owned utilities cloak their fear that NEM will hurt their guaranteed profits on transmission from centralized generation with the cynical narrative that NEM hurts the poor. One of the most active proponents of the "NEM hurts the poor" argument is PG&E, which

- *despite* having been found to have caused a string of disasters (the 2010 San Bruno pipeline explosion that destroyed a neighborhood and killed 8, the 2015 deadly blaze in Amador County and Calaveras County, fatal infernos in the North Bay Wine Country and nearby regions in 2017, and California's deadliest and most destructive wildfire in Butte County in 2018) and

- *despite* being convicted of felonies in connection with the San Bruno explosion and

- *despite* pleading guilty in 2020 to 84 counts of involuntary manslaughter in connection with the Butte County fire, and

- *despite* bankruptcy, and

- *despite* being assessed a $1.6 billion penalty by the PUC in connection with the San Bruno explosion and $1.94 billion PUC penalty in connection with the 2017 and 2018 wildfires, and

- *despite* the pendency of more criminal charges in connection with equipment failures causing the Kincade fire in 2019 and the Shasta fire in 2020,

awarded its executives shockingly high executive compensation. PG&E, the "it hurts the poor" advocate for low-income customers paid these executive compensation packages:

— Peter Darbee, the CEO during the San Bruno pipeline explosion got a $35 million package when he stepped down after the disaster, which, after public outcry, PG&E assured that it, not the ratepayers, would pay.

— William Johnson, former CEO. $1.76 million in 2020, down from $18.5 million in 2019 after public outcry. (He also got $1.72 million from the sale of stock options);

—William Smith, interim CEO, $6.17 million in direct compensation plus $2.03 from sale of stock options;

—Patti Poppe, the new 2021 CEO of the holding company, got a base salary of $1.35 million, plus long-term incentive award has a target value of $9.25 million for 2021, according to the SEC document plus a one-time award of restricted stock valued at $31.92 million and a one-time cash award of $6.6 million.

— Michael Lewis, interim president of the utility unit of the holding company. $2.08 million in 2020;

— Andrew Vessey, former CEO. $3.63 million in 2020, up from $2.37 million in 2019.

— John Simon, PG&E general counsel, and chief ethics & compliance officer. $5.13 million in 2020, up from $1.55 million in 2019;

— Janet Loduca, former PG&E general counsel. $3.71 million in 2020, up from $1.22 million in 2019.[23]

c) DG vs. CG. The avoided cost argument—that the value of rooftop solar as distributed generation is less than centralized generation-- is addressed above in #10. Both centralized and distribution generation are essential if we are to avert climate catastrophe. Unfortunately, the law gives utilities a strong financial incentive to prefer centralized generation. "The law says they should spend the least they can while providing quality, environmentally safe service, but when it comes to their bottom line, utilities are incentivized to make more costly investments. The more they spend on physical infrastructure, the more profit they stand to make."[24]

d) Batteries. While adding storage is a reasonable goal, it should be secondary to maximized renewable energy output, which helps everyone every day, not just on days of rolling blackouts. Also, having a large number of solar systems installed will make it easier for utility companies to harden the grid when this technology evolves. Finally, the idea that new solar customers and those who have already invested in a solar system will also invest in an expensive battery may be unrealistic. And if the solar customer can afford a battery, the new high solar surcharge and grid participation fee will encourage him to use that battery to become grid independent. With growth in new technologies to permit using vehicles as batteries, eventual reductions in battery pricing, and building and vehicle electrification, the push towards grid independence could occur in the near future. –But a departure of solar generators from the grid would likely reduce energy brought into the grid by customer generators, and threaten the ability of the regional/national grid to survive severe climate and security shocks. There will be

so many new electrified buildings and EV charging stations that the existing grid will be too small. More solar generators are needed and batteries will play an important role in the new grid, but not without distributed generation.

d) "Done its job." NEM is an effective policy tool to increase rooftop solar, but its job is far from done. Today, in California, the leader in rooftop solar in the United States, only about 1.3 million residential rooftop solar systems exist out of a total housing stock of more than 12 million. Moreover, we are short of reaching the California state goal of 100% clean energy by 2045. We need to increase incentives for renewable energy rather than decrease them.

13. How would the NEM 3.0 changes affect solar customers, the solar industry and the adoption of DG rooftop solar?

The CPUC underestimated the impact of 3.0 on the time it would take a solar customer to amortize their investment in a rooftop solar system, erroneously claiming that it is currently 3 to 5 years. In fact, the time period is between 8 and 10 years. NEM 3.0 would make the amortization period 14 to 15 years. For many senior homeowners who might consider investing in rooftop solar as a commitment to the future of their children and grandchildren, that would mean that their investment would not be amortized until after their deaths.

The rooftop solar industry in California employs more than 68,000 of which 43,000 work in installation of rooftop solar and 59% of those workers are installing residential systems.[25]

Professor Mark Z. Jacobson of Stanford University describes the consequences of adopting the "reforms" of NEM 3.0:

> "The California Public Utilities Commission is poised to kill off much of the rooftop solar photovoltaic (PV) industry in California, which will result in the use of more polluting natural gas and biomass electricity as well as dirty electricity imported from out of state. The use of the new dirty electricity will raise air pollution death rates in California above the 12,000 per year who perish in the state already. Most of these additional deaths will be in poor communities in the Los Angeles basin and Central Valley, where pollution levels are already the highest in the state." [26]

One 2022 study forecast that NEM 3.0 would cause California's new residential solar installed capacity to drop 42% between 2022 and 2023, and drop another 10% in 2024. That year, new annual residential installed capacity would be about half of 2021 volumes, sinking to its lowest annual output since 2014.[27]

States that have diminished NEM have shown the drastic and negative effect these "reforms" have had on the solar industry and solar adoption by the public.

- In Nevada, the state's rooftop solar adoption rate plummeted 47 percent in the year after the state's public utilities commission made solar more expensive for consumers by

adding higher fixed costs on net-metering customers and reducing the price paid to customers for the excess energy they generate. A public outcry compelled the Nevada Legislature to reverse the changes, and more people started putting solar panels on their rooftops again.

- In Arizona, the Salt River Project adopted new fees and policies for rooftop solar that nearly doubled the payback time of solar projects. Solar adoption declined between 50 percent and 95 percent after the changes were made.
- The Imperial Irrigation District in California abandoned net metering in July 2016, causing residential solar installations to decline by 88 percent.
- The Turlock Irrigation District in California ended net metering at the beginning of 2015. Within two years, annual residential solar installations had declined 74 percent.[28]

14. How would reducing the NEM incentive affect California's ability to meet its statutory mandate of 100% clean energy by 2045?

As former Governor Arnold Schwarzenegger stated: "[W]e should be pulling out all the stops to slow global warming. California is already so far behind on meeting its 2030 climate goals that the state isn't projected to hit them until 2063. And our 2050 goals? We are on track to reach them by 2111."[29]

15. Would NEM 3.0 lower utility rates or otherwise benefit or protect low to middle income utility customers?

There is no provision in NEM 3.0 for lowering or discounting utility bills for low or middle-income customers who do not have rooftop solar systems.

There is no protection or rate ceiling for low or middle income customers to address high future utility costs as fossil fuel costs continue to rise.

NEM 3.0 states that it would establish a fund called the "Equity Fund" with *up to* $600 million to support clean energy and storage programs for low-income Californians, with "allocation details to be determined following stakeholder feedback." The CPUC states that this fund could support community solar or support new low-income programs that improve access to clean energy. The actual programs and the actual amount of the Fund are not specified.[30]

NEM 3.0 would exempt low-income customers (not middle income), customers living in a disadvantaged community, and tribal households from paying the Grid Participation charge, if these persons could install rooftop solar systems.

But NEM 3.0 would hurt low-income families more than high-income families because the cost to install *and use* solar would become prohibitive. Utility companies, many of which are locked into long term power purchase agreements for fossil fuel ("legacy contracts"), will continue to pass on higher fossil fuels costs, trapping low-income families with high utility bills.

Low-income families globally are most affected by climate change. Asthma, excessive heat, environmental toxicity, certain types of cancer and water scarcity/toxicity are all problems that disproportionately affect minorities and the poor. Reducing our carbon footprint in as many ways as possible will lead to less weather extremes and weather damages, reduced wildfires, lower insurance costs and a healthier air quality which will benefit everyone.

New policy tools should be implemented to find easier paths to solar for low-income families rather than lock them out using the wedge issue of cost-shifting which can be treated more effectively with additional incentives for low-income families.

One focus should be on incentives for community solar programs and Virtual Net Metering.

16. How to obtain objective information about NEM given the financial interests at stake?

The difficulty of sorting fact from fiction is increased by the number of for-profit entities involved in energy sourcing. It is difficult to find and assess objective information about the impact of NEM 2.0 vs. NEM 3.0 on the transition to renewable energy.

The Affordable Clean Energy for All coalition received payments totaling $1.7 million in 2020 from PG&E, SCE, and SDG&E to "stop the cost shift" and support the proposed (and since postponed) Net Energy Metering 3.0 decision.[31]

Severin Borenstein, the director of The Haas Center for Energy at the University of California at Berkeley, has been a vocal advocate of NEM 3.0, especially espousing the "it hurts the poor/cost shift" argument. The Haas Center receives funding from, among others, the three largest investor-owned utilities in California (PG&E, Southern California Edison, and San Diego Gas & Electric and several municipal utilities.[32] However, the Haas Center receives "support" and possibly funding from a number of other entities not directly associated with I.O.U.s. including the CPUC, the California Independent System Operator (CAISO). The amount of contributions from utility companies is not disclosed on the Haas website.

The solar industry has also lobbied for retaining the policy incentives of NEM 2.0, a decision that would economically benefit for-profit solar businesses.

The CPUC identifies the consultancies that prepared the CPUC study and models that justified the proposed "reform" to NEM 2.0 as: Verdant Associates and Itron.[33] Verdant was spun off from Itron. Both are in the business of providing services to "leading utilities across the United States."[34]

The industry lobbying on NEM has been intense. In Florida, Florida Power & Light delivered bill text to a state lawmaker. Its parent company sent $10,000 to her campaign coffers.[35] Although campaign contributions by utility companies are not illegal per se, these kinds of contributions contribute to the difficulty of effective and objective analysis by law makers.

[1] CPUC Decision (D.)16-01-044 p. 13.
[2] The grid stores energy, whether DG or CG, in a variety of ways. See: About Grid Storage, https://www.epa.gov/energy/electricity-storage; see also https://science.howstuffworks.com/environmental/green-tech/sustainable/grid-energy-storage.htm
[3] https://www.californiadgstats.ca.gov/
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