

NEM 3.0 Proposed Decision – Analysis and Comment

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Summary Assessment – Reversal of On-going Retail Solar Industry Growth

Cost shifts between and among customer classes are proposed. They radically change the retail solar value proposition. Because they make life cycle valuation much more complex and contingent on future CPUC decisions, their effect will be disruptive in ways the CPUC has not considered. Positive intended consequences for customers are speculative and over-stated. Negative unintended consequences are not evaluated because they only impact electricity customers indirectly. For example, indirect impacts include loss of city and county economic benefits from on-site solar deployment that currently dwarf any real or imagined savings in utility service costs resulting from the PD. California's retail solar industry is likely to suffer precipitous attrition as a result of its current and future need to present a value proposition to prospective customers based on reliable forecasts of avoided costs.

The need for an attractive value proposition is met now. The future value proposition will be both less attractive and harder to quantify. Time of use rates currently do not encourage on-site battery storage adoption. So, the retail solar industry has not had the opportunity to prepare for the transition that will be required. Its overall financial health and customer acquisition capacity may be significantly degraded. Surviving installers will need time to complete a transition to competently install and service battery storage systems and accurately forecast their economic benefits to electricity users.

Analytical tools, standards and models used by CPUC staff in formulating rule and rate changes are retrospective rather than prospective. Perhaps as a result, the CPUC evinces no interest in how a wrenching retail solar industry transition may play out and what state-wide deployment capacity may remain. In any case, surviving solar retailers will need time to adjust their skill sets and customer cost recovery models. Local governments exercising permitting authority will also need time to adapt to address and resolve issues of battery lifetime and disposal, installer qualifications, and product certification. Greatly increased collaboration between utilities and local governments will be required.

Major Provisions of the Proposed Decision¹

1. Compensation (in the form of bill credits) for net hourly generation is 80% lower for new NEM residential customers than for current NEM residential customers.
2. Grid access fees are imposed on NEM residential customers and are indexed to array rating. A new monthly residential fixed ("grid participation") charge is levied at \$8 per kilowatt (kW) of installed solar capacity.
3. New NEM residential customers are allowed to "oversize" their systems to meet up to 150% of historical usage. Currently the limit is 100%.

¹ Click [here](#) to view the PD. Members of the public can comment on the proposal and view documents related to the proceeding [here](#).

4. Higher but unspecified (per kWh) prices will be offered to new NEM residential customers selling stored solar electricity to the grid between 6 and 9 pm.
5. New PG&E and SCE NEM residential customers will be eligible for a ten year fixed monthly “transition” credit starting at \$10/month for PG&E that steps down to zero over 4 years and is higher for low income customers.
6. Eligibility for NEM-1 and NEM-2 compensation for net generation is reduced from 20 to 15 years. (This enables faster imposition of grid access fees.)
7. NEM 2.0 customers who transition to NEM 3.0 within the next four years become eligible for storage rebates. (They give up their eligibility for NEM 2.0 compensation for net generation.)
8. No annual billing for net over/under-generation. Only monthly.
9. Effective date: 5/28/2022

General Concerns – Rate-setting and Stakeholder Engagement

Rate-setting. The PD should focus on rates. Funding for major new programs deserves legislative attention, not funding proposals buried in rate-setting decisions.

The proposal to create an “equity fund” serves the political purpose of bolstering the relentless but false claim that NEM residential generators enjoy the benefits of a “cost shift” to other low income customers. Rates should be set with reference to valid “cost causation” information, not to address hypothetical cost shifts posited without supporting data and analysis. Creation of incentive programs should start in the legislature, or at least be considered there, not in a rate setting context but in the context of public purpose program prioritization and budgeting.

Stakeholders. Cities and counties are primary stakeholders regarding economic impacts of decisions that affect local decarbonization and energy resilience investments. In support of future stakeholder dialog, energy users across the state should be surveyed to determine how potential rule changes will shape their future decisions to adopt or not adopt on-site solar and on-site energy storage. Likewise, cities and counties across the state should be surveyed to determine the extent to which their climate action and adaptation plans depend on continued deployment of on-site solar and future deployment of on-site and vehicle based electricity storage.

A stakeholder process focused on NEM generation and storage should also recognize that both retail solar and investor-owned utility industries have comparable stakes because they make comparably important contributions to state-wide decarbonization and energy resilience goals. They should engage with one another to work out compromises acceptable to both. Likewise, the CPUC should engage with other policy stakeholders, especially the California Energy Commission - the state’s energy policy lead, CAISO - the state’s lead regarding energy resilience and the California EPA - the state’s lead regarding decarbonization.

The CPUC summary of the PD includes 10 points² which are quoted and analyzed below.

1. Tariff Changes. The PD “evolves the tariff to improve grid reliability and accelerate climate goals by incenting the adoption of solar paired storage systems through more accurate price signals that will provide more value to the electric grid.”

The proposed decision “evolves” the tariff by decreasing (by eighty percent) credits for solar electricity that feeds into local electricity distribution systems when customer usage is less than on-site supply. Credits for net NEM generation are increased to match existing peak time of use rates during early evening peak hours when solar production is winding down.

Will NEM tariff changes accelerate or retard decarbonization progress? Decarbonization progress depends on substitution of carbon free sources for sources that emit GHGs. NEM generation growth³ in recent years has driven state-wide GHG emissions down by approximately one percent per year while enabling affordable electrification of California’s buildings. Further growth will be curtailed or reversed.

Will NEM tariff changes improve grid reliability, or degrade it? Grid reliability will not be improved because distribution grids are still not “smart” enough to use on-site solar plus storage inputs to supply community-wide load when electricity imports are disrupted.

Will tariff changes incent adoption of solar plus storage effectively across all customer classes or favor adoption by some classes over others? While the PD favors storage integration with on-site solar, it favors projects that pair storage with existing solar arrays over projects that pair new solar arrays with storage. NEM generation growth will be retarded for this reason and also because some level of continued commercial NEM customer adoption⁴ of solar paired storage will not off-set a major downturn in residential customer adoption.⁵

Prices utilities pay for net NEM generation will remain grossly inaccurate to the extent they fail to account for major benefits of NEM generation to local economies, to state-wide decarbonization goals and to the avoidance of new transmission investment. Prices resulting from the PD are less, not more accurate because they greatly undervalue net NEM generation.

Electricity customers have had no historical obligation to provide value to the grid or grid owners. Rather rates have been set to recover costs incurred in providing grid electricity service. Giving priority to the notion of providing value to the grid is a radical new rate-setting policy that has not been properly vetted.

² Ref: <https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-proposal-aims-to-modernize-state-decarbonization-incentive-efforts>

³ Currently installed residential NEM solar generation in CA investor owned utility service areas is 75% of the current installed total of 10.1 GW.

⁴ New commercial NEM installation are exempt from “grid transition charges” that will apply to NEM residential installations.

⁵ The downturn will be the result of smaller retailers being driven out of business because they serve the residential NEM market and offer prices lower than are offered by larger national retailers. A recent report by the U.S. government found that large installers are \$2,000 to \$5,000 more expensive than small solar companies.

Source: [Energy Sage](#)

2. Grid Access Fees. The PD “adopts a monthly residential ‘Grid Participation Charge’ of \$8 per kilowatt (kW) of installed solar to capture residential adopters’ fair share of costs to maintain the grid and fund public purpose programs.”

Currently, no current California IOU electricity customers pay a “grid participation charge” identified as such. The proposed charge is an untested concept. Further, because of the overlap in NEM system size between residential and commercial, it is hard to rationalize why only residential customers should be subject to the charge.

Even though some NEM customers may not rely on the grid for a major portion of their annual electricity usage, they do rely on the grid to receive electricity when they are producing more than they are using. Thus, they are participants in the benefits of being connected to regional and local grids that back up their on-site systems and buffer the differences between their consumption and production.

At \$8 per kW, the proposed grid participation charge will add about \$50 per month to the average residential NEM customer bill.⁶ The combination of this change and the reduction in compensation for non-peak NEM net generation by 80 percent, demolishes the current NEM generation value proposition. A proper assessment of the impact these changes will have on NEM generation and storage adoption should be completed before approving them. Such an assessment would require reference to data regarding NEM residential customer monthly and annual bills that is not readily available to independent analysts.

Grid access fees are being challenged in Federal court because they appear to violate the Public Utilities Regulatory Policy Act. Whether they also subsidize commercial customers at NEM residential customer expense in violation of California’s AB 327 is also an open question.

3. System Sizing. The PD “allows net billing customers to ‘oversize’ their systems by up to 150 percent of the customer’s historical load to allow for future vehicle and appliance electrification.”

The general direction of this change is overdue. The current sizing limit requires that customers “undersize” their arrays relative to future usage. Oversizing vs. historical usage will result in more benefits for the state, the community and other local customers than sizing to avoid “overgeneration”. The current sizing limit is decades old and increasingly inconsistent with state policies favoring electric vehicle adoption and building electrification. A large proportion of existing NEM residential customers are adding arrays to adjust output to match increased electricity usage after they electrify their heating energy use or purchase electric vehicles. The combined cost of two small arrays significantly exceeds that of a single array sized to anticipate future use.

It is unclear whether existing NEM customers will be allowed to add capacity in order to oversize their systems. Many have already added capacity after purchasing electric vehicles and/or switching to electric heat pump space and water heating. Full building and mobility

⁶ For reference, the average non-NEM residential customer bill is \$153.

electrification increases electricity usage by more than 50% in most residential cases.⁷ So, there appears to be an intent to prevent residential new NEM residential customers from sizing their systems to supply their future annual usage. Decoupling sizing from historical usage is a policy shift that will make NEM residential solar installations more environmentally beneficial and effective in support of local decarbonization and energy resilience goals in the near term but less so in the longer term. Future solar adopters should have the option to use renewable electricity to power more of their future usage.

As an alternative to a one size fits all “oversizing” limit, there could be provisions for NEM residential customers to apply for a higher temporary limit based on projected usage, pending their purchase of an electric vehicle and/or conversion of heating appliances from gas to electricity. If a customer over-sizes and fails to electrify personal transportation or building electrification within five years, the customer can be disqualified from receiving payments for net generation. Such a sizing policy would have the side benefit of encouraging electricity users to gain a quantitative understanding of their future use and consider how most economically to meet it.

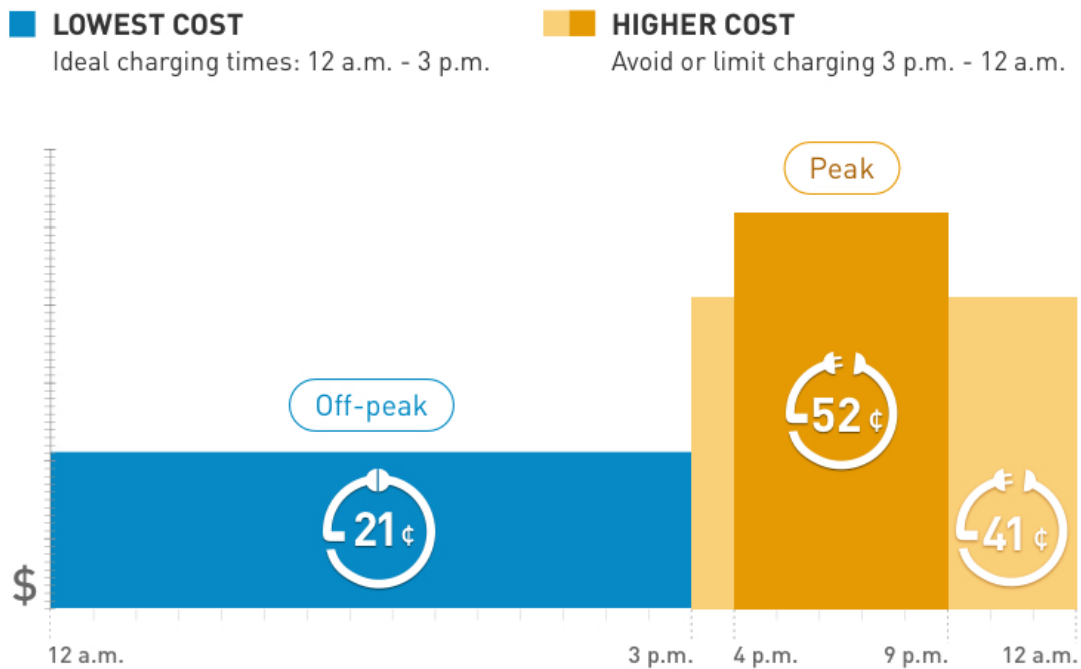


Figure 1. PG&E EVA-2 rates

4. Time of Use Prices. The PD “requires Net Billing customers to take service on rates with high differentials between peak and off-peak prices, which will incent energy conservation or the use of stored solar energy during the net peak window of 6 p.m. to 9 p.m. when California needs to displace electric grid fossil fuel usage.”

⁷ In general, building electrification, per se, may not increase electricity use in commercial buildings to the same extent as in residential buildings because heating energy use accounts for a smaller percentage of commercial building energy use.

Time of use pricing can be used to shift demand to lower usage periods. Historically, time of use price differentials have been too small to compensate NEM customers for the cost of solar paired storage. If the PD is approved, the differential may remain too small if peak prices for stored electricity are only available for three hours. Figure 1 is representative of the differentials that will apply. Differentials should be based on cost of service differences.⁸

Other technical and economic issues the CPUC and proceeding participants did not consider include the effect of losses in charging and discharging storage and storage sizing, both as to storage capacity and peak storage output. Rate-setting uninformed by such cost-influential technical details cannot produce economically efficient results for either the NEM customer or the grid.

Setting time of use rates for solar paired storage should be accomplished in a proceeding that relies on organizations familiar with energy storage technology and applications. Energy storage sizing and charge/discharge operations are much more complex than EV charging, and solar paired storage equipment service life will be strongly influenced by both design and the parameters of charge/discharge cycles. The proposed differential is greater than the average cost of service and may result in an unfair burden on NEM customers to the extent they subsidize energy storage investments that minimize costs of service for other customers during peak periods and are not fairly compensated for doing so.

5. Transition credit. “Creates a four-year glide path for the industry through a monthly ‘market transition credit’ of up to \$5.25 per kW for residential solar plus storage and solar-only systems. Customers will lock this amount in for 10 years. During the four-year glide path, the credit will step down 25 percent a year for prospective customers, who will also lock in their amount for 10 years.”

The term “glide path” is a euphemism for a major market intervention that will result in retail solar industry turmoil, putting smaller local retailers at a significant disadvantage relative to national retailers. In effect, the CPUC is embarking on a market intervention that will take years to sort itself out.

Storage plus solar is a relatively new option for residential customers. Ratcheting down incentives before the retail solar industry has experience introducing the option to prospective customers may do nothing to influence adoption other than make adoption less likely each year. Many questions must be answered before the (economically incidental) incentive can or should be a factor in customer decisions.

How well prepared is California’s retail solar industry to market, sell, and fulfill orders for solar plus storage systems? Generally not at all. Are control systems commercially available and proven in service that manage the charge/discharge cycle of the storage device to optimize customer economic benefits? No, they are not. The industry is not prepared, primarily because until now, because of the small differential between on-peak and off-peak rates, on-site solar

⁸ The cost of service during peak periods can be approximated as the sum of 1) “fixed costs” (of distribution, transmission and customer service) that are not influenced by time of day or varying rates of usage, plus 2) the cost of electricity that is generated or purchased by utilities during peak periods. On-peak generation costs increase during peak periods in California by factor of 2 to 4 above average generation costs, but the impact on total cost may be lower by a factor of five.

coupled storage could not be presented to solar customers as an affordable choice that would pay back initial investments with comparable payback periods to those of solar-only systems.

6. Special incentives and exemptions. The PD “provides additional measures to incentivize distributed solar plus storage for low-income and tribal households, including an exemption from the Grid Participation Charge.”

The value of the exemption from grid participation (access) fees for low income customers depends on the legality of grid access fees.

7. Storage rebates. “Establishes a ‘Storage Evolution Fund’ to provide storage rebates to existing NEM 2.0 customers who transition to the (NEM 3.0) Net Billing Tariff within the next four years, so that they can add storage systems to their homes to support the grid and become more resilient to wildfires and natural disasters.”

Unspecified storage rebates funded from unspecified sources will be attractive to existing NEM customers only if they more than off-set the 80 percent reduction in compensation for electricity they supply to the grid when their arrays produce more electricity than they are using.

CPUC staff agrees with solar industry and advocacy groups who point out “that the transition to the successor tariff will require customers to make substantial investments in storage, as well as solar, with longer payback periods.” Battery storage will have a significantly shorter operating life than a solar array. What would motivate customers to opt for longer payback periods in order to capture incentives for battery storage? And why would they opt to lengthen payback periods for solar equipment that is part-way through its expected life?

8. Retroactive eligibility change. “Transitions residential NEM 1.0 and 2.0 customers (except low-income customers) to the Net Billing Tariff after 15 years of being interconnected to the electric grid, which will incent storage adoption and reduce costs paid by other ratepayers by billions of dollars.”

This provision retroactively changes the basis on which NEM 1.0 and 2.0 customer decided to invest in rooftop solar. The basis for adoption decisions by current NEM customers and supporting calculations provided by retailers has been that hourly, monthly and annual net generation would, for 20 years, be valued at the price of grid electricity. No calculation provided by retailers in the future can be relied on if this provision is approved.

This provision also exacerbates problems created by other provisions that make valuation of on-site solar and storage investments complex and intuitively opaque. The provision creates a precedent for future retroactive rate setting. Potential future NEM residential customers will need to be more wary than was necessary in the past.

Beneficiaries of the change include all non-NEM residential customers, plus commercial and low income customers. The change signals that that the future value of NEM “over-generation” is a matter of speculation rather than settled policy.

Solar retailers will no longer be able to provide reliable forecasts of total system value over the expected life of the systems they sell and install. Retail solar customer expectations will need to be based on projected avoided costs that cannot be impacted by future CPUC decisions – for example, grid electricity costs that are avoided by solar electricity that powers on-site use without being first exchanged with the local grid.

9. Equity fund. The PD “establishes an Equity Fund with up to \$600 million to help scale up low-income access to distributed clean energy. There would be a stakeholder process to determine the allocation of funds, which could go toward upfront incentives for distributed storage, community solar in low-income and disadvantaged communities, or other low-income clean energy programs with strong consumer protections.”

Funds would be expended as they accumulate to implement as yet undefined new public purpose programs. And if they don’t accumulate? Rate incentives for distributed storage are created elsewhere in the PD. Are rate incentives and up-front incentives both needed? Why should NEM residential customers bear the primary burden of funding “other low-income clean energy programs”? Which other low income clean energy programs?

A stakeholder processes “to allocate funds” might result in some fine tuning of utility recommendations but is not a substitute for program planning prior to program authorization.

Funds set aside for low income access to distributed clean energy should not be diverted to distributed storage owned by IOUs.

Regarding community solar in low-income and disadvantaged communities, why make it contingent on revenues from NEM residential customer rates? A better approach would be to refocus CPUC attention on achieving the intent of SB 843, which was to make locally produced solar electricity accessible to electricity customers unable to own or benefit from rooftop solar. Instead of a community solar program, California ratepayers lacking access to on-site solar were given the opportunity to pay extra for solar electricity through the mechanism of green tariffs. Did they avail themselves of the “opportunity”?

Following the example being set in several other states, community solar in California deserves its own public purpose program that is managed by the CPUC, not the utilities, and/or the California Energy Commission as in the case of the California Solar Initiative. Such a program would need to be enabled by legislation that does not conflate community solar with green tariffs as ultimately happened with SB 843.

10. Monthly billing. “Moves residential customers from annual billing to monthly billing to help customers avoid unexpectedly large annual electric bills at the end of their 12-month billing period.”

Current NEM residential customers who sized their systems to match their historical annual usage are accustomed to small or zero bills in their annual “true-up” month.

Most future residential NEM customers who purchase or adopt storage will have an economic incentive to undersize their solar arrays to avoid both real time net generation and peak usage and thus to minimize total solar plus storage upfront costs. If they do, their monthly bills for

grid electricity will be a significant fraction of their monthly bills prior to solar plus storage investments.