

Decarbonizing California's Economy: The Bigger Picture & Net Metering

Mohit Chhabra

(Speaking as an individual)

Works as Senior Scientist – Natural Resources Defense Council

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Net Zero Economy by 2045

Governor Brown's Order B-55-18 calls for carbon neutral economy by 2045

Senate Bill 100 sets goal for 100% net zero carbon electric sales by 2045

Governor Newsom's Order N-79-20 requires all new cars and passenger trucks sold in California be zero-emission by 2035

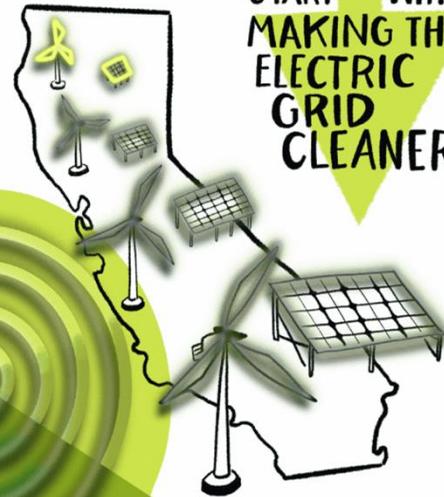
HOW TO CREATE A LOW CARBON ECONOMY

REPEAT THESE STEPS
TO GET A LOW CARBON ECONOMY

MEET THIS
NEW DEMAND
WITH MORE
INVESTMENTS
IN CLEAN
ENERGY



START WITH
MAKING THE
ELECTRIC
GRID
CLEANER



THIS
INCREASES
ELECTRIC
DEMAND WHILE
DECARBONIZING
THE ECONOMY



CONVERT
NON-
ELECTRIC
END USES
TO ELECTRICITY

- Jessica Russo NRDC

Pathway to a zero-carbon economy

- Clean and expanded power sector
- Electrify: move polluting end uses to cleaner electricity

Rest of the presentation talks through challenges

Constraints and Co-Objectives

- Reliable electricity
- Enhance energy affordability
- Timely transition
- Local pollution reduction
- Global environmental impact

Note: environmental justice embedded within these

Multiple piece puzzle

- Electricity production: how and where electricity is produced
- Electricity consumption: change how electricity is consumed
 - Both are interconnected; consumption patterns impact production and vice versa
- Cross cutting solutions: e.g., cap and trade, rate design

Recap: California's Clean Energy Policy

- SB100 and Executive Order B-55-18 set goals for “zero carbon” electric retail sales and carbon neutral economy by 2045
- We know where to go, but how do we get there?
 - Cost-effectively
 - Equitably
 - Environmentally conscious

Where does net energy metering fit?

- Net energy metering rate determines how much to pay customers who have solar, and other distributed generation, for electricity exports.
- Net energy metering has so far driven adoption of rooftop solar in California; 10 GW and counting.
 - ~5% of new solar customers also install storage in the last year
- What should net energy metering rules be to align with our broader CA clean energy goals?

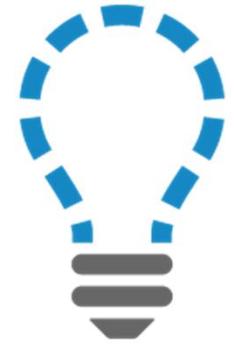
Net Energy Metering



Energy you
PRODUCE



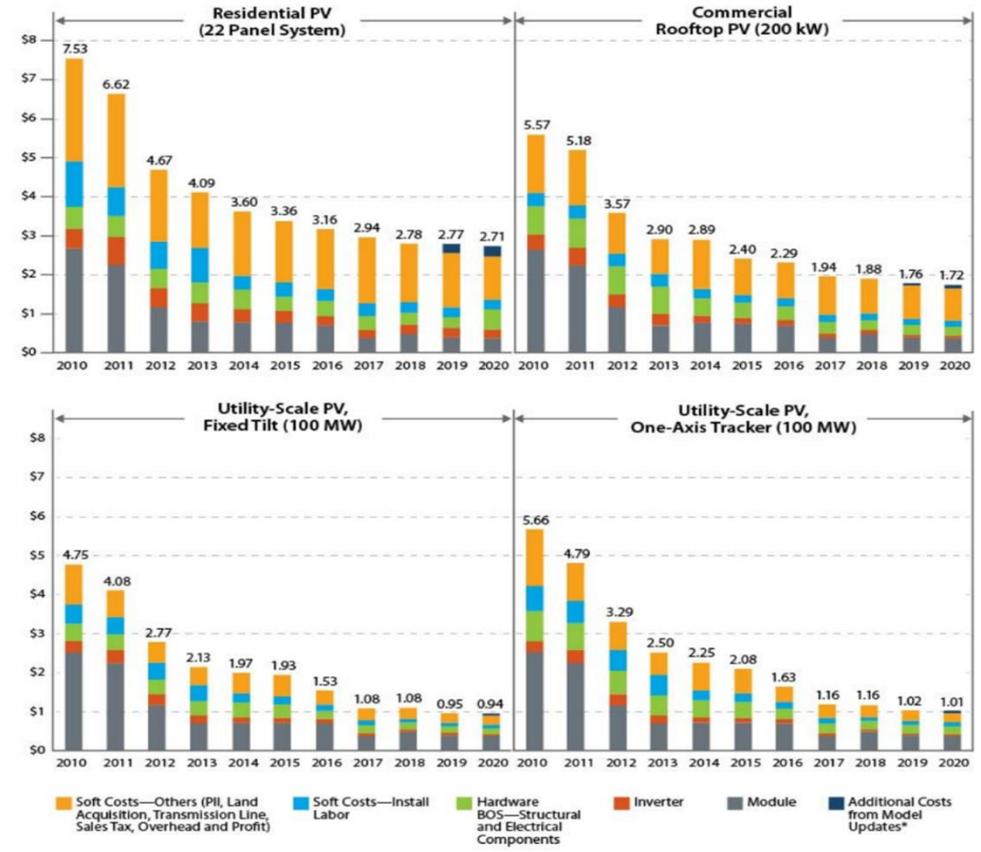
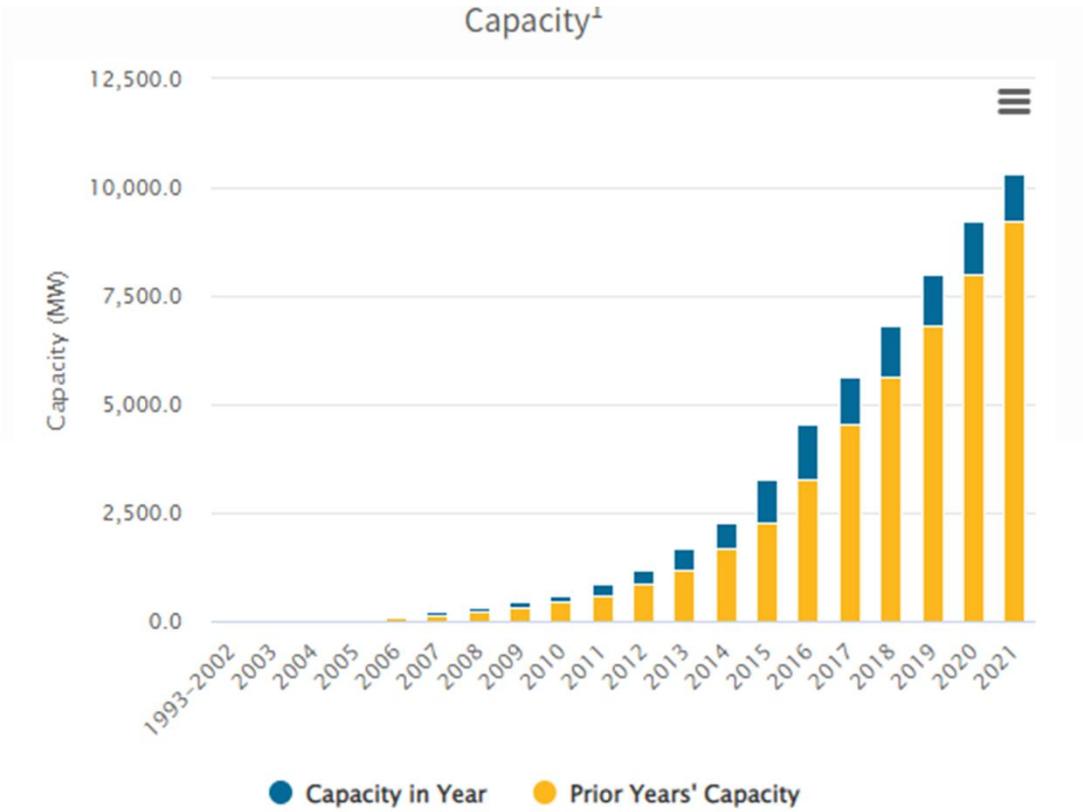
Energy you
CONSUME



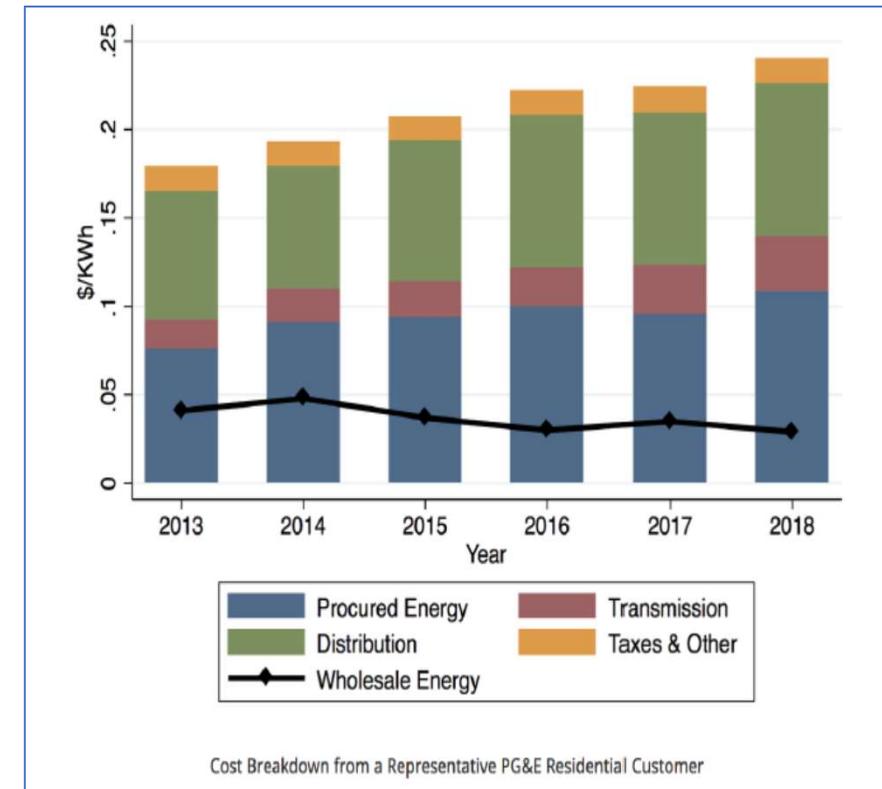
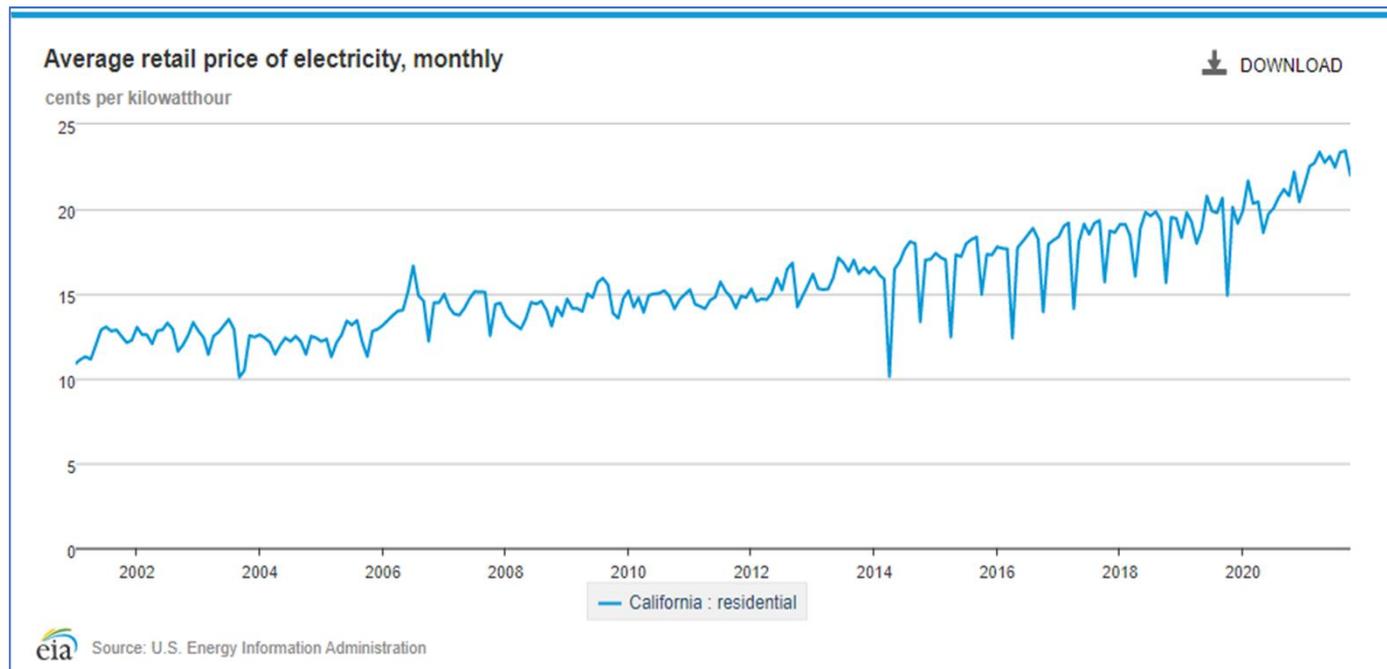
**NET
ENERGY**

Instrumental in starting up the residential solar industry.

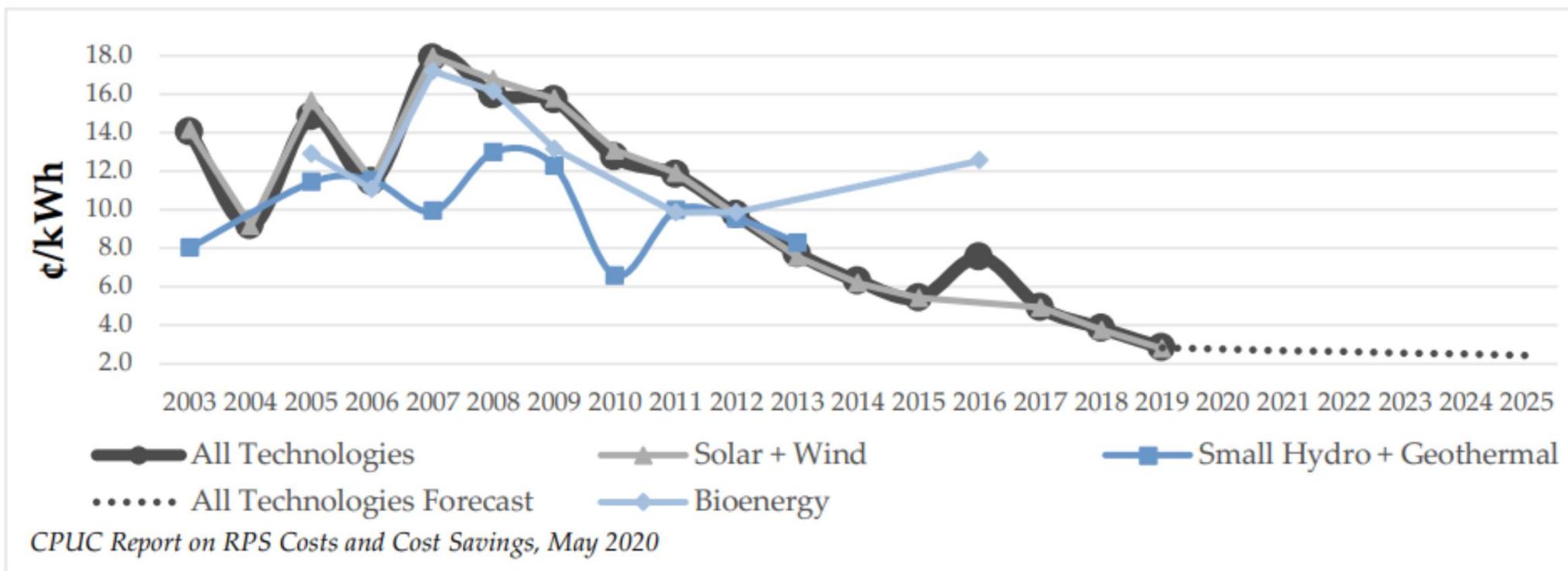
Why consider changes to NEM?



Why consider changes to NEM?



Historical Trend of All Load Serving Entities' RPS Contract Costs by Technology and Year of Execution from 2003-2025 (Real Dollars)



Investor-Owned Utilities in CA are Decoupled

Their revenue not tied to how much electricity they sell

Make profits on building infrastructure; all electricity contract prices passed on to customers at cost

CPUC decides how much they deserve through litigated cases; rates are then determined to recover the revenue granted

- So, if one set of customers over or under pay their bills, others have to make up to make the revenue requirement whole

The Cost Shift Debate

Disagreement on how much residential NEM impacts rates for non-solar customers.

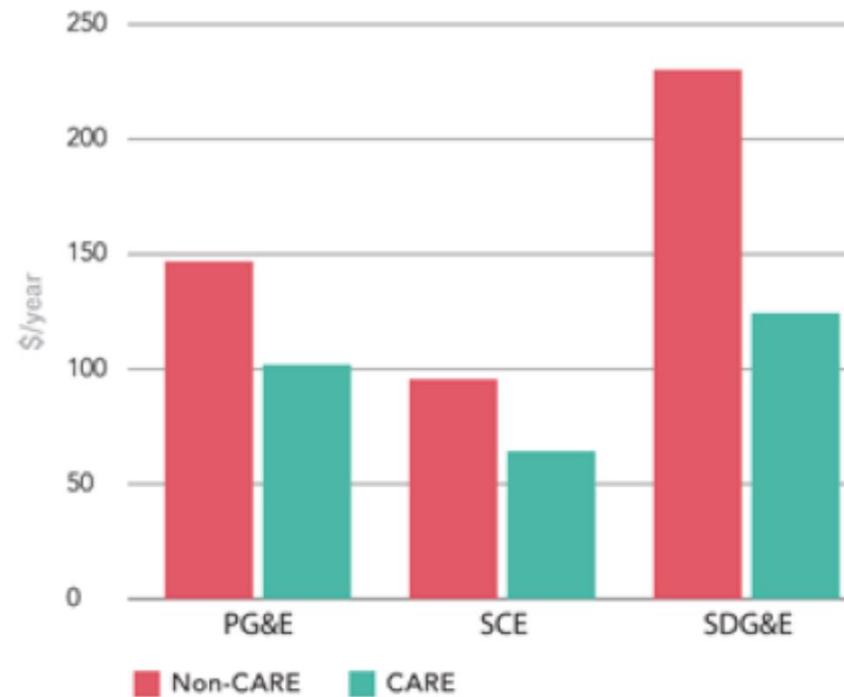
If NEM costs are greater than its benefits then it raises rates, if benefits less than costs then it decreases rates.

- Yes, there is a cost-shift: Public Advocates, The Utilities Reform Network, NRDC, CPUC research, Haas Energy Institute, CA Assembly Analysis, MIT research, Sacramento Municipal Utilities Dept, IOUs
 - Approximately \$3 Billion per year
- Not really or not that big: solar industry, solar customers, some enviros (e.g., Protect our Communities, Clean Coalition, unclear where Sierra Club stands)
 - Haven't provided any estimate to my knowledge. Mostly refuted others' estimates

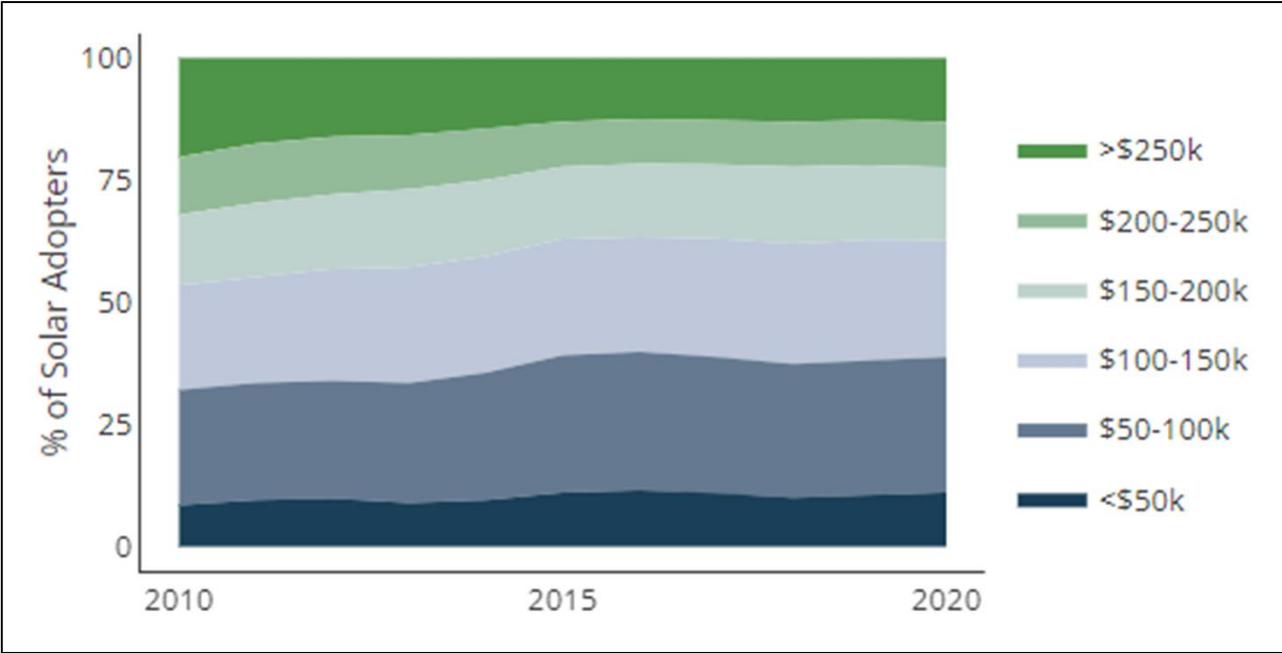
The Cost Shift Debate (3)

CA Assembly Committee analysis concludes that there is a shift, references Next10/ Haas research

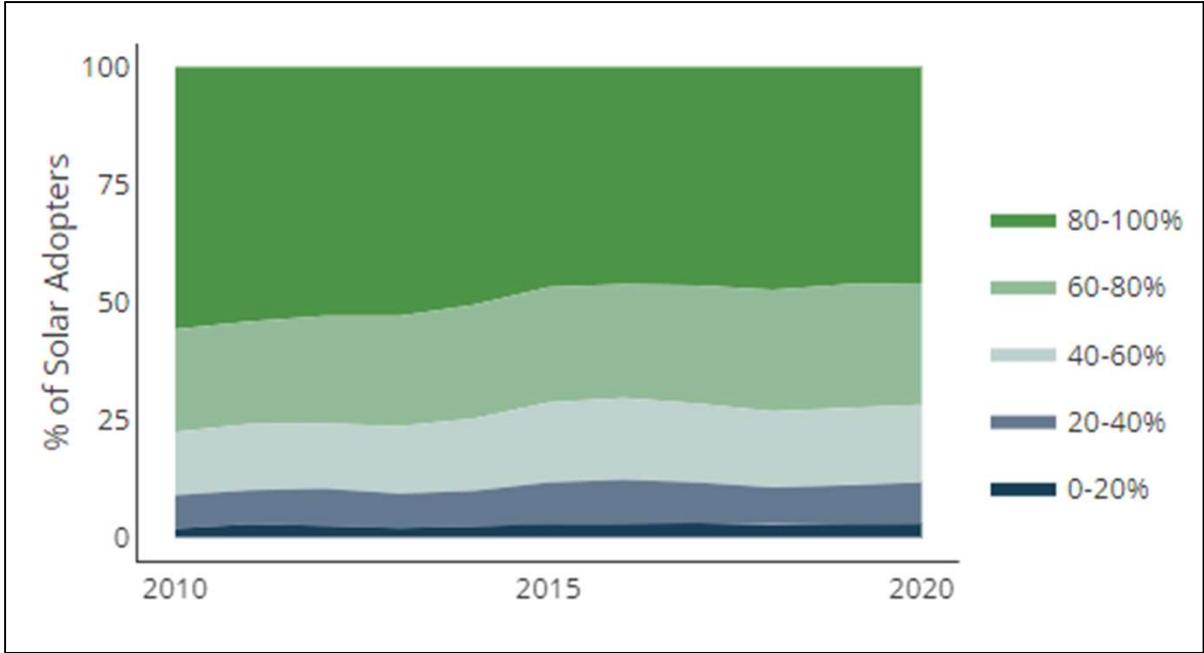
FIG 5 Household-Level Bill Impacts of BTM PV Incentives (\$/year)



The Cost Shift Debate (4)



By Annual Income



By State Income Percentiles

Impact: Environmental

Expensive electricity reduces customer willingness to electrify. Electrification is needed to reduce carbon and pollution.

- Haas Energy Instt. estimate that ~20% of SDG&E rates are due to NEM overpayment. Smaller but significant impacts in PG&E and SCE
- See chart on rising rates compile by Public Advocates on the next slide

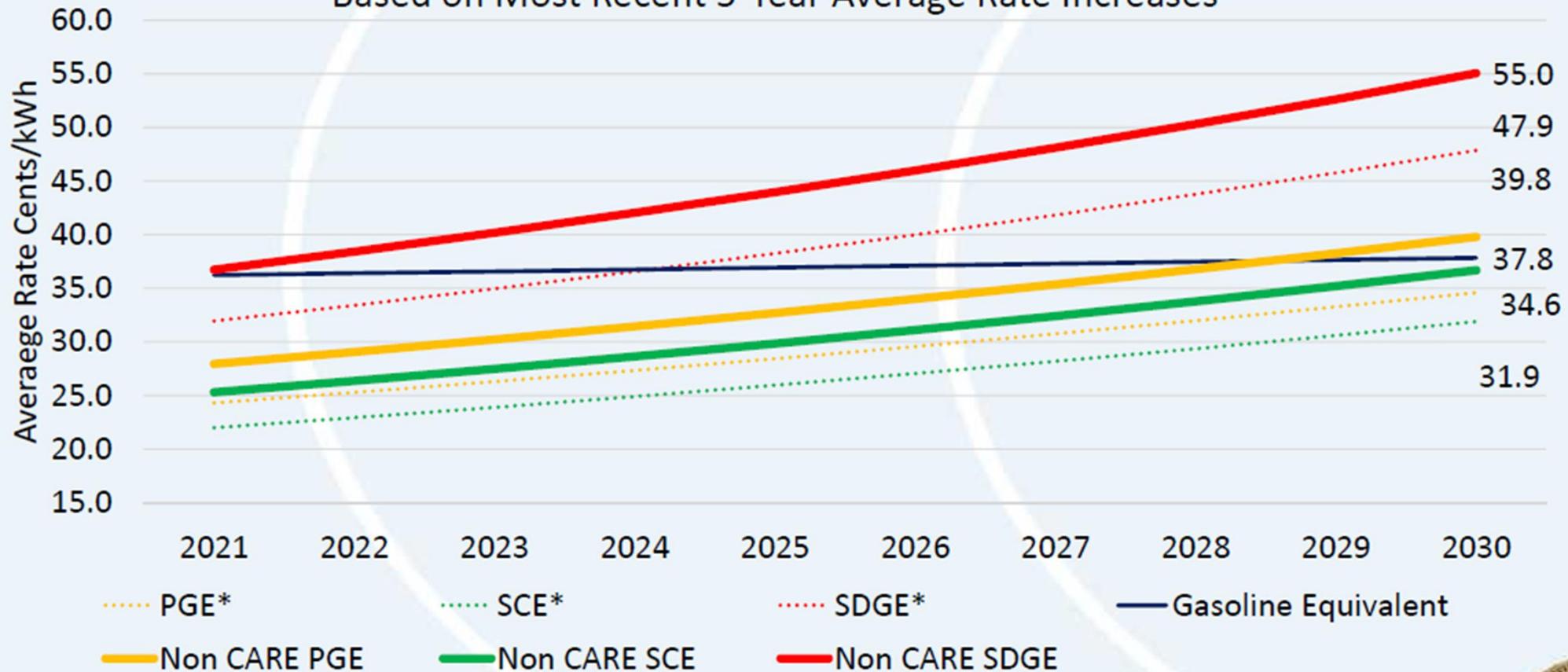
Counterpoints:

People with solar are more likely to buy electric cars.

Res. rooftop solar through NEM could reduce strain on the ecosystem

Impact: Environmental (2)

Forecast of Residential Average Rates Vs. Non-CARE Rates
Based on Most Recent 5-Year Average Rate Increases



Low-income customers that are enrolled in the California Rates for Energy (CARE) program receive a 30-35 percent discount off their electricity bills. Participants qualify through income guidelines or if enrolled in certain public assistance programs



Residential Solar in CA's Decarbonizing Grid

- What are the costs of alternative clean energy resources?
- What is the incremental value of rooftop solar to those?
- How much land does *additional* rooftop solar save? How should we value that?
Alternates to NEM to ease that pressure?
- Building transmission is expensive. What does it take to defer the need for additional transmission? What effect does rooftop solar have on new transmission build? Is (unplanned) solar adoption through NEM the right tool for this?
 - Transmission is built to ensure that (clean) electricity is available all the time for each community
 - Similar questions with distribution

What Does Equity Mean in this Space?

- Equal distribution of solar?
- Affordable, fair, and progressive rates?
- Both?
- If both, then how do you balance the solar access and low rates if a cost-shift exists?
All customers, CARE and non-CARE impacted by cost-shift (if any)
- Note: most targeted programs cause some cost-shift from some Californians to others.
The question is what level and what type is tolerable?
 - OK if low-income programs cost-shift a little to upper-income. Not OK if it is the other way.