DOCKETED	
Docket Number:	21-lEPR-06
Project Title:	Building Decarbonization and Energy Efficiency
TN #:	238793
Document Title:	Presentation - Designing Electricity Rates for an Equitable Energy Transition
Description:	S2.4 Meredith Fowlie, UC Berkeley
Filer:	Raquel Kravitz
Organization:	Berkeley, University of California
Submitter Role:	Commission Staff
Submission Date:	7/9/2021 9:16:04 PM
Docketed Date:	7/9/2021

Designing Electricity Rates for an Equitable Energy Transition

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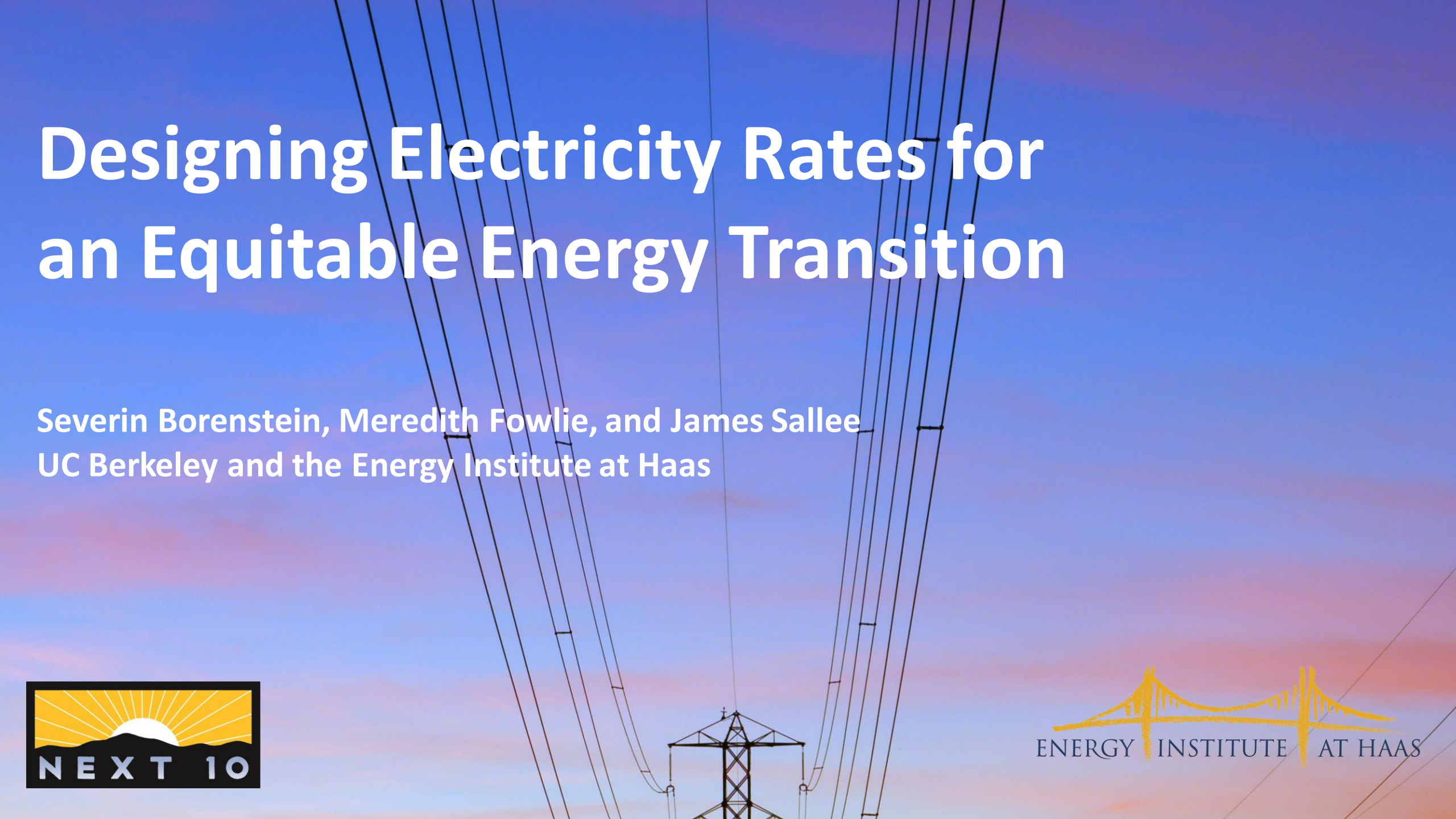


Background: the role of electricity in the energy transition

Plan A for decarbonizing the economy:

- Generate clean electricity
- Electrify everything

Electricity rate structures are crucial:

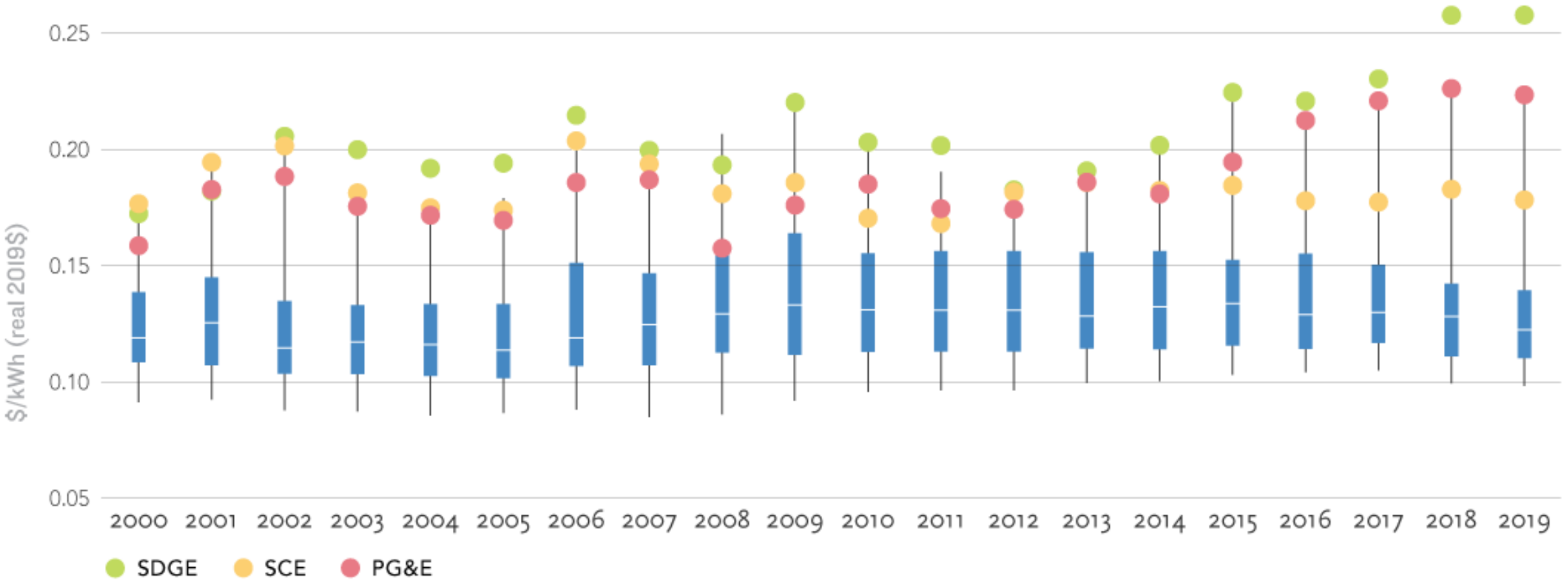
- People won't electrify their vehicles and homes if electricity is too expensive

Our report in one slide

1. Residential electricity prices (per kWh) in California are too high.
2. Marginal prices are too high because we recover all fixed costs through volumetric rates.
3. This amounts to an "electricity tax," which is quite regressive.
4. We could foster decarbonization by lowering volumetric prices and recovering fixed costs through fixed charges.
5. But this would be equally, or more, regressive.
6. Instead, we suggest paying some system costs via state revenue, or by using income-based fixed charges.
7. Either approach can improve efficiency **and** foster equity.

Residential electricity prices are high in California

FIG 1 Average Residential Price ($/kWh) by Year for Major U.S. Utilities



Note: Observations are weighted by total annual consumption. The box represents the 25th, 50th, and 75th percentile. The whiskers represent the 5th, and 95th percentiles. Source: Data come from FERC Form 1.

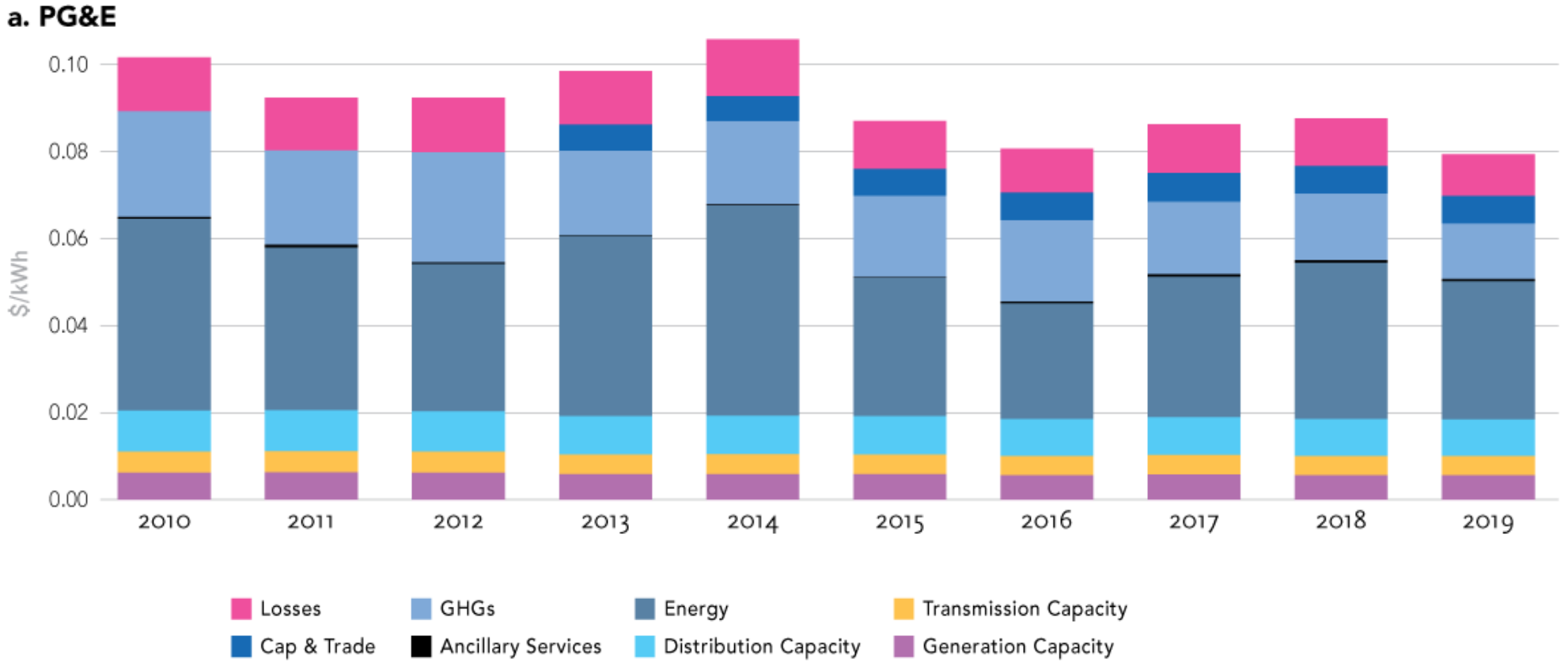
What's the *efficient* electricity price?

- If economists called the shots, retail electricity prices would reflect the **social marginal cost (SMC)** of electricity consumption.

- The SMC captures all the incremental costs that electricity consumption imposes, including fuel costs, pollution impacts, etc.

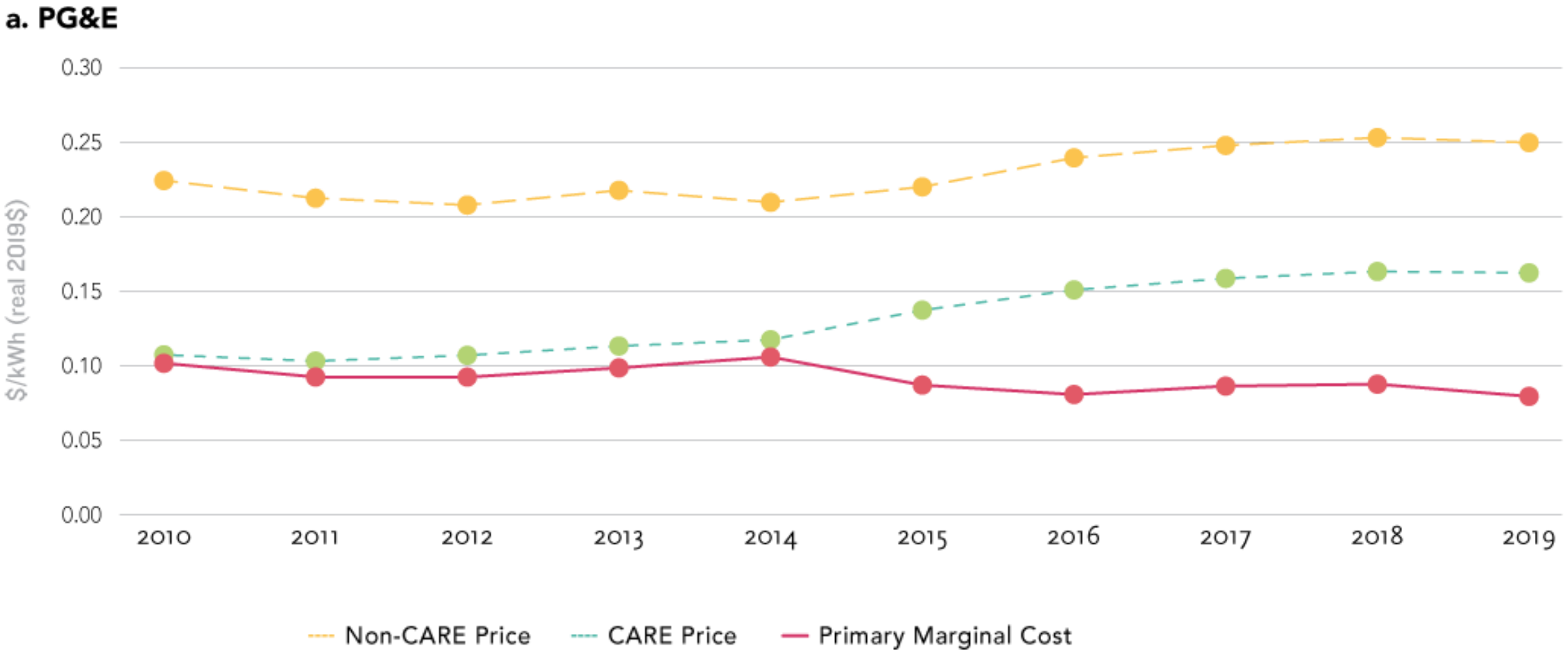
- We estimate the efficiency benchmark for the 3 major IOUs over the last decade.

Annual social marginal cost estimates ($/kWh)



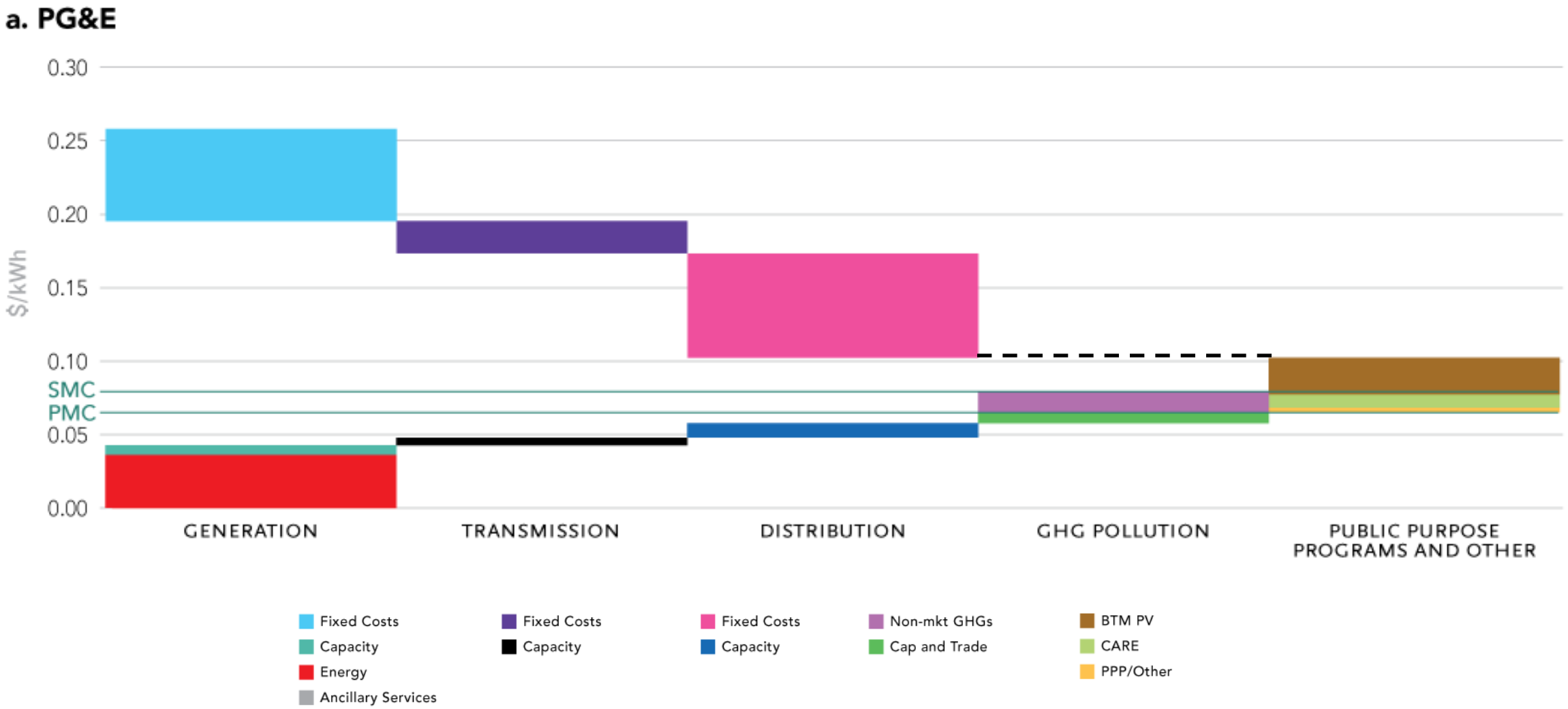
Notes: Marginal cost components are weighted by IOU load. See text for details on the construction of cost components. Additional details on data sources and methodology behind author calculations can be found in the Appendix.

Residential prices versus social marginal cost ($/kWh)



Significant price-marginal cost gaps across all IOUs

2019 residential price decomposition ($/kWh)



Notes: Primary marginal cost estimates are weighted by IOU load. Average 2019 residential prices (CARE and non-CARE) are constructed using advice letters and rate schedules PG&E sources: 5366-E-A/B; 5444-E; 5573-E; 5644-E. SCE sources: 67666-E: 67668-E. SDGE: 31811-E; 31501-E. Details on the methodology behind author calculations can be found in the Appendix.

Why worry about high electricity prices?

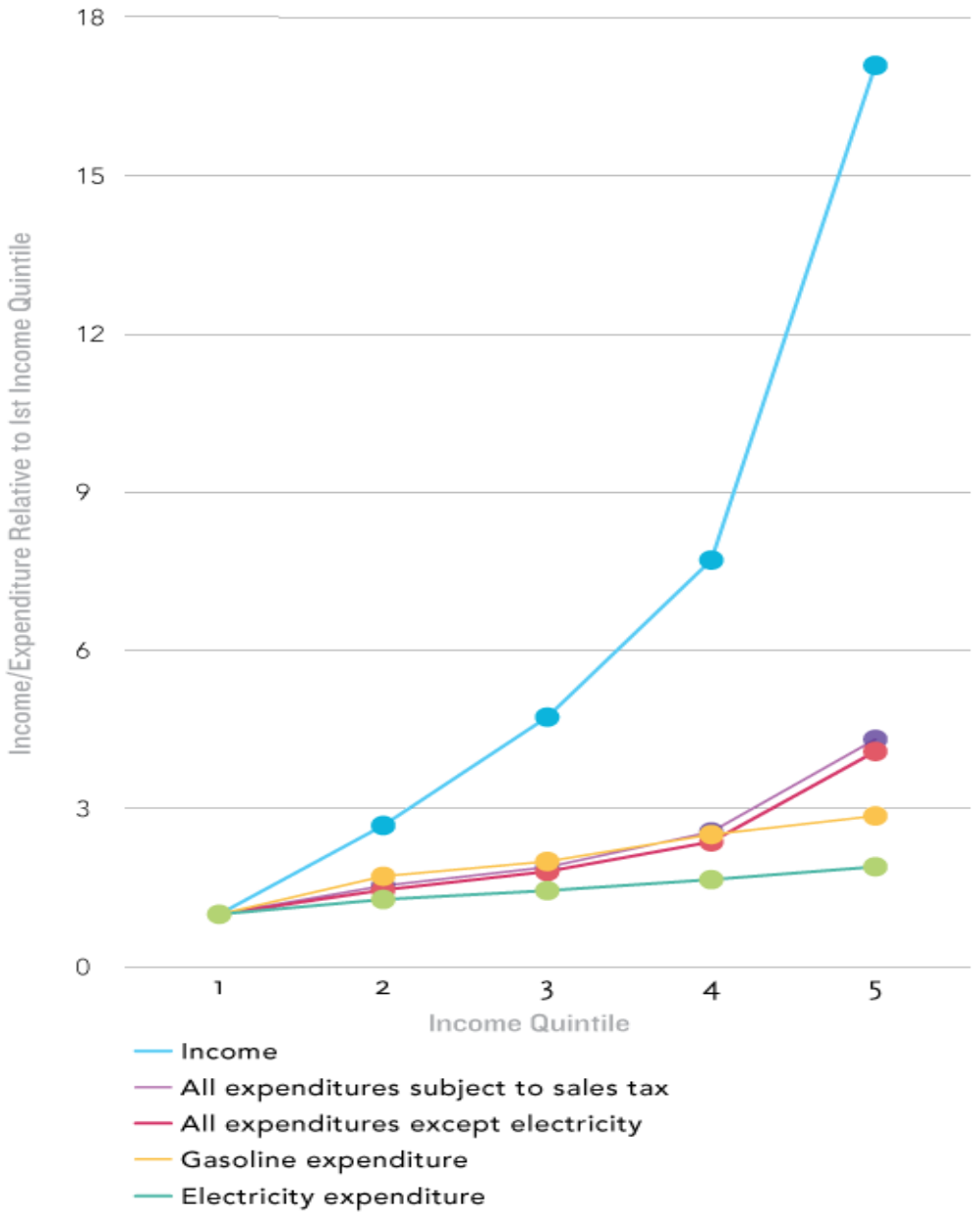
- **Efficiency**: Burdening electricity prices with costs that are not going-forward incremental expenses of supplying electricity discourages efficient substitution from other energy sources towards electricity.

- **Equity**: Higher electricity prices can impose a large economic burden on lower-income households in an increasingly unequal economy.

An unequal burden

- This figure charts relative income and relative expenditures across California households by income quintile.

- Lower-income households spend a much larger share of their income on electricity.



Source: Authors' calculations of data from the Consumer Expenditure Survey in 2017-2018. Source data at https://www.bls.gov/cex/2017/research/income-ca.htm

Equity/affordability implications

- We are taxing electricity consumption to pay for infrastructure, climate change adaptation, and public purpose programs.
- At this point wealthier households consume only slightly more (net) electricity from the grid than poorer households.
- **Implication**: a volumetric tax on electricity is quite regressive; more so than sales or income taxes.

Equity/affordability considerations

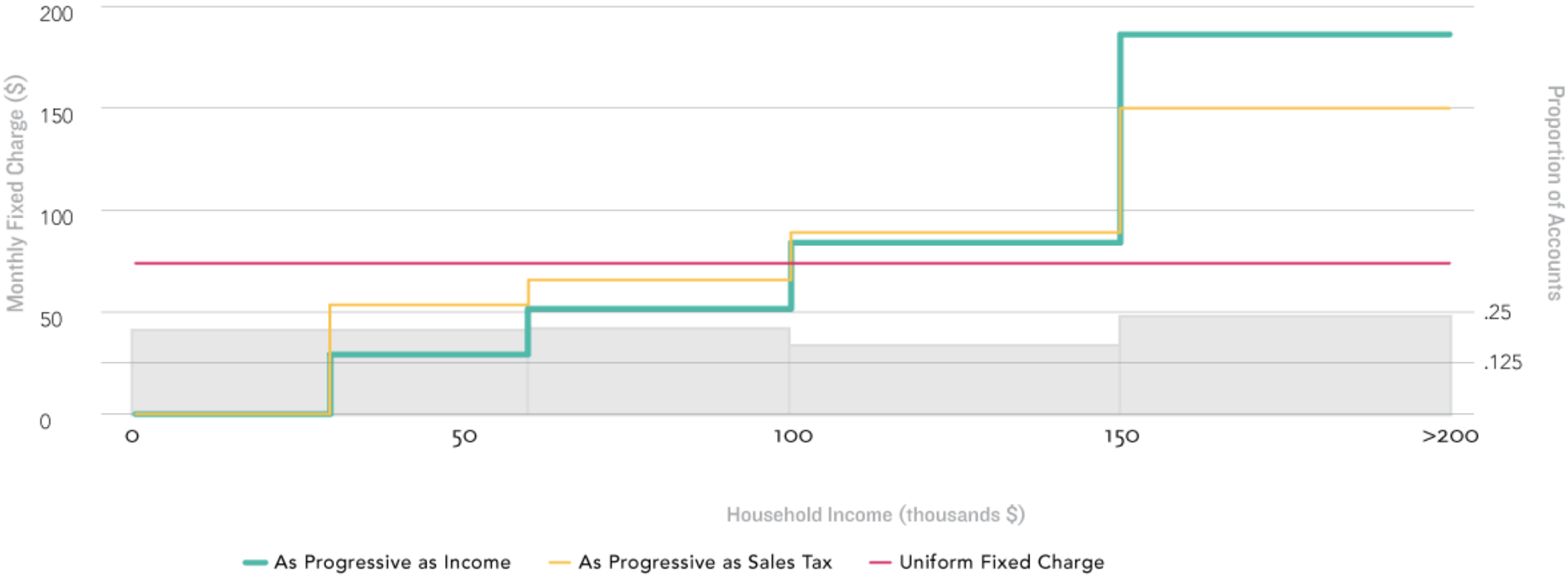
- One solution: pay for state policy priorities (e.g. building electrification) through the state budget.

- Alternatively, infrastructure and public purpose investment costs could be recovered *via income-based fixed charges* paired with an efficient volumetric price that reflects the social marginal cost.

- Our report examines alternative ways this could be done
  - Declaration to utility, true up with Franchise Tax Board (FTB)
  - FTB transfers information on income categories to the utilities
  - Presumptive fixed charge by location

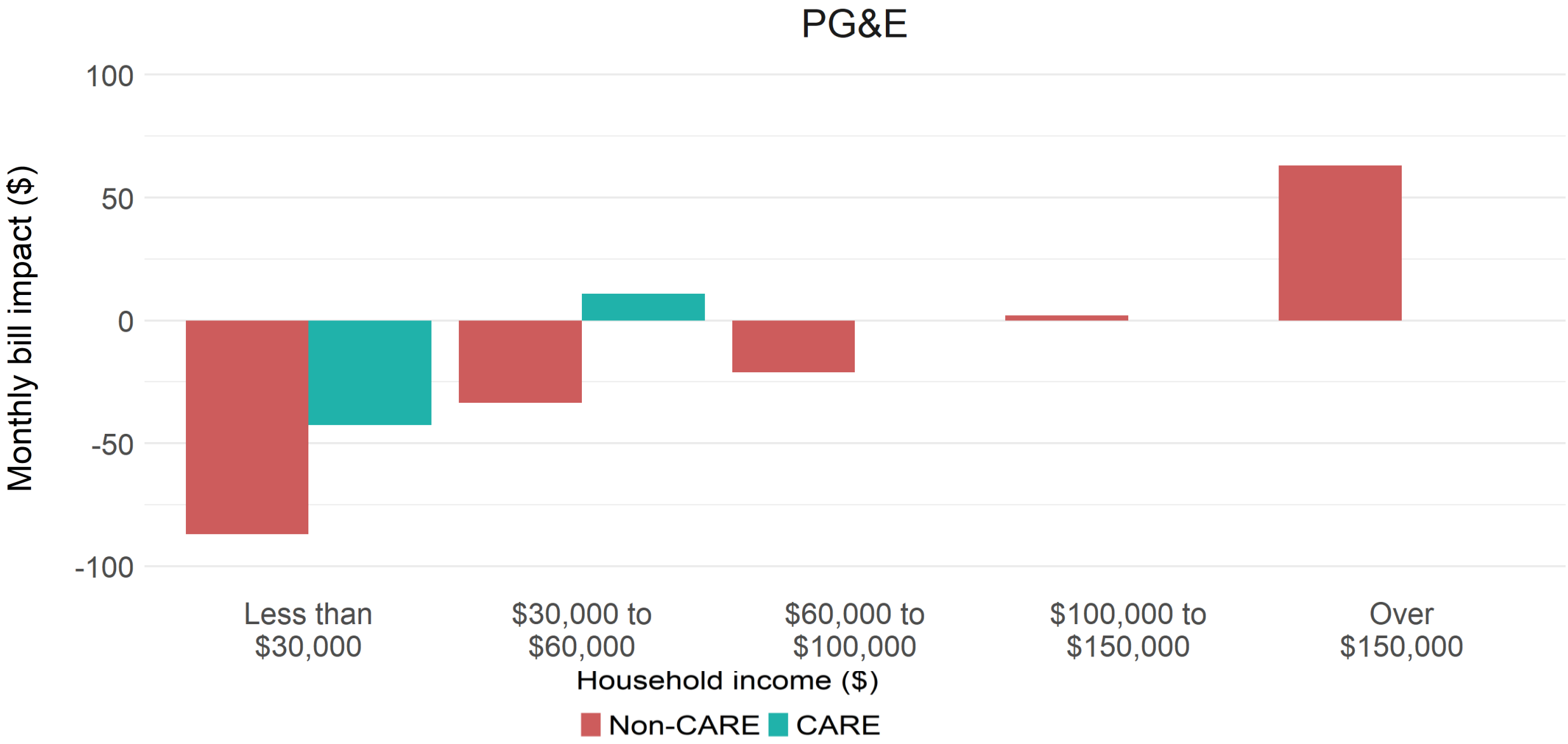
Example income-based fixed charge schedules (2019)

a. PG&E



Note: Each scheme depicted recovers the same amount of revenue. The gray histogram shows the proportion of accounts in each of the five pricing tiers in each service territory. Household distribution by income from the American Community Survey. Rates are author's calculations based on cost recovery gap estimated in this study using proportional fees across quintiles as discussed in text. Full calculations available in the Appendix.

Net impacts on monthly bills (Sales tax progressivity)



Conclusion

- In California, volumetric electricity rates are being used to raise revenues for infrastructure investments, wildfire mitigation, etc.
- This amounts to a highly regressive tax with negative implications for both efficiency and equity.
- Changing the way electricity-related costs are recovered can help ensure affordable electricity as the state looks to rapidly increase usage in the path to decarbonization
- Income-based fixed charges could also lighten the burden of cost recovery on households that can least afford to pay.

Thank you!

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