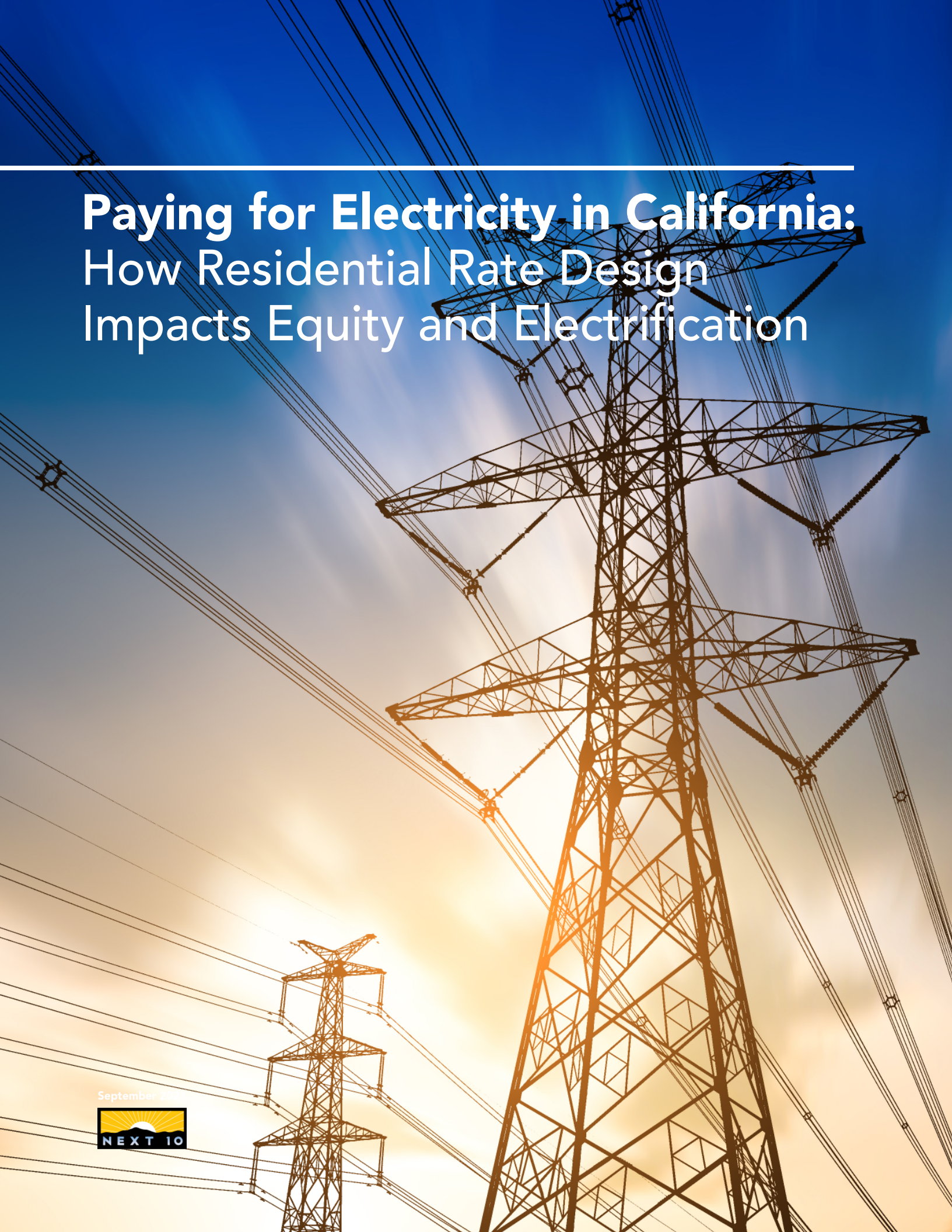
Paying for Electricity in California: How Residential Rate Design Impacts Equity and Electrification



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The Appendix can be found at
https://www.next10.org/electricity-rates-2

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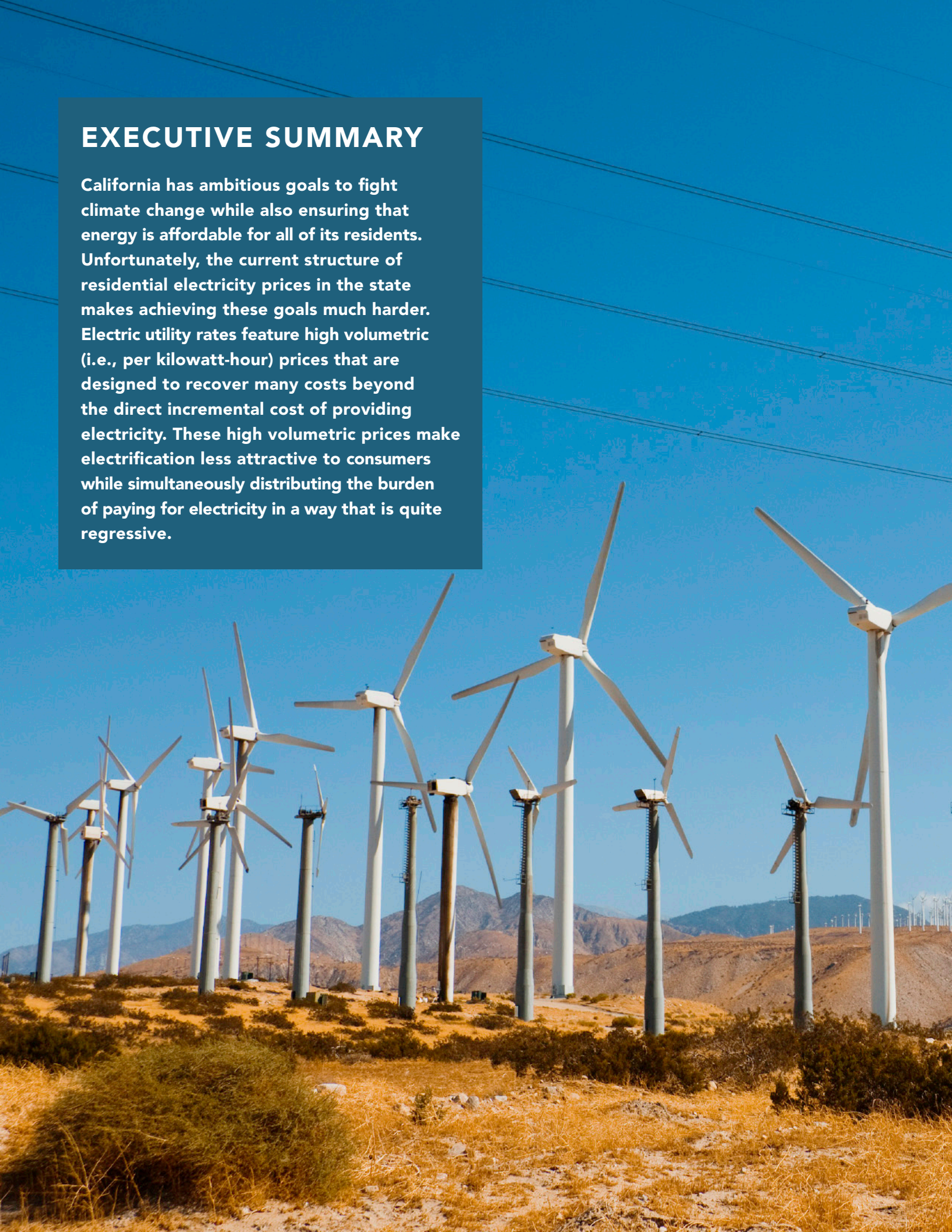
EXECUTIVE SUMMARY

California has ambitious goals to fight climate change while also ensuring that energy is affordable for all of its residents. Unfortunately, the current structure of residential electricity prices in the state makes achieving these goals much harder. Electric utility rates feature high volumetric (i.e., per kilowatt-hour) prices that are designed to recover many costs beyond the direct incremental cost of providing electricity. These high volumetric prices make electrification less attractive to consumers while simultaneously distributing the burden of paying for electricity in a way that is quite regressive.



In this report, the authors analyze detailed billing data from over 11 million California households served by the state's three large investor-owned utilities (IOUs)—Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E)—in order to characterize the implications of the current residential electricity prices for equity and for electrification of vehicles and homes. The authors then discuss potential reforms that could simultaneously improve equity while fostering decarbonization by removing barriers to electrification.

This report builds on a prior companion report that established key facts about retail electricity pricing in California.[1] First, the initial study showed that IOU customers face prices that are two to three times higher than social marginal cost (SMC), which is defined as the going-forward cost to the utility of providing additional electricity to an existing customer, inclusive of pollution costs. Second, the initial report also found that the reason that retail prices are so far above the efficient SMC benchmark is that retail prices are used to recover non-incremental costs of electricity supply along with other programs that have been integrated into bills. This method of cost recovery has generated a large, and rapidly growing, gap between retail electricity prices and social marginal costs. The report authors refer to this gap as the effective "electricity tax."

This report explores the consequences of this effective electricity tax on equity and efficiency and ultimately finds that reforms could better align electricity rates with the state's climate and clean energy goals. Using the detailed billing data, the residual cost burden for each customer—defined as the difference between the amount the customer pays on their bill and the incremental cost to the utility of providing that household with power—is calculated under the current rate system. The distribution of those residual cost burdens across the income distribution is then characterized.

Customers do not see their bill broken into "incremental costs" and "residual cost burden," so the drivers of escalating retail prices are opaque to the typical customer. A primary goal of this analysis is to bring to light essential facts about the current system—who is paying for California's electricity system today? and how is that determined by specific features of current rates?—in order to better inform public discussion.

Household & Equity Impacts: This report offers a first-of-its-kind analysis for California that demonstrates how residual cost increases for customer electricity bills are impacting households and how that impact varies across households with different abilities to pay. The analysis presented in this report finds that:

- Overall, customers across the three IOU service territories contribute $678 per year on average toward the residual cost burden. For PG&E and SDG&E customers, residual cost burdens are more than two-thirds of their total bills, whereas SCE customers pay slightly more than half of their bills towards residual costs. As a result, how California chooses to recover these costs is the primary driver of electricity costs.
- Residual cost burdens vary widely across households. As of 2019, a quarter of households were contributing less than $220 per year, while the quarter of households with the highest usage contributed more than $850 per year.
- California's current electricity pricing regime assigns a greater share of residual costs to higher-income households, but lower-income households pay much more as a fraction of their annual income on average, so much so that the effective electricity tax is more regressive than the state sales tax. Figure ES.1 summarizes these data for 2019: it shows the estimated average residual cost burden by income category for each household (in solid lines, which rise with income), as well what fraction of average income this represents (in dashed lines, which decline with income).[2]

1 Borenstein, Severin, Meredith Fowlie, and James Sallee. *Designing Electricity Rates for An Equitable Energy Transition*. Next 10 and the Energy Institute, February 23, 2021. Available at: https://www.next10.org/publications/electricity-rates.

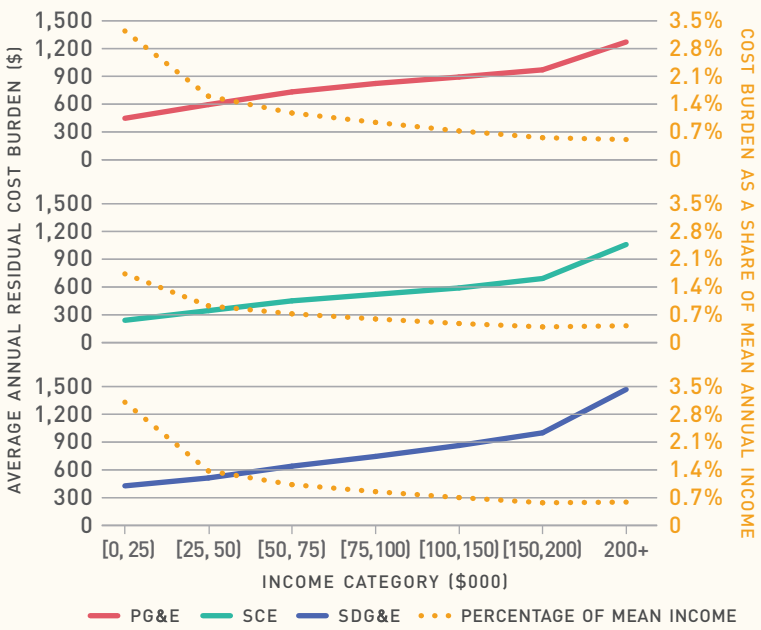
2 This report focuses primarily on 2019 data, because they are pre-pandemic and the most recent available when data were requested from the utilities. But it is clear that the residual cost burden has continued to expand since 2019.

- Net metering for rooftop solar makes the effective electricity tax substantially more regressive. This is because wealthier households are much more likely to have rooftop solar. The effect is strongest in SDG&E, where rooftop solar in 2019 already provided over 20 percent of residential electricity under net metering, thus offsetting a majority of the cross-subsidy created by the California Alternative Rates for Energy (CARE) program.

Impacts on Decarbonization Efforts: The state's strategy for decarbonization includes plans for widespread electrification of buildings and rapid electrification of personal transportation. Relying entirely on the effective electricity tax to recover residual costs, however, implies that customers considering electrification face much higher operating costs if they electrify than they would if prices were set equal to social marginal cost. The authors refer to this increase in operating costs as the "electrification cost premium." Related to this issue, this analysis finds that:

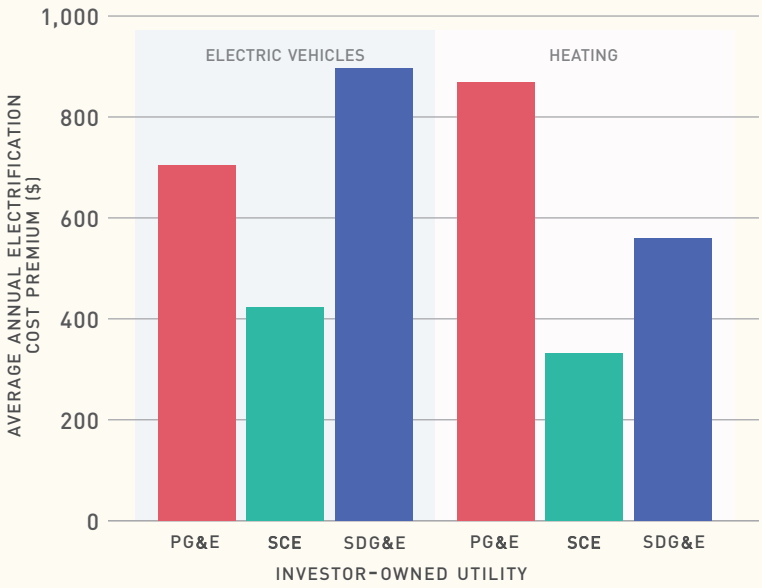
- For California households considering purchasing an electric vehicle (EV), the effective electricity tax raises the annual operating cost of an EV by around $600 per year on average. Recent research suggests that this could be reducing EV adoption by somewhere between 13 and 33 percent. Figure ES.2 shows the average annual electrification cost premium for EVs across the utilities. The premium is close to $900 for the average SDG&E customer.
- For households considering electric heating in lieu of natural gas, the effective electricity tax raises the annual cost of doing so by around $600 per year. Recent research suggests that eliminating this tax could increase the fraction of new homes that are built with electric heating by around one-

FIGURE ES 1 Annual Residual Cost Burden by IOU (2019)



Note: Solid lines show average annual residual cost burden (bill amount above SMC) by income category. Dashed lines divide the residual cost burden by average income in the category.

FIGURE ES 2 Average Annual Electrification Cost Premium by IOU for Electric Vehicles and Home Heating (2019)



Note: For electric vehicles and electric heat pump space heating in each utility territory, this graph shows the difference in average annual operating cost comparing current prices to price set equal to SMC. See text for details.

third. Figure ES.2 shows how the electrification cost premium for home heating varies across the utilities, with the highest annual burdens, around $850 on average, in PG&E.

Fortunately, there are ways that residential electricity rates could be reformed in order to foster electrification (by lowering volumetric prices), while simultaneously improving equity outcomes. Some of these possible reforms were discussed in the previous related report,[3] but with the detailed billing data available for this report, the authors are now able to examine their impacts much more closely. They find that:

- Moving some costs that contribute to the residual cost burden onto the state budget, to be funded by increases in the sales or income tax, would increase equity and improve efficiency because it would reduce the effective electricity tax. A variety of costs that might be moved are discussed, including public purpose programs, legacy costs and costs related to wildfires.
- Introduction of income-based fixed charges would similarly increase equity and efficiency at the same time. As an example, the authors consider a system of income-based fixed charges that would mimic the progressivity of the state's sales tax, showing the rates needed and the distribution of bill changes it would induce.
- Minimum bills, which have been suggested as a potential source of funds to cover the residual cost burden, would be both ineffective and highly inequitable. The report authors conclude that minimal bills are more regressive than even the current rate structure, as more than half of the added revenues from a minimum bill would be paid by households with below-median income. In addition, minimum bill levels that have commonly been discussed in the current debate, such as $30 per month, would make an extremely small contribution to covering the residual cost burden.

Some of the challenges with rate reforms are discussed in this report. The authors also note that, even where it is possible to pursue rate reforms that are equitable *on average* across income categories, their analysis of the billing data makes clear that there would be a wide distribution of resulting winners and losers—which could make it more difficult to reach political consensus on reform.

In this report, the authors take as given the amount of revenue that utilities need to recover. Another important policy direction is to identify and reduce any costs due to inefficiency or unnecessary expenditures, but that is not pursued in this report. Also, this report focuses exclusively on residential electricity rates. Commercial and industrial electricity rates are also used to cover costs above SMC, raising many of the same issues around electrification, as well as different concerns over equity and business climate in California.

Given this context and these complexities, this report is first and foremost aimed at providing useful facts and outlining possible paths forward, guided by the twin objectives of fostering decarbonization and improving equity. All possible reforms create some manner of trade off, and as such should be debated in the broader policy context in the state.

3 Borenstein, Severin, Meredith Fowlie, and James Sallee. *Designing Electricity Rates for An Equitable Energy Transition*. Next 10 and the Energy Institute, February 23, 2021. Available at: https://www.next10.org/publications/electricity-rates.