



# ZAPPED!

**How California's Punishing Energy Agenda Hurts the Working Class**

WAYNE WINEGARDEN

Zapped! How California's Punishing Energy Agenda Hurts the Working Class

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# Executive Summary

California imposes a complex array of energy regulations, taxes, and subsidies that include cap-and-trade, a renewable portfolio mandate with a goal of 100 percent of electricity being generated from zero-emission energy sources by 2045, the Advanced Clean Car Program, the low carbon fuels standard, net metering regulations that over-compensate homeowners with rooftop solar panels by paying retail rates for what is essentially wholesale power, energy efficiency standards, and electric vehicle subsidies.

It is well documented that California’s approach to energy regulation unnecessarily inflates electricity prices, which were 56 percent higher than the U.S. average as of 2020. Despite consuming about 34 percent less electricity per household, these high electricity prices cause the average California electricity bill to be slightly higher than the national average.

Table ES1 estimates the current average residential electricity bill in each California county. The total electricity usage is based on the total residential electricity consumption over the latest five years (2016 – 2020) and the total number of households per county.<sup>1</sup> Electricity prices are based on the average annual prices charged by the utility(ies) that serves each county.<sup>2</sup> As shown in Table ES1, the average electricity bill varies widely across the state, with the average bill in the more temperate coastal communities tending to be less than the average bill in the generally lower income counties in the Central Valley, Inland Empire, and eastern regions of the state that tend to use more electricity.

**TABLE ES1**  
**Average Annual Household Electricity Expenditures at California Prices by County, 2020**

AVERAGE HOUSEHOLD EXPENDITURES					
<b>California</b>	\$1,450	<b>Madera</b>	\$1,958	<b>San Luis Obispo</b>	\$1,223
<b>Alameda</b>	\$796	<b>Marin</b>	\$1,296	<b>San Mateo</b>	\$1,227
<b>Alpine</b>	\$1,690	<b>Mariposa</b>	\$1,840	<b>Santa Barbara</b>	\$1,080
<b>Amador</b>	\$1,853	<b>Mendocino</b>	\$1,168	<b>Santa Clara</b>	\$1,299
<b>Butte</b>	\$1,728	<b>Merced</b>	\$1,891	<b>Santa Cruz</b>	\$1,165
<b>Calaveras</b>	\$2,469	<b>Modoc</b>	\$2,077	<b>Shasta</b>	\$2,186
<b>Colusa</b>	\$1,985	<b>Mono</b>	\$3,325	<b>Sierra</b>	\$1,776
<b>Contra Costa</b>	\$1,530	<b>Monterey</b>	\$1,111	<b>Siskiyou</b>	\$2,027
<b>Del Norte</b>	\$1,824	<b>Napa</b>	\$1,571	<b>Solano</b>	\$1,466
<b>El Dorado</b>	\$2,036	<b>Nevada</b>	\$2,318	<b>Sonoma</b>	\$1,432
<b>Fresno</b>	\$1,894	<b>Orange</b>	\$1,238	<b>Stanislaus</b>	\$2,188
<b>Glenn</b>	\$1,988	<b>Placer</b>	\$2,121	<b>Sutter</b>	\$1,849
<b>Humboldt</b>	\$1,441	<b>Plumas</b>	\$2,155	<b>Tehama</b>	\$2,055
<b>Imperial</b>	\$1,983	<b>Riverside</b>	\$1,938	<b>Trinity</b>	\$1,496
<b>Inyo</b>	\$1,350	<b>Sacramento</b>	\$1,213	<b>Tulare</b>	\$1,749
<b>Kern</b>	\$1,796	<b>San Benito</b>	\$1,471	<b>Tuolumne</b>	\$1,877
<b>Kings</b>	\$1,710	<b>San Bernardino</b>	\$1,510	<b>Ventura</b>	\$1,250
<b>Lake</b>	\$2,313	<b>San Diego</b>	\$1,416	<b>Yolo</b>	\$1,455
<b>Lassen</b>	\$1,399	<b>San Francisco</b>	\$840	<b>Yuba</b>	\$1,763
<b>Los Angeles</b>	\$1,160	<b>San Joaquin</b>	\$1,677		

Source: Author calculations

These results demonstrate that lower income households and households living in the Central Valley, Inland Empire, and eastern regions are bearing a disproportionate burden from the state’s high electricity costs. These excessive burdens are troubling because there is no inherent reason California’s electricity prices should be significantly higher than the national average. In fact, repealing the policies that are inflating California’s electricity prices will meaningfully reduce costs and generate significant budgetary relief for many families.

To get a sense of the potential savings, the average household electricity bill in each county from Table ES1 is compared to the bill that would result if each county’s electricity prices reflected the much lower U.S. average price. Table ES2 summarizes the potential savings that would result, which provides a useful benchmark for the excess costs that households across the state are paying. Not surprisingly, the households that are struggling to afford the highest electricity bills could reap the largest savings.

**TABLE ES2**  
**Average Potential Annual Residential Savings by County**  
**If California’s Prices Equaled U.S. Average Electricity Rates**

POTENTIAL SAVINGS					
California	\$517.73	Madera	\$736.97	San Luis Obispo	\$460.38
Alameda	\$121.68	Marin	\$487.74	San Mateo	\$461.89
Alpine	\$506.82	Mariposa	\$692.70	Santa Barbara	\$406.58
Amador	\$697.45	Mendocino	\$47.57	Santa Clara	\$488.95
Butte	\$650.57	Merced	\$711.99	Santa Cruz	\$438.70
Calaveras	\$929.45	Modoc	\$84.63	Shasta	\$823.05
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Inyo	\$391.45	Sacramento	\$49.43	Tulare	\$507.15
Kern	\$676.21	San Benito	\$553.63	Tuolumne	\$706.62
Kings	\$643.84	San Bernardino	\$437.93	Ventura	\$362.37
Lake	\$870.61	San Diego	\$642.27	Yolo	\$547.88
Lassen	\$423.11	San Francisco	\$316.29	Yuba	\$663.56
Los Angeles	\$336.22	San Joaquin	\$631.47		

Source: Author calculations

Repealing the state’s costly energy taxes and regulations and embracing market-tested energy sources such as natural gas and nuclear power will help families across California realize these savings while still making progress toward the state’s low-emission goals.

Starting with natural gas, data from the Energy Information Administration (EIA) confirm that it has played a pivotal role reducing overall U.S. greenhouse gas emissions since the mid-2000's peak.<sup>3</sup> And, thanks to the fracking revolution, natural gas is also one of the more affordable and reliable low-emission energy sources. California's policies currently discourage fracking and shun the use of natural gas, which helps explain why electricity rates continue to rise. Repealing the state's current position on fracking and biases against the use of natural gas would reverse these trends.

Nuclear energy is also an essential technology that can help California reduce emissions while also providing affordable and reliable electricity. Nuclear power plants produce almost no greenhouse gas emissions during operation, and according to the International Atomic Energy Agency (IAEA), "the use of nuclear power has reduced carbon dioxide emissions by more than 60 gigatons over the past 50 years, which is almost two years' worth of global energy-related emissions."<sup>4</sup> Due to these benefits, California should be expanding its reliance on nuclear power rather than shuttering its remaining nuclear power plants. Despite the fears of Californians who have memories of Chernobyl or Three Mile Island in the back of their minds, nuclear power generation is very safe. According to the World Nuclear Association, "in the 60-year history of civil nuclear power generation, with over 18,500 cumulative reactor-years across 36 countries, there have been only three significant accidents at nuclear power plants. They conclude, "the risk of accidents in nuclear power plans is low and declining."<sup>5</sup>

California's current approach to energy regulations impose much higher financial burdens on lower-income families, particularly those families living in the Central Valley, Inland Empire, and eastern regions of the state. In far too many cases, the high costs force too many families into the scourge of energy poverty. Given that alternative policies exist that will promote low emission, yet affordable, energy sources these burdens are simply unjustifiable.

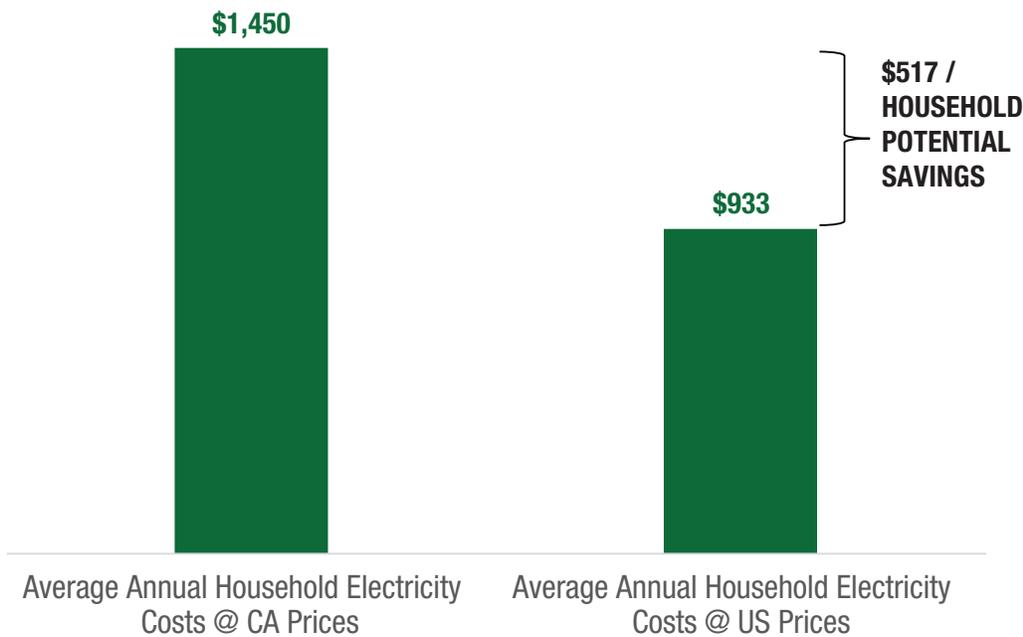
# Introduction

Californians endure the 4th highest electricity rates in the lower 48 states. According to the Energy Information Administration,<sup>6</sup> California’s average rate per kwh (kilowatt-hour) was 20.45-cents for all of 2020 compared to an average U.S. price of 13.15-cents per kwh. Only the highly regulated northeastern states of Connecticut, Rhode Island, and Massachusetts have higher average retail prices.

Unlike the Northeast, many Californians are lucky to live in temperate environments and consequently use less electricity than the average American. Despite using less, the nearly 56 percent price premium overwhelms the benefits from needing less electricity. This causes the average annual bill for California residents to be higher than the average bill for the rest of the country.

Based on the U.S. average electricity usage and retail prices, average annual electricity costs in the U.S. are \$1,409. In comparison, the average residential electricity costs in California are around \$1,450 per year, based on the average electricity consumption over the latest five-years (2016 – 2020)<sup>7</sup> and the latest average residential electricity rates for the state. If Californians’ costs were not inflated, these costs would be a substantially smaller \$933 annually, saving families \$517 on their electric bills – a nearly 36 percent reduction. Figure 1 presents these costs and potential savings.

**FIGURE 1**  
**Annual Average Electricity Bills at Current Average California Prices**  
**Compared to Annual Average Electricity Bills at Current Average U.S. Prices**



Source: Author calculations based on data from the Energy Information Administration and California Energy Commission

The lost savings are troubling because there is nothing unique about California that should cause the state's electricity rates to be significantly higher than the rest of the country. Instead, the results are the expected and desired outcome from Sacramento's energy policy agenda of recent years. These policies include:

- cap-and-trade regulations that went into effect in 2013<sup>8</sup>;
- renewable portfolio mandate with a goal of 100 percent of the state's electricity generated from zero-emission energy sources by 2045<sup>9</sup>;
- Advanced Clean Car Program that requires automakers to reduce greenhouse emission from cars by 34 percent by 2025<sup>10</sup>;
- the low carbon fuels standard with a goal of reducing the carbon intensity of the transportation fuel pool by at least 20 percent by 2030<sup>11</sup>;
- net metering regulations that over-compensate homeowners with rooftop solar panels by paying retail rates for what is essentially wholesale power;
- energy efficiency standards<sup>12</sup>;
- electric vehicle subsidies;<sup>13</sup> and
- oil and natural gas production restrictions.<sup>14</sup>

This policy mix of imposing costly regulatory mandates and high taxes increase the price of energy for Californians.<sup>15</sup> With respect to carbon taxes and cap-and-trade regulations, the Congressional Research Service (CRS) noted that, "to some extent, a carbon tax and a cap-and-trade program...are estimated to increase the price of fossil fuels, which would ultimately be borne by consumers, particularly households."<sup>16</sup>

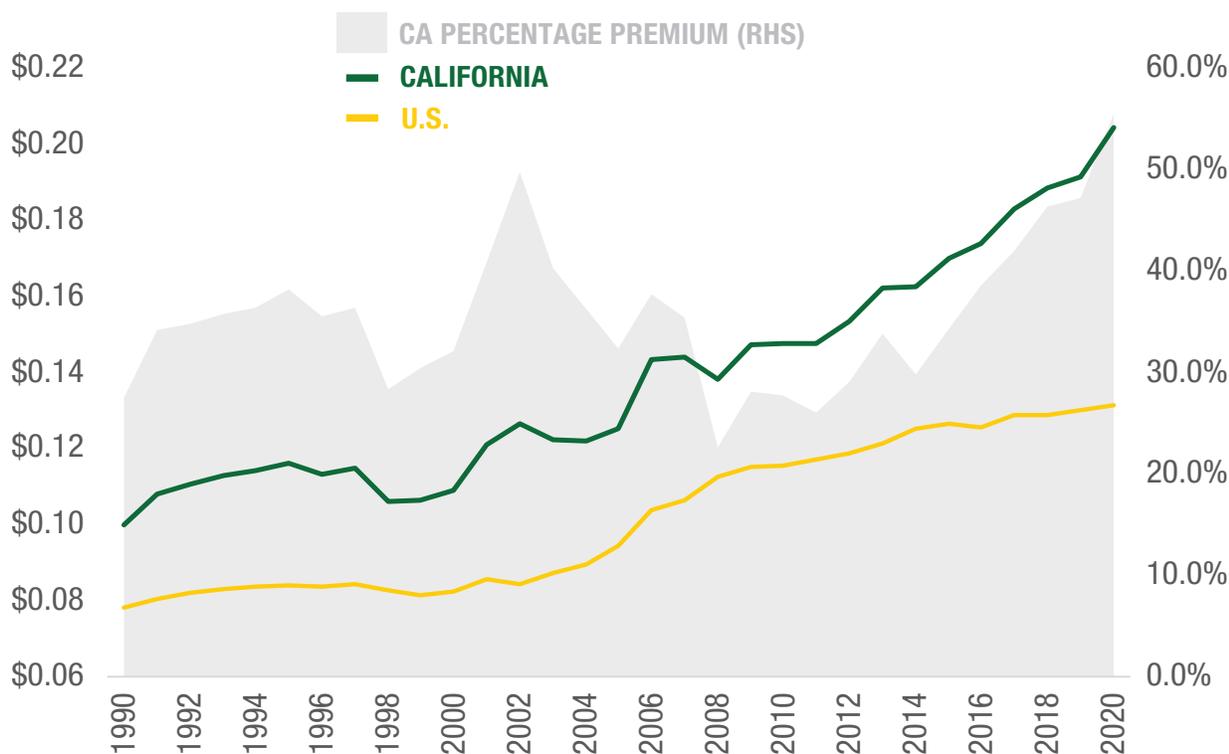
Both left- and right-leaning policy groups also concur with the CRS' finding. The Center on Budget and Policy Priorities promotes cap-and-trade regulations precisely because the "higher energy prices under a cap-and-trade system will give all consumers the incentive to conserve energy and invest in energy efficiency".<sup>17</sup> When evaluating the federal cap-and-trade regulations proposed in 2009 under President Obama, the Heritage Foundation concluded that "average household electric rates would increase by 90 percent by 2035 if Obama signed the bill into law. The total energy bill for a family of four would be \$1,200 higher than it would be without cap-and-trade in place."<sup>18</sup>

Renewable portfolio mandates increase costs by forcing the use of the politically favored energy sources regardless of their price, quality, or economic viability. As Smith and Cornwall (2019) note, "a wide range of academic research finds that RPS [Renewable Portfolio Standards (or Mandates)] raise electricity prices and are not the most cost-effective way to reduce carbon emissions."<sup>19</sup> According to their review, researchers estimate an increase in electricity prices of between 2 and 13 percent due to these mandates.<sup>20</sup>

In an examination of California's cap-and-trade and renewable mandate program, Lesser (2015) concluded that "California households' electricity prices have risen as a result of the state's renewable-energy mandates and carbon cap-and-trade program – and will likely continue to rise at an even faster rate in coming years."<sup>21</sup> A study sponsored by the Los Angeles Department of Water and Power (LADWP), Pacific Gas and Electric Company (PG&E), Sacramento Municipal Utilities District (SMUD), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) examined the impacts from alternative renewable portfolio standards in California – 33 percent, 40 percent, and 50 percent.<sup>22</sup> The analysis found that a 33 percent RPS would raise utility rates between 6.0 percent and 8.0 percent; a 40 percent RPS would increase costs by an additional 3.2 percent; and, a 50 percent RPS would further increase costs by an additional 9.0 percent to 23.0 percent.<sup>23</sup>

Data from the Energy Information Administration (EIA), presented in Figure 2, supports the results from these studies. Figure 2 compares the average residential electricity prices in California to the average residential electricity prices in the U.S., as well as California's percentage premium. Figure 2 demonstrates that prices in California have been higher than the national average for decades and the gap between prices in California and the rest of the country have been widening since 2008. Prices in the Golden State are now nearly 56 percent more expensive than the U.S. average – the widest price differential in the past 30 years.

**FIGURE 2**  
**Average Annual Residential Electricity Prices**  
**California Compared to U.S. National Average**  
**1990 – 2020**



Source: Energy Information Administration

The burden from these higher costs is not shared equally across the state due to California's widely varied incomes and energy use requirements. To provide insights on the size and distribution of the electricity cost burden, this analysis leverages county data on actual electricity usage and average electricity rates to estimate county-specific annual electricity burdens. These burdens are then compared to the costs that Californians would pay if prices reflected the often significantly lower U.S. average price. The results demonstrate that Californians could be saving hundreds of dollars a year on their residential electricity bill if rates in California reflected the national average. While these savings are valuable for all families, these savings are particularly important for lower-income families living in the Central Valley, Inland Empire, and eastern regions of the state where the average annual electricity bills are the highest.

# Quantifying California's Higher Average Annual Electricity Bills: A County Perspective

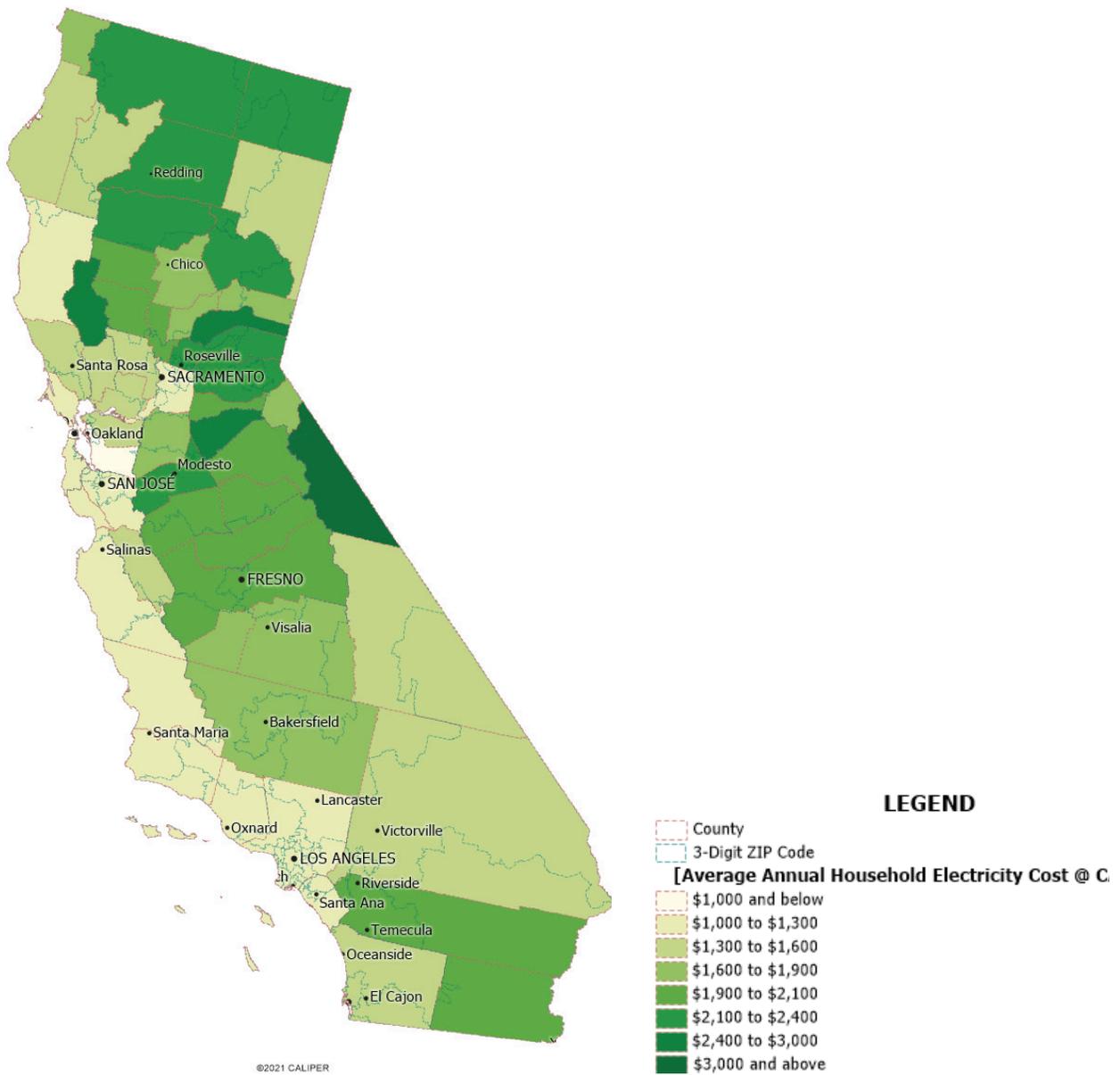
Actual prices and usage of electricity vary across California depending upon the service area. To account for the consumption differences between the counties, the aggregate data on electricity consumption by county maintained by the California Energy Commission is used as the basis for residential demand.<sup>24</sup> Since electricity use varies from year to year, for instance due to differences in weather conditions, the average consumption levels over the latest five years (2016 – 2020) were evaluated.

Since the goal is to evaluate the impact from electricity costs on the average household, it is necessary to evaluate the average household consumption of electricity rather than the total aggregate consumption of electricity. The U.S. Census maintains data on the number of people per county, and the average household size per California county. To estimate the average household consumption of electricity, the aggregate electricity consumption data by county were divided by the estimated number of households over the latest five years (2016 – 2020) for that county.<sup>25</sup> For the state overall, the estimated average annual household consumption of electricity was 7,092 kwh, or 33.8 percent smaller than the estimated average annual household consumption in the U.S. of 10,715.<sup>26</sup>

To account for the variation in electricity prices, each county's prices were set to reflect the average annual electricity prices charged by the utility(ies) that serves the county as of 2020.<sup>27</sup> Multiplying the market electricity prices by the estimated average household electricity consumption provides an estimate of the average annual electricity costs by county.<sup>28</sup> Map 1 and Table 1 present the average annual electricity costs by county based on this methodology.

# MAP 1

## Average Annual Household Electricity Expenditures at California Prices by County, 2020



Source: Author calculations

**TABLE 1**  
**Average Annual Household Electricity Expenditures at California Prices by County**  
**2020**

AVERAGE HOUSEHOLD EXPENDITURES					
California	\$1,450	Madera	\$1,958	San Luis Obispo	\$1,223
Alameda	\$796	Marin	\$1,296	San Mateo	\$1,227
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El Dorado	\$2,036	Nevada	\$2,318	Sonoma	\$1,432
Fresno	\$1,894	Orange	\$1,238	Stanislaus	\$2,188
Glenn	\$1,988	Placer	\$2,121	Sutter	\$1,849
Humboldt	\$1,441	Plumas	\$2,155	Tehama	\$2,055
Imperial	\$1,983	Riverside	\$1,938	Trinity	\$1,496
Inyo	\$1,350	Sacramento	\$1,213	Tulare	\$1,749
Kern	\$1,796	San Benito	\$1,471	Tuolumne	\$1,877
Kings	\$1,710	San Bernardino	\$1,510	Ventura	\$1,250
Lake	\$2,313	San Diego	\$1,416	Yolo	\$1,455
Lassen	\$1,399	San Francisco	\$840	Yuba	\$1,763
Los Angeles	\$1,160	San Joaquin	\$1,677		

Source: Author calculations

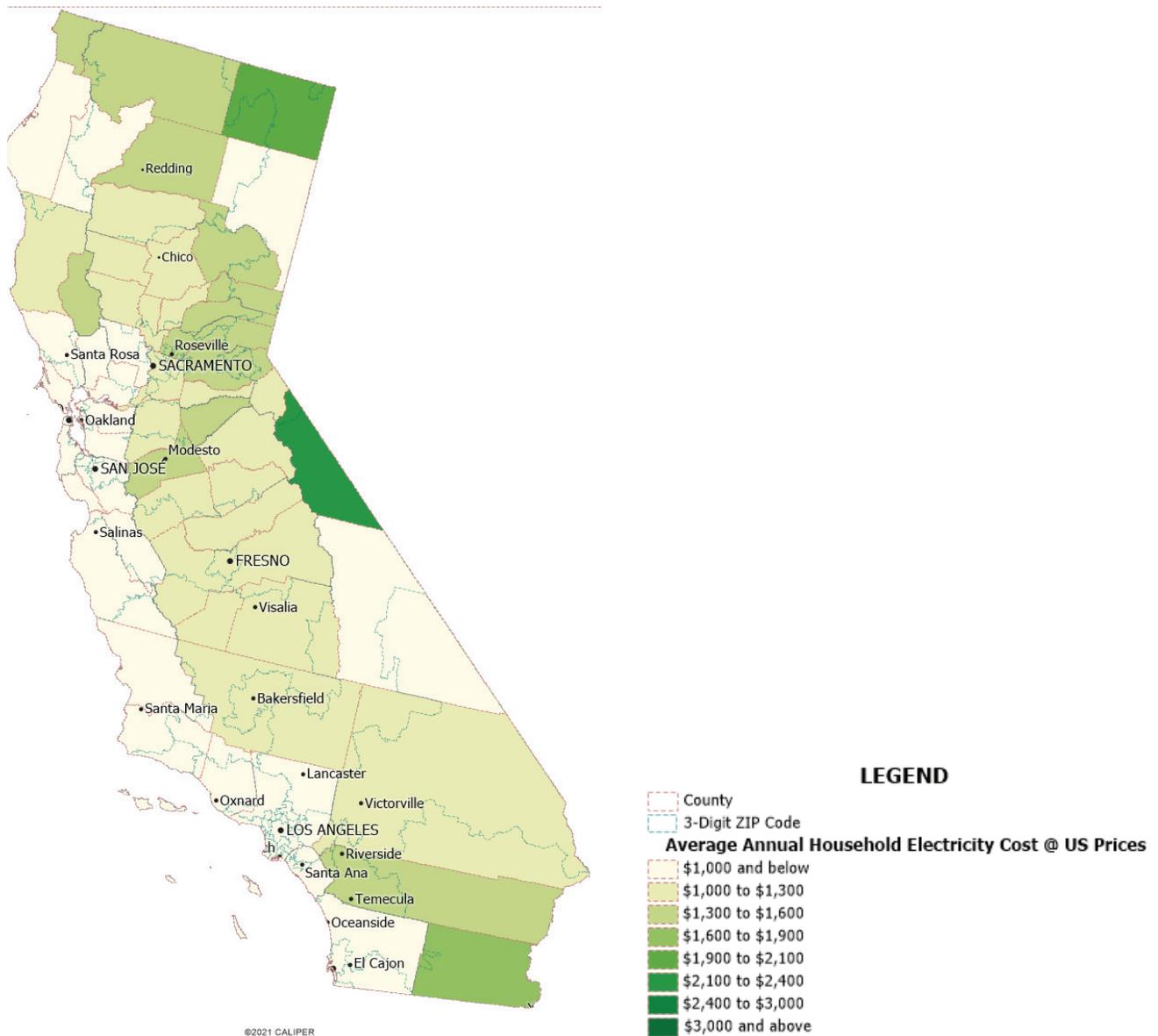
The average annualized expenditures across the 58 counties in the state were \$1,683; expenditures in Alameda County (\$796) were the least while expenditures in Mono County (\$3,325) were the highest. The fact that the average of each county’s expenditures (\$1,683) exceeds the average costs for a Californian (\$1,450) illustrates that residents in smaller, generally rural counties face higher annual costs relative to the more populous counties along the coast.

Map 1 demonstrates the wide variation in annual electricity costs across the state. Along the coast, where energy usage is lower-than the statewide average, electricity costs are generally the lowest. Annual costs are the highest in the Central Valley, Inland Empire, and eastern regions of the state, which are generally the regions with a greater amount of annual electricity use.

Map 2 and Table 2 present the average annual expenditures that California households would have paid had prices across the state reflected average prices in the U.S. Compared to Map and Table 1, Map and Table 2 illustrate a reduction in the average annual expenditures for all counties. Due to the much higher rates currently paid in San Francisco County coupled with the low amount of annual electricity use, San Francisco County would have the lowest average annual electricity costs when prices reflect the average U.S. costs (\$524). Mono County would still have the most expensive average annual electricity costs but would be 29 percent lower (\$2,361) than

currently. Overall, the average of each county’s annual electricity costs would fall 33 percent to \$1,129. The large reductions in costs can be visualized in the much lighter color scheme evidence in Map 2 compared to Map 1. The total average annual savings by county are presented in Map 3 and Table 3. Each demonstrate that the counties with the greatest potential dollar savings are the same ones paying the highest amount for electricity. Averaging across the counties, the average annual household costs would be over \$554 smaller if Californians paid the average U.S. price for electricity rather than the policy-inflated costs that prevail in the state.

## MAP 2 Average Annual Household Electricity Expenditures at U.S. Average Prices by County 2020



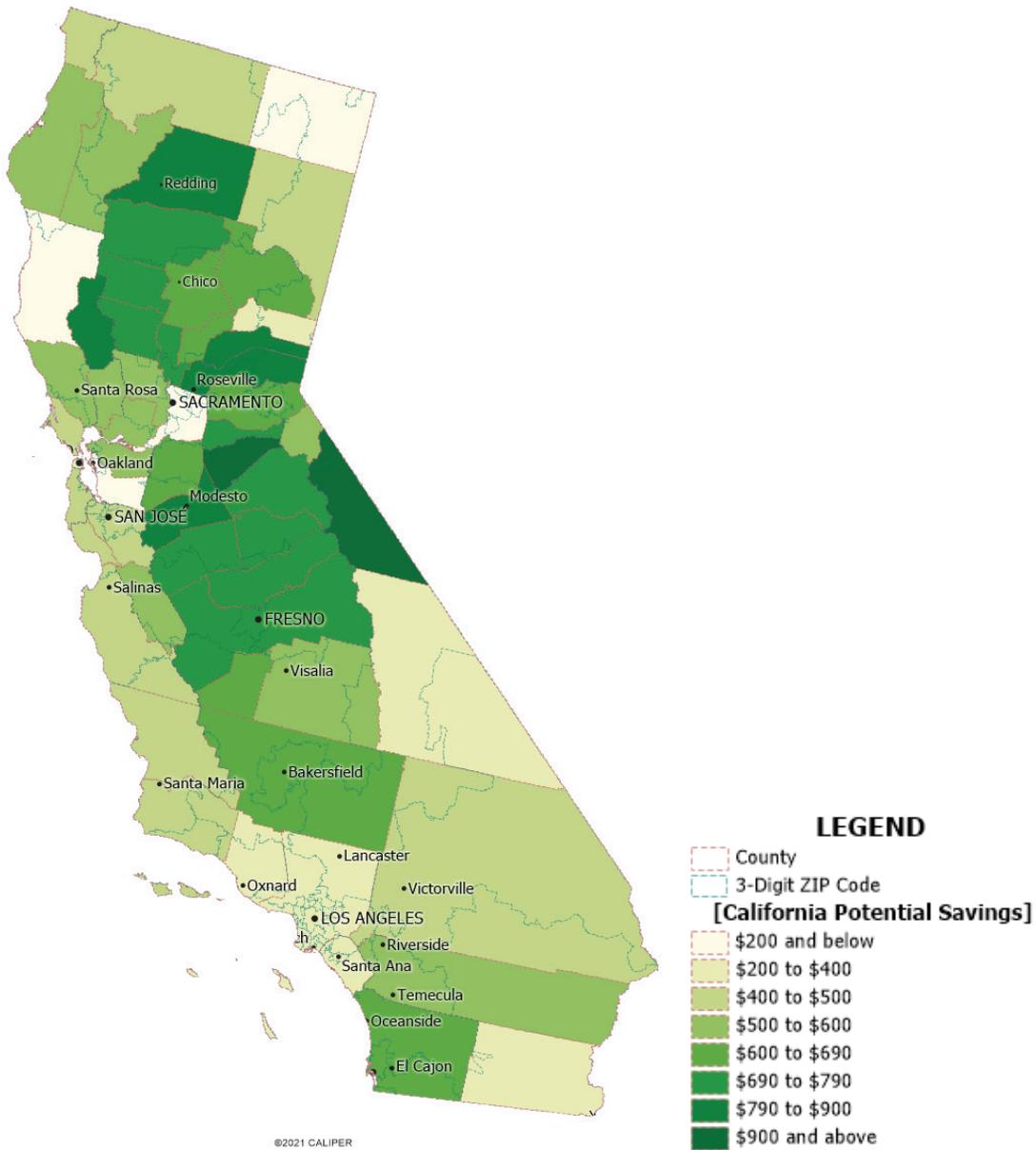
Source: Author calculations

**TABLE 2**  
**Average Annual Household Electricity Expenditures at U.S. Average Prices by County**  
**2020**

<b>AVERAGE EXPENDITURES AT U.S. PRICES</b>					
<b>California</b>	\$933	<b>Madera</b>	\$1,221	<b>San Luis Obispo</b>	\$762
<b>Alameda</b>	\$675	<b>Marin</b>	\$808	<b>San Mateo</b>	\$765
<b>Alpine</b>	\$1,183	<b>Mariposa</b>	\$1,147	<b>Santa Barbara</b>	\$673
<b>Amador</b>	\$1,155	<b>Mendocino</b>	\$1,120	<b>Santa Clara</b>	\$810
<b>Butte</b>	\$1,077	<b>Merced</b>	\$1,179	<b>Santa Cruz</b>	\$727
<b>Calaveras</b>	\$1,539	<b>Modoc</b>	\$1,993	<b>Shasta</b>	\$1,363
<b>Colusa</b>	\$1,238	<b>Mono</b>	\$2,361	<b>Sierra</b>	\$1,418
<b>Contra Costa</b>	\$954	<b>Monterey</b>	\$693	<b>Siskiyou</b>	\$1,536
<b>Del Norte</b>	\$1,382	<b>Napa</b>	\$979	<b>Solano</b>	\$914
<b>El Dorado</b>	\$1,425	<b>Nevada</b>	\$1,445	<b>Sonoma</b>	\$893
<b>Fresno</b>	\$1,181	<b>Orange</b>	\$879	<b>Stanislaus</b>	\$1,364
<b>Glenn</b>	\$1,240	<b>Placer</b>	\$1,322	<b>Sutter</b>	\$1,153
<b>Humboldt</b>	\$898	<b>Plumas</b>	\$1,544	<b>Tehama</b>	\$1,281
<b>Imperial</b>	\$1,707	<b>Riverside</b>	\$1,376	<b>Trinity</b>	\$933
<b>Inyo</b>	\$959	<b>Sacramento</b>	\$1,164	<b>Tulare</b>	\$1,242
<b>Kern</b>	\$1,120	<b>San Benito</b>	\$917	<b>Tuolumne</b>	\$1,170
<b>Kings</b>	\$1,066	<b>San Bernardino</b>	\$1,072	<b>Ventura</b>	\$887
<b>Lake</b>	\$1,442	<b>San Diego</b>	\$773	<b>Yolo</b>	\$907
<b>Lassen</b>	\$976	<b>San Francisco</b>	\$524	<b>Yuba</b>	\$1,099
<b>Los Angeles</b>	\$823	<b>San Joaquin</b>	\$1,046		

Source: Author calculations

**MAP 3**  
**Potential Average Annual Household Electricity Savings**  
**If California Prices Were Reduced to Average U.S. Prices**  
**by County, 2020**



Source: Author calculations

**TABLE 3**  
**Potential Average Annual Household Electricity Savings**  
**If California Prices Were Reduced to Average U.S. Prices**  
**by County, 2020**

<b>POTENTIAL SAVINGS</b>					
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<b>Lake</b>	\$870.61	<b>San Diego</b>	\$642.27	<b>Yolo</b>	\$547.88
<b>Lassen</b>	\$423.11	<b>San Francisco</b>	\$316.29	<b>Yuba</b>	\$663.56
<b>Los Angeles</b>	\$336.22	<b>San Joaquin</b>	\$631.47		

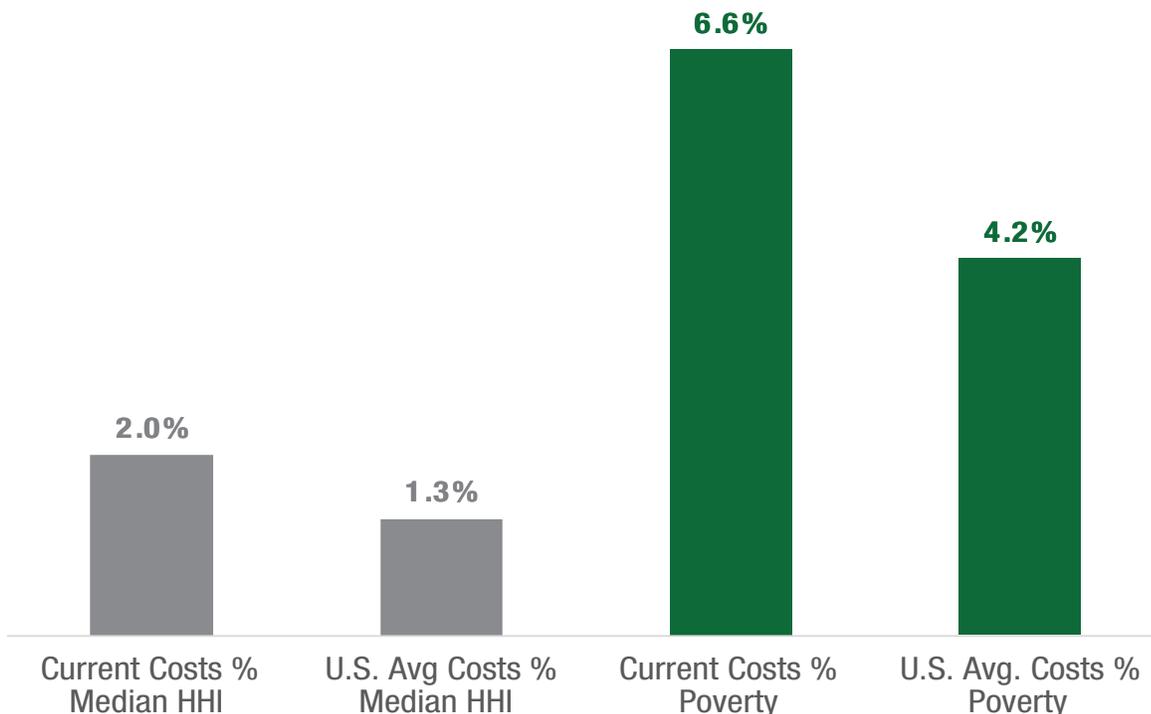
Source: Author calculations

# Potential Savings Are Large Relative to Household Incomes

While the dollar amounts expressed in Map 3 and Table 3 are large, energy affordability is generally defined with respect to a household's income. As cited by the American Council for an Energy-Efficient Economy (ACEEE), "a household's energy burden—the percentage of household income spent on energy bills—provides an indication of energy affordability. Researchers define households with a 6% energy burden or higher to experience a high burden."<sup>29</sup>

The current average costs for a Californian (\$1,450) exceeds this 6 percent threshold for families living at the poverty line, see Figure 3. Figure 3 also presents the electricity burden for families living at the poverty level if prices in California reflected the much lower U.S. average costs. If prices in California equaled the average U.S. price, then the annual electricity costs for a family at the poverty line would fall below the "high burden" threshold, indicating a significant improvement in their financial wellbeing. Figure 3 also illustrates that while households earning the median (average) income in the state are not exceeding the "high burden" threshold currently (costs are 2.0 percent of income), California's inflated prices are still unnecessarily increasing their costs by a significant amount. If valued at U.S. prices, costs on households earning California's median income could be as low as 1.3 percent of income.

**FIGURE 3**  
**Average Electricity Costs for A Californian Relative to Median Household Income (HHI) and Families Living at the Poverty Threshold California 2020 Prices compared to U.S. Prices**

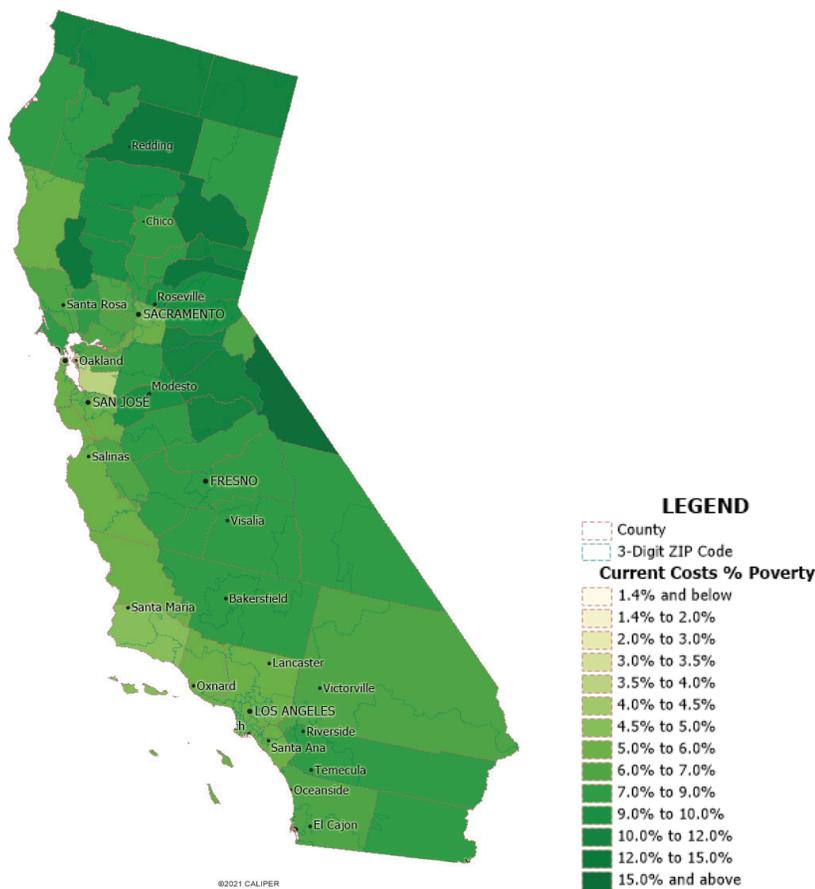


Source: Author calculations

It is important to note that the costs for households living at the poverty threshold do not reflect the impacts from the potential 30 – 35 percent discount that low-income customers can receive through the California Alternate Rates for Energy (CARE) program.<sup>30</sup> These discounts are excluded for several reasons. First, families must request these discounts indicating that not all vulnerable families are necessarily receiving the discounts. Second, the purpose of the comparison is to understand the impact on affordability created by California’s policies, which are the costs gross of the offered discounts. Finally, California’s high electricity costs create lost opportunities, particularly for low-income families. One way to visualize the lost opportunities is to recognize that low-income families’ potential electricity savings could be even higher if electricity prices in California equaled the lower U.S. average costs, but the same discounts were offered. For these reasons, examining the burden excluding these discounts provides a more accurate understanding of how the excessive prices in California are harming low-income families.

While the burden from the average annual electricity costs on low-income families is universally large across the state, lower-income families living in the Central Valley, Inland Empire, and eastern regions of the state are bearing a substantially higher burden than the lower-income families living in other areas, see Map 4 and Table 4. Each show that for some of these counties, Mariposa County for instance, the average annual electricity costs can exceed 10 percent of the income for a family living at the poverty line.<sup>31</sup>

**MAP 4**  
**Average Annual Household Electricity Expenditures at California Prices**  
**Relative to Poverty Threshold Income**  
**by County, 2020**



Source: Author calculations

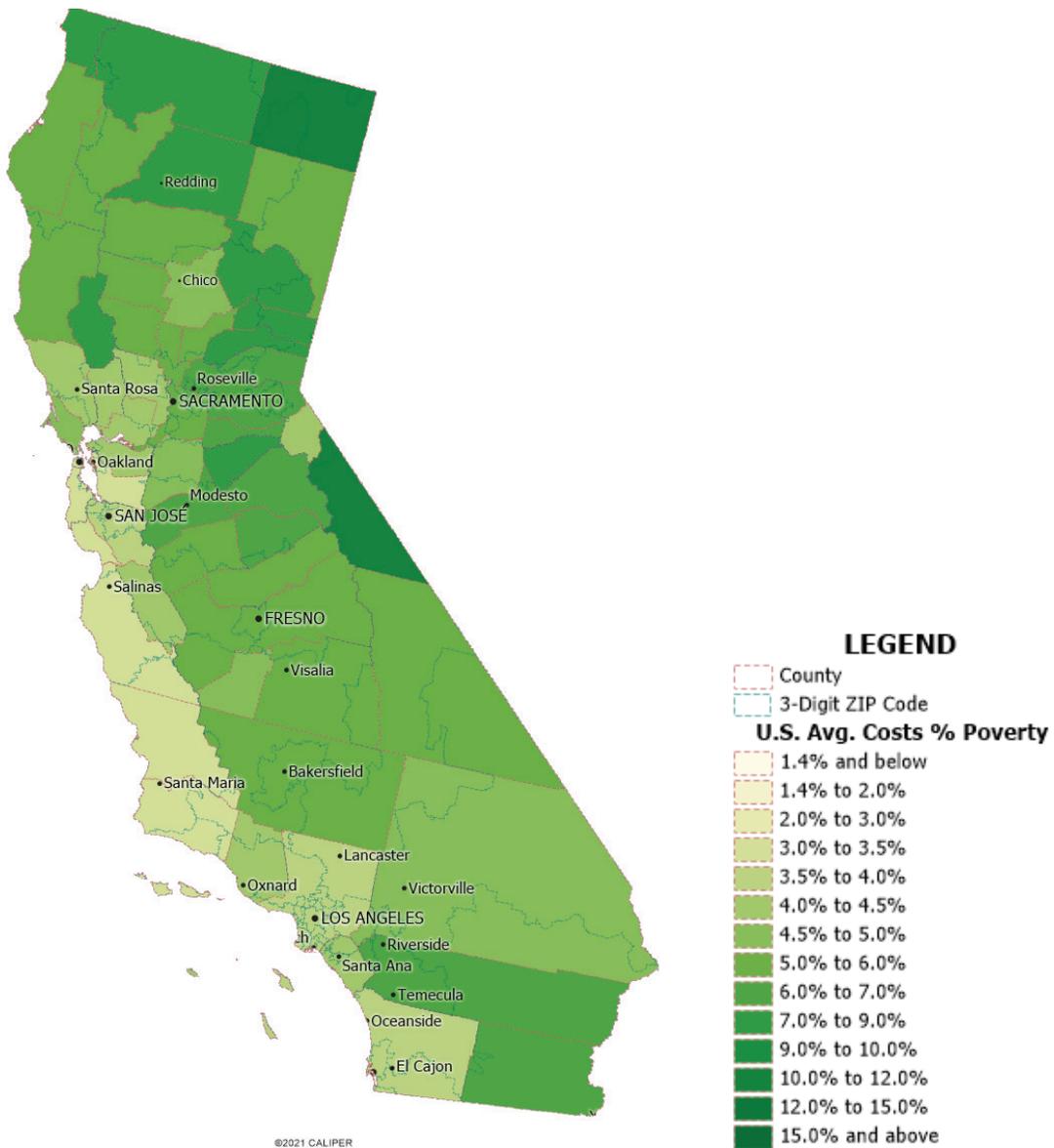
**TABLE 4**  
**Average Annual Household Electricity Expenditures at California Prices**  
**Relative to Poverty Threshold Income**  
**by County, 2020**

<b>CURRENT EXPENDITURES % POVERTY INCOME</b>					
<b>California</b>	6.6%	<b>Madera</b>	8.9%	<b>San Luis Obispo</b>	5.6%
<b>Alameda</b>	3.6%	<b>Marin</b>	7.4%	<b>San Mateo</b>	5.6%
<b>Alpine</b>	6.4%	<b>Mariposa</b>	10.6%	<b>Santa Barbara</b>	4.9%
<b>Amador</b>	10.6%	<b>Mendocino</b>	5.3%	<b>Santa Clara</b>	5.9%
<b>Butte</b>	7.9%	<b>Merced</b>	8.6%	<b>Santa Cruz</b>	5.3%
<b>Calaveras</b>	11.2%	<b>Modoc</b>	11.9%	<b>Shasta</b>	12.5%
<b>Colusa</b>	9.0%	<b>Mono</b>	15.1%	<b>Sierra</b>	10.2%
<b>Contra Costa</b>	7.0%	<b>Monterey</b>	5.1%	<b>Siskiyou</b>	11.6%
<b>Del Norte</b>	10.5%	<b>Napa</b>	7.2%	<b>Solano</b>	6.7%
<b>El Dorado</b>	9.3%	<b>Nevada</b>	13.3%	<b>Sonoma</b>	6.5%
<b>Fresno</b>	8.6%	<b>Orange</b>	5.6%	<b>Stanislaus</b>	10.0%
<b>Glenn</b>	9.1%	<b>Placer</b>	9.7%	<b>Sutter</b>	8.4%
<b>Humboldt</b>	8.3%	<b>Plumas</b>	12.4%	<b>Tehama</b>	9.4%
<b>Imperial</b>	7.5%	<b>Riverside</b>	8.8%	<b>Trinity</b>	8.6%
<b>Inyo</b>	7.7%	<b>Sacramento</b>	5.5%	<b>Tulare</b>	8.0%
<b>Kern</b>	8.2%	<b>San Benito</b>	6.7%	<b>Tuolumne</b>	10.8%
<b>Kings</b>	7.8%	<b>San Bernardino</b>	6.9%	<b>Ventura</b>	5.7%
<b>Lake</b>	13.3%	<b>San Diego</b>	6.4%	<b>Yolo</b>	6.6%
<b>Lassen</b>	8.0%	<b>San Francisco</b>	4.8%	<b>Yuba</b>	8.0%
<b>Los Angeles</b>	5.3%	<b>San Joaquin</b>	7.6%		

*Source: Author calculations*

Map 5 and Table 5 illustrate that the reduction in electricity expenditures that would occur if California's prices reflected the U.S. average is substantial relative to the income of households living at the poverty line. Overall, while the average of the counties electricity cost burden is 8.2 percent of the poverty line income at California prices, this burden would fall to 5.5 percent of the poverty line income at the average U.S. prices. This large reduction in the burden imposed on low-income families demonstrates that repealing California's policies that are driving electricity costs higher would substantially help low-income households across the state, particularly in the central and eastern parts of the state.

**MAP 5**  
**Average Annual Household Electricity Expenditures at U.S. Average Prices**  
**Relative to Poverty Threshold Income**  
**by County**  
**2020**



Source: Author calculations

**TABLE 5**  
**Average Annual Household Electricity Expenditures at U.S. Average Prices**  
**Relative to Poverty Threshold Income**  
**by County, 2020**

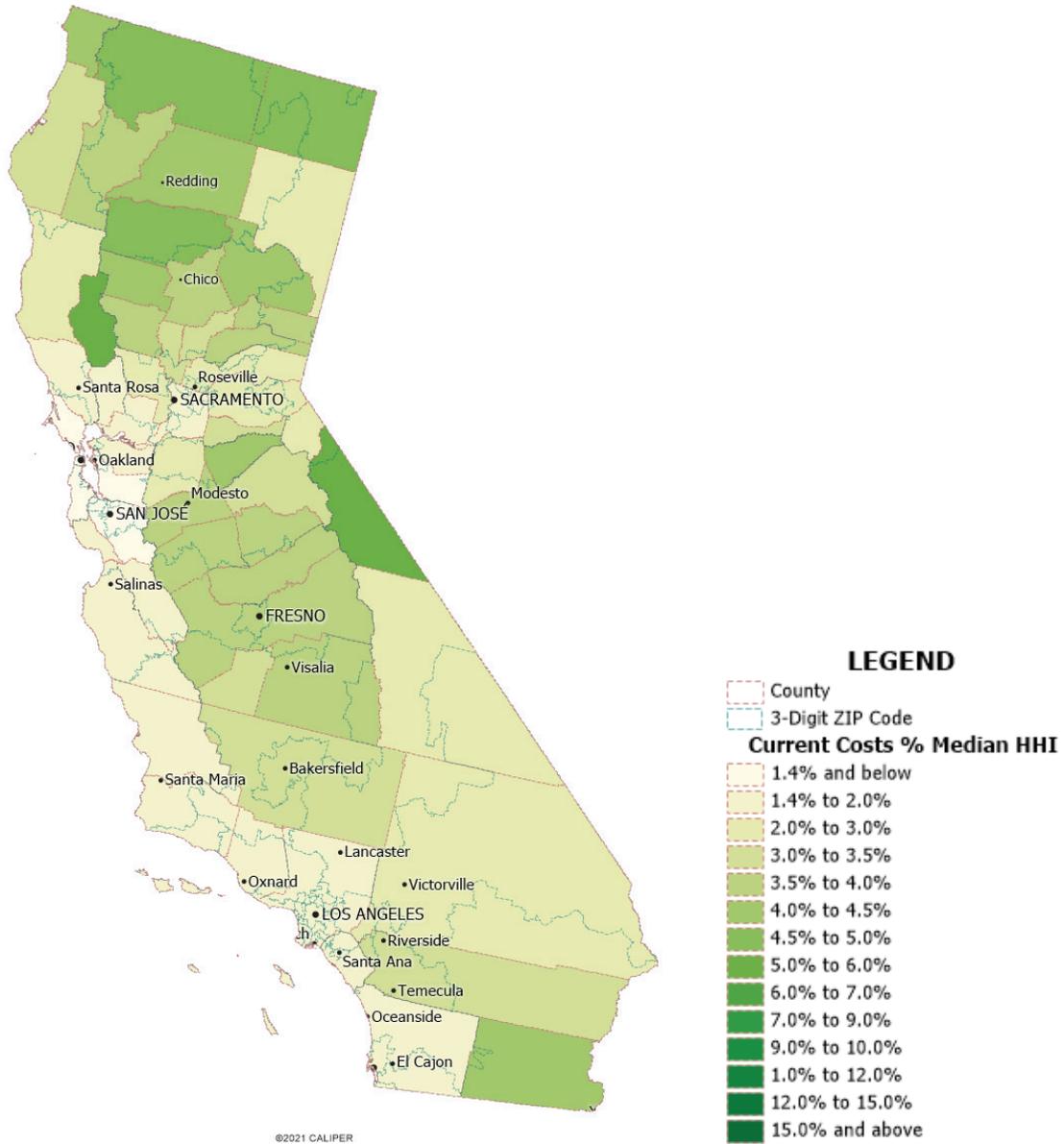
AVERAGE EXPENDITURES AT U.S. PRICES					
California	4.2%	Madera	5.6%	San Luis Obispo	3.5%
Alameda	3.1%	Marin	4.6%	San Mateo	3.5%
Alpine	4.5%	Mariposa	6.6%	Santa Barbara	3.1%
Amador	6.6%	Mendocino	5.1%	Santa Clara	3.7%
Butte	4.9%	Merced	5.4%	Santa Cruz	3.3%
Calaveras	7.0%	Modoc	11.4%	Shasta	7.8%
Colusa	5.6%	Mono	10.8%	Sierra	8.1%
Contra Costa	4.3%	Monterey	3.2%	Siskiyou	8.8%
Del Norte	7.9%	Napa	4.5%	Solano	4.2%
El Dorado	6.5%	Nevada	8.3%	Sonoma	4.1%
Fresno	5.4%	Orange	4.0%	Stanislaus	6.2%
Glenn	5.6%	Placer	6.0%	Sutter	5.3%
Humboldt	5.2%	Plumas	8.9%	Tehama	5.8%
Imperial	6.4%	Riverside	6.3%	Trinity	5.4%
Inyo	5.5%	Sacramento	5.3%	Tulare	5.7%
Kern	5.1%	San Benito	4.2%	Tuolumne	6.7%
Kings	4.9%	San Bernardino	4.9%	Ventura	4.0%
Lake	8.3%	San Diego	3.5%	Yolo	4.1%
Lassen	5.6%	San Francisco	3.0%	Yuba	5.0%
Los Angeles	3.7%	San Joaquin	4.8%		

Source: Author calculations

Examining the impact on families earning the median income for each county demonstrates that middle class families still bear substantial, and unnecessary, costs from the state’s excessively high electricity costs, see Map 4A and Table 4A (costs relative to median income at current California prices) and Map 5A and Table 5A (costs relative to median income at U.S. average prices).

## MAP 4A

### Average Annual Household Electricity Expenditures at California Prices Relative to Each County's Median Household Income, 2020



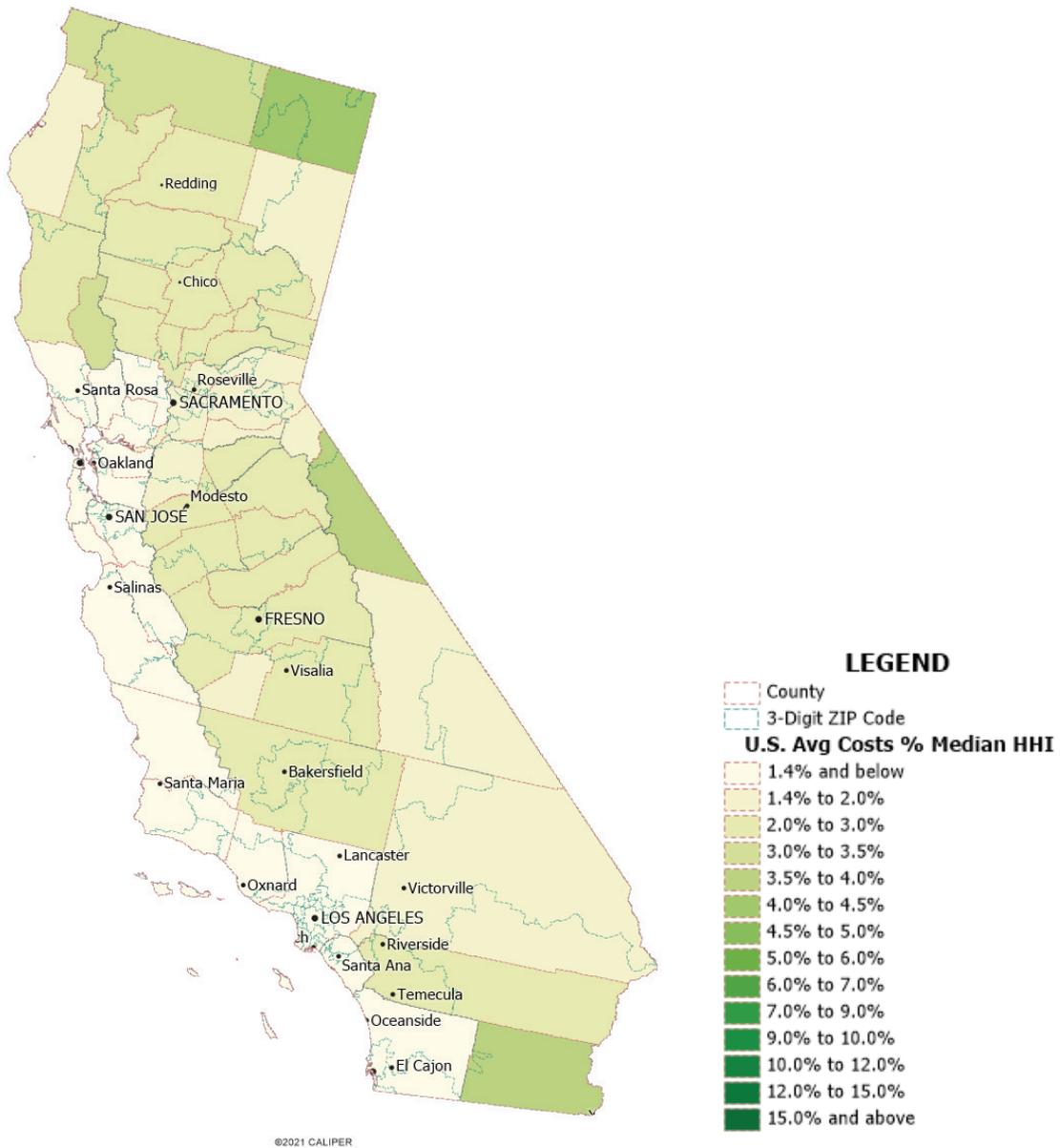
Source: Author calculations

**TABLE 4A**  
**Average Annual Household Electricity Expenditures at California Prices**  
**Relative to Each County's Median Household Income**  
**2020**

<b>CURRENT EXPENDITURES % MEDIAN INCOME</b>					
<b>California</b>	2.0%	<b>Madera</b>	3.7%	<b>San Luis Obispo</b>	1.7%
<b>Alameda</b>	0.9%	<b>Marin</b>	1.2%	<b>San Mateo</b>	1.1%
<b>Alpine</b>	2.6%	<b>Mariposa</b>	3.6%	<b>Santa Barbara</b>	1.5%
<b>Amador</b>	3.0%	<b>Mendocino</b>	2.4%	<b>Santa Clara</b>	1.1%
<b>Butte</b>	3.6%	<b>Merced</b>	3.8%	<b>Santa Cruz</b>	1.5%
<b>Calaveras</b>	4.2%	<b>Modoc</b>	4.6%	<b>Shasta</b>	4.3%
<b>Colusa</b>	3.5%	<b>Mono</b>	5.3%	<b>Sierra</b>	3.7%
<b>Contra Costa</b>	1.6%	<b>Monterey</b>	1.7%	<b>Siskiyou</b>	4.6%
<b>Del Norte</b>	4.0%	<b>Napa</b>	1.9%	<b>Solano</b>	1.9%
<b>El Dorado</b>	2.5%	<b>Nevada</b>	3.7%	<b>Sonoma</b>	1.9%
<b>Fresno</b>	3.7%	<b>Orange</b>	1.4%	<b>Stanislaus</b>	3.8%
<b>Glenn</b>	4.2%	<b>Placer</b>	2.5%	<b>Sutter</b>	3.2%
<b>Humboldt</b>	3.2%	<b>Plumas</b>	4.0%	<b>Tehama</b>	4.8%
<b>Imperial</b>	4.3%	<b>Riverside</b>	3.0%	<b>Trinity</b>	3.9%
<b>Inyo</b>	2.6%	<b>Sacramento</b>	1.9%	<b>Tulare</b>	3.7%
<b>Kern</b>	3.4%	<b>San Benito</b>	1.8%	<b>Tuolumne</b>	3.3%
<b>Kings</b>	3.2%	<b>San Bernardino</b>	2.5%	<b>Ventura</b>	1.5%
<b>Lake</b>	5.4%	<b>San Diego</b>	1.9%	<b>Yolo</b>	2.2%
<b>Lassen</b>	2.5%	<b>San Francisco</b>	0.8%	<b>Yuba</b>	3.3%
<b>Los Angeles</b>	1.8%	<b>San Joaquin</b>	2.7%		

*Source: Author calculations*

**MAP 5A**  
**Average Annual Household Electricity Expenditures at U.S. Average Prices**  
**Relative to Each County's Median Household Income, 2020**



Source: Author calculations

**TABLE 5A**  
**Average Annual Household Electricity Expenditures at U.S. Average Prices**  
**Relative to Each County's Median Household Income, 2020**

AVERAGE EXPENDITURES AT U.S. PRICES					
California	1.3%	Madera	2.3%	San Luis Obispo	1.1%
Alameda	0.7%	Marin	0.7%	San Mateo	0.7%
Alpine	1.8%	Mariposa	2.2%	Santa Barbara	0.9%
Amador	1.9%	Mendocino	2.3%	Santa Clara	0.7%
Butte	2.2%	Merced	2.4%	Santa Cruz	0.9%
Calaveras	2.6%	Modoc	4.4%	Shasta	2.7%
Colusa	2.2%	Mono	3.7%	Sierra	2.9%
Contra Costa	1.0%	Monterey	1.0%	Siskiyou	3.5%
Del Norte	3.1%	Napa	1.2%	Solano	1.2%
El Dorado	1.8%	Nevada	2.3%	Sonoma	1.2%
Fresno	2.3%	Orange	1.0%	Stanislaus	2.4%
Glenn	2.6%	Placer	1.6%	Sutter	2.0%
Humboldt	2.0%	Plumas	2.9%	Tehama	3.0%
Imperial	3.7%	Riverside	2.2%	Trinity	2.4%
Inyo	1.8%	Sacramento	1.8%	Tulare	2.6%
Kern	2.1%	San Benito	1.1%	Tuolumne	2.1%
Kings	2.0%	San Bernardino	1.8%	Ventura	1.1%
Lake	3.4%	San Diego	1.0%	Yolo	1.4%
Lassen	1.7%	San Francisco	0.5%	Yuba	2.1%
Los Angeles	1.3%	San Joaquin	1.7%		

*Source: Author calculations*

Map 4A demonstrates that California's inflated electricity costs currently equal 2.9 percent of the median earning household's income across the 58 counties in the state. If prices reflected the U.S. average prices, these costs would decline to 2.0 percent, see Map 5A. Compared to Map 4A, Map 5A demonstrates that households earning the county median income would universally see substantial savings relative to their earnings. These large reductions indicate that eliminating the state's excessive electricity costs would substantially improve the financial wellbeing of middle-class families across all of California.

# Conclusion

California's excessive electricity costs are around all-time highs relative to the national average. These cost burdens harm lower-income households and households living in the Central Valley and eastern parts of the state the most. Using the average U.S. prices as the benchmark demonstrates that the average annual cost reduction could exceed \$554 for households across the state.

These results indicate that the problem of pervasive energy poverty is, essentially, a policy choice. The substantial financial benefits that low-income and middle-class families could realize from cheaper electricity provides evidence that policymakers should choose energy affordability rather than energy poverty.

Realizing these savings is within policymakers' reach because California's higher prices do not reflect a physical reality. Californians pay a price premium because California's policies are driving up these costs. Consequently, repealing these costly mandates, taxes, and regulations that artificially drive up the costs of traditional energy sources will help lessen the state's unaffordable energy environment.

Importantly, repealing these policies does not mean that California must abandon its low-emission goals. California can simultaneously encourage affordable energy and greenhouse gas reductions by supporting market-driven mechanisms to drive emission reductions. Two such policies include embracing the fracking revolution and expanding nuclear energy.

Thanks to the fracking revolution, electricity generated from lower-emitting natural gas has replaced the electricity from high emitting coal. As the U.S. Energy Information Administration has noted, natural gas is "an efficient, relatively clean burning, and economical energy source" that has helped drive the overall reduction in U.S. greenhouse gas emissions that has occurred over the past decade and a half.<sup>32</sup> California discourages fracking and shuns the use of natural gas to the detriment of affordable and reliable electricity. It also hampers an important near-term policy to reduce overall greenhouse gas emissions. Repealing the state's current position on fracking and increasing the use of natural gas would reverse these trends.

Nuclear power is another market-tested technology that can meaningfully reduce emissions while ensuring Californians have access to safe, affordable and reliable electricity. As the International Atomic Energy Agency (IAEA) noted, "nuclear power is the second-largest source of low carbon energy used today to produce electricity, following hydropower. During operation, nuclear power plants produce almost no greenhouse gas emissions. According to the IEA, the use of nuclear power has reduced carbon dioxide emissions by more than 60 gigatons over the past 50 years, which is almost two years' worth of global energy-related emissions."<sup>33</sup> Due to these benefits, California should reverse course and promote the expansion of this zero-emission economically viable energy source instead of shuttering nuclear power plants.

The costs from California's current approach to energy regulations are not borne equally. Energy poverty and lack of affordability harm residents in the lower-income areas of the Central Valley, Inland Empire, and eastern regions of the state to a much larger extent than the wealthier regions along the coast. The costs that families in these regions are currently bearing are difficult to justify given that alternative policies exist that will promote low-emission energy sources and help alleviate the growing problem of energy poverty that afflicts too many families across the state.

# Endnotes

- 1 California electricity consumption data by county is from: California Energy Commission, <http://www.ecdms.energy.ca.gov/elecbycounty.aspx>. California households by county is from the U.S. Census.
- 2 The SCE, PG&E, SDG&E, Liberty, PacificCorp, and Bear Valley utility rates were from the California Public Utility Commission (CPUC). Rates for the Imperial Irrigation District, City of Ukia, Lassen Municipal Utility District, Surprise Valley, Plumas-Sierra Rural Electric Cooperative, SMUD, and Alameda utilities were from the respective utility websites.
- 3 “Natural gas explained: Natural gas and the environment” U.S. Energy Information Administration” <https://www.eia.gov/energyexplained/natural-gas/natural-gas-and-the-environment.php>, accessed January 3, 2022.
- 4 Jawerth N “What is the Clean Energy transition and How Does Nuclear Power Fit In?” International Atomic Energy Agency, September 2020, <https://www.iaea.org/nuclear-power-and-the-clean-energy-transition/what-is-the-clean-energy-transition-and-how-does-nuclear-power-fit-in>.
- 5 “Safety of Nuclear Power Reactors,” World Nuclear Association, March 2021, <https://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/safety-of-nuclear-power-reactors.aspx>
- 6 U.S. Energy Information Administration, Electricity Detailed State Data, <https://www.eia.gov/electricity/data/state/>.
- 7 California Energy Commission, <http://www.ecdms.energy.ca.gov/elecbycounty.aspx>.
- 8 “California Cap-and-trade” Center for Climate and Energy Solutions, <https://www.c2es.org/content/california-cap-and-trade/>.
- 9 See: the California Air Resources Board; <https://www.arb.ca.gov/cc/pillars/pillars.htm>; and Damonoske C (2018) “California Sets Goal Of 100 Percent Clean Electric Power By 2045” NPR, September 10; <https://www.npr.org/2018/09/10/646373423/california-sets-goal-of-100-percent-renewable-electric-power-by-2045>.
- 10 “Advanced Clean Cars Program” California Air Resources Board, <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program>.
- 11 California Air Resources Board, <https://ww2.arb.ca.gov/sites/default/files/2020-09/basics-notes.pdf>.
- 12 Mauer J, deLaski A, and DiMascio M (2017) “States Go First: How States Can Save Consumers Money, Reduce Energy and Water Waste, and Protect the Environment with New Appliance Standards” ACEEE, July, <https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf>.
- 13 ACEEE State and Local Policy Database; <https://database.aceee.org/state/california>.
- 14 For a discussion that evaluates the different economic outcomes in California and New York due to their production restrictions see: Winegarden W (2016) “Regulating the Upstream Energy Industry: Getting the balance right” Pacific Research Institute, May, [https://www.pacificresearch.org/wp-content/uploads/2017/06/UpstreamEnergy\\_Web.pdf](https://www.pacificresearch.org/wp-content/uploads/2017/06/UpstreamEnergy_Web.pdf).

- 15 Winegarden W “Legislating Energy Poverty: A case study of how California’s and New York’s climate change policies are increasing energy costs and hurting the economy” Pacific Research Institute, November 2018, [https://www.pacificresearch.org/wp-content/uploads/2018/12/LegislatingEnergy\\_F\\_Web.pdf](https://www.pacificresearch.org/wp-content/uploads/2018/12/LegislatingEnergy_F_Web.pdf).
- 16 Ramseur J and Parker L (2009) “Carbon Tax and Greenhouse Gas Control: Options and Considerations for Congress” Congressional Research Service, March 10, <https://sgp.fas.org/crs/misc/R40242.pdf>.
- 17 Stone C, Shaw H, and Parrott S “Cap and Trade Can Fight Global Warming Effectively While Also Protecting Consumers” Center on Budget and Policy Priorities, March 3, 2009, <https://www.cbpp.org/research/cap-and-trade-can-fight-global-warming-effectively-while-also-protecting-consumers>.
- 18 Loris N “The Costs of Cap and Trade” The Heritage Foundation, September 14, 2010, <https://www.heritage.org/environment/commentary/the-costs-cap-and-trade>.
- 19 Smith JT and Cornwall V “What Is the Relationship between Renewable Portfolio Standards and Electricity Prices?” The Center for Growth and Opportunity at Utah State University, February 12, 2019, <https://www.thecgo.org/research/what-is-the-relationship-between-renewable-portfolio-standards-and-electricity-prices/>.
- 20 Ibid.
- 21 Lesser JA “Less Carbon, Higher Prices: How California’s climate policies affect lower-income residents” Center for Energy Policy and the Environment, No. 17, July 2015, [https://www.heartland.org/\\_template\\_assets/documents/publications/manhattan\\_ins\\_analysis\\_of\\_californias\\_power\\_plans.pdf](https://www.heartland.org/_template_assets/documents/publications/manhattan_ins_analysis_of_californias_power_plans.pdf).
- 22 (2014) “Investigating a Higher Renewables Portfolio Standard in California” E3, January, [https://www.ethree.com/wp-content/uploads/2017/01/E3\\_Final\\_RPS\\_Report\\_2014\\_01\\_06\\_with\\_appendices.pdf](https://www.ethree.com/wp-content/uploads/2017/01/E3_Final_RPS_Report_2014_01_06_with_appendices.pdf).
- 23 Ibid.
- 24 California Energy Commission, <http://www.ecdms.energy.ca.gov/elecbycounty.aspx>.
- 25 The latest data from the U.S. Census as of this analysis was 2019, so an estimated value for 2020 was used.
- 26 Average annual household electricity consumption for the U.S. is from: Energy Information Administration, <https://www.eia.gov/tools/faqs/faq.php?id=97&xt=3#:~:text=In%202020%2C%20the%20average%20annual,about%20893%20kWh%20per%20month..>
- 27 The SCE, PG&E, SDG&E, Liberty, PacificCorp, and Bear Valley utility rates were from the California Public Utility Commission (CPUC). Rates for the Imperial Irrigation District, City of Ukia, Lassen Municipal Utility District, Surprise Valley, Plumas-Sierra Rural Electric Cooperative, SMUD, and Alameda utilities were from the respective utility websites.
- 28 Utilities in California have programs designed to provide discounts to families with incomes below specified thresholds. For more information on these programs see: <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/care-fera-program>. The analysis does not include these rate reductions because the objective of the analysis is to evaluate the impact from California’s policy-driven cost premium. Therefore, the estimates reflect the costs for the household based on actual rates and may not reflect a lower-income family’s actual bill.

- 29 “Understanding Energy Affordability”, American Council for an Energy-Efficient Economy, <https://www.aceee.org/sites/default/files/energy-affordability.pdf>.
- 30 California Alternate Rates for Energy (CARE) <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/care-fera-program>.
- 31 The poverty line is defined as the federal poverty threshold for the average household size in each county, rounded to the closest whole number.
- 32 “Natural gas explained: Natural gas and the environment” U.S. Energy Information Administration” <https://www.eia.gov/energyexplained/natural-gas/natural-gas-and-the-environment.php>, accessed January 3, 2022.
- 33 Jawerth N “What is the Clean Energy transition and How Does Nuclear Power Fit In?” International Atomic Energy Agency, September 2020, <https://www.iaea.org/nuclear-power-and-the-clean-energy-transition/what-is-the-clean-energy-transition-and-how-does-nuclear-power-fit-in>.

# About the Author

**Wayne Winegarden, Ph.D.**, is a Sr. Fellow in Business & Economics, Pacific Research Institute, as well as the Director of PRI's Center for Medical Economics and Innovation.

Dr. Winegarden's policy research explores the connection between macroeconomic policies and economic outcomes, with a focus on fiscal policy, the health care industry, and the energy sector. As Director of the Center for Medical Economics and Innovation, Dr. Winegarden spearheads research and advances policies that support the continued viability and vitality of the U.S. biomedical and pharmaceutical industries to the benefit of patients and overall economic growth.

Dr. Winegarden's columns have been published in the *Wall Street Journal*, *Chicago Tribune*, *Investor's Business Daily*, *Forbes.com*, and *USA Today*. He was previously economics faculty at Marymount University, has testified before the U.S. Congress, has been interviewed and quoted in such media as CNN and Bloomberg Radio, and is asked to present his research findings at policy conferences and meetings.

Dr. Winegarden is also the Principal of an economic advisory firm that advises clients on the economic, business, and investment implications from changes in broader macroeconomic trends and government policies. Clients have included Fortune 500 companies, financial organizations, small businesses, and trade associations. Previously, Dr. Winegarden worked as a business economist in Hong Kong and New York City; and a policy economist for policy and trade associations in Washington D.C. Dr. Winegarden received his B.A., M.A., and Ph.D. in Economics from George Mason University.

# About PRI

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PRI shows how the entrepreneurial spirit—the engine of economic growth and opportunity—is stifled by onerous taxes, regulations, and lawsuits. It advances policy reforms that promote a robust economy, consumer choice, and innovation.

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PRI works to restore to all parents the basic right to choose the best educational opportunities for their children. Through research and grassroots outreach, PRI promotes parental choice in education, high academic standards, teacher quality, charter schools, and school-finance reform.

## **CENTER FOR THE ENVIRONMENT**

PRI reveals the dramatic and long-term trend toward a cleaner, healthier environment. It also examines and promotes the essential ingredients for abundant resources and environmental quality: property rights, markets, local action, and private initiative.

## **CENTER FOR HEALTH CARE**

PRI demonstrates why a single-payer Canadian model would be detrimental to the health care of all Americans. It proposes market-based reforms that would improve affordability, access, quality, and consumer choice.

## **CENTER FOR CALIFORNIA REFORM**

The Center for California Reform seeks to reinvigorate California's entrepreneurial self-reliant traditions. It champions solutions in education, business, and the environment that work to advance prosperity and opportunity for all the state's residents.

## **CENTER FOR MEDICAL ECONOMICS AND INNOVATION**

The Center for Medical Economics and Innovation aims to educate policymakers, regulators, health care professionals, the media, and the public on the critical role that new technologies play in improving health and accelerating economic growth.



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