The Unfair Share: Societal Ramifications of Funding California's Wildfire Adaptation Costs through Electricity Rates

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In California, climate change and more Californians living near natural habitats are increasing the need for more spending to prevent against, adapt to and rebuild after wildfires.

California's largest revenue source of spending on wildfire adaptation – electric utility rates – has regressive impacts on low-income families and sends an incorrect price signal as California aims to transition to a net-zero economy. In comparison, spending from the state budget for wildfire adaptation and rebuilding – a progressive, less distortionary revenue source – has been significantly smaller.

Using electricity rates as a revenue source for adaptation costs is inequitable and makes climate mitigation more challenging in at least three ways.

- *Paying for growing wildfire adaptation costs through electricity rates hits low-income households the hardest. This is because wildfire-related costs are disproportionately paid through the electricity bills of low-income households.*
- *California is paying for climate adaptation by penalizing the primary tool for climate mitigation – clean electricity. This makes complying with the state's emissions targets more expensive and puts pressure to spend more on climate mitigation elsewhere.*
- *Increases in electricity prices place an upward pressure on many goods and services throughout the state's economy. For a salient example, rising electricity rates put an upward pressure on grocery prices, worsening access to fruits and vegetables for low-income households.*

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Climate change and increased habitation in wildfire-prone areas is increasing the need to spend on wildfire prevention, adaptation and recovery in California. While increasing the amount of investment to reduce wildfire risk is paramount, *who pays* for this funding and adaptation also matters.

Using electricity rates as a revenue source results in low-income households paying for a larger share of the spending, as compared to alternative methods like spending from the general fund or bonding capacity, sourced from California's tax base.

Additionally, paying for wildfire adaptation through electricity rates penalizes electricity use at a time when the electricity grid is becoming cleaner, counteracting policies that aim to encourage switching from fossil fuels to electric alternatives.

In the last half decade, California private utility wildfire-related spending has significantly outpaced investment made in wildfire resilience and rebuilding from the state tax base. This discrepancy indicates an opportunity to alleviate cost-of-living pressure from rising electricity costs for low-income Californians, while also making progress on the state emissions reductions targets.

Wildfire Adaptation Investment Need is Growing throughout California

Climate change is worsening disasters globally, resulting in increased structural damage to electricity infrastructure and secondary economic and social losses.[1] In western North America, increased human habitation in wildland-urban interfaces combined with climate change has decreased precipitation levels and increased warmer conditions, which has increased fire activity, including acreage of burned areas and the severity of wildland fires.[2] In addition, these increasingly hot and arid conditions have contributed to more incidents of wildfires ignited by electric utility equipment, including the 2018 Camp Fire (153,336 acres burned), 2017 Thomas Fire (281,893 acres burned) and the 2021 Dixie Fire (963,309 acres burned), all which rank among the top 20 largest and most destructive wildfires in California's history.[3] These rising disaster risks are creating a new economic demand for social adaptation and recovery spending.

This growing disaster risk is also increasing the cost of owning, building and maintaining utility infrastructure.[4] Regulated monopoly utilities, including California's investor-owned utilities

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[1] Vanesa Broto, "IPCC Chapter 6: Cities, Settlements and Key Infrastructure," (2022). https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter06.pdf

[2] Jackie Dawson et al., "IPCC Chapter 14: North America" (2022). https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter14.pdf

[3] CalFIRE, "Top 20 Largest California Wildfires," (accessed Oct 2025). https://34c031f8-c9fd-4018-8c5a-4159cdff6b0d-cdn-endpoint.azureedge.net/-/media/calfire-website/our-impact/fire-statistics/top-20-largest-ca-wildfires.pdf?rev=fba7bfc52eab4d5d87fbee5bd9416ed8&hash=270E810A7FCF091122EE2A18EB24ACB6; CalFIRE, "Top 20 Most Destructive California Wildfires" (accessed Oct 2025). https://34c031f8-c9fd-4018-8c5a-4159cdff6b0d-cdn-endpoint.azureedge.net/-/media/calfire-website/our-impact/fire-statistics/newtop20_destruction.pdf?rev=a12fe8cd105b4df8bf479beba79cb692&hash=E70B3C80C15C2B9024F719D2C12F6E3F

[4] Note that this report distinguishes these costs as wildfire 'adaptation' and 'resilience' costs, while excluding funding spent on wildfire response and suppression spending. The former categories are preventative or after the disaster, which this report distinguishes from immediate response spending.

(IOU), are subject to a social and legal obligation to serve all customers who request utility service without discrimination and at reasonable rates.[5] In California, this obligation means that existing utility infrastructure bears an increased risk of being involved with or causing damage, and new wildfire-prone IOU transmission and distribution lines have increasingly been built within the wildland-urban interface, mirroring human land use and development. Fires caused by utility infrastructure are more likely to occur under high wind conditions when suppression is more difficult, which increases the potential for damage.[6] At the same time, California utilities are also spending record-high amounts each year to mitigate wildfire risk, which is paid for by electricity customers through rates.

In the last half decade, nationwide utility spending on disaster infrastructure recovery and preventive resilience is a driving factor in rising electricity prices.[7] In California, electricity bills have similarly spiked primarily due to wildfire prevention costs.

The costs of adapting the state's existing electric infrastructure to address and prevent the rapidly changing wildfire risk are very high and growing. Like most of the built environment, this infrastructure was never designed for the conditions the state is now facing and will face in the future. The long-term effects could include more damage and even more reliance on electricity sector funding, which could put the electric utility business model at risk. [8]

Utility Wildfire-related Spending Hurts Low-income Residential Electricity Customers

Electricity rates have increased in the last half-decade above inflation due to wildfire-related spending, which is forecasted to continue through the end of the decade. PG&E residential electricity rates increased 40 percent above inflation (or 80 percent with inflation) between 2018-2024, primarily due to wildfire-related spending.[9] Of the $0.11 per kWh increase above inflation, $0.06 per kWh (55 percent) is attributable to vegetation management and grid hardening, mostly within the category of distribution spending. This outsized share of wildfire spending continued in PG&E territory during 2024, with 27 percent of total approved IOU spending attributed to wildfire prevention, rebuilding and risk management. [10]

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[5] Roger D. Colton (Office of Economic, Electricity and Natural Gas Analysis US Department of Energy, "The Obligation to Serve and a Competitive Electric Industry," (1997).

[6] Eric Macomber et al., "Wildfire: Assessing and Quantifying Risk Exposure and Mitigation Across the Western Utilities," (2024). woodsinstitute.stanford.edu/system/files/publications/Woods_CEPP_Wildire_White_Paper_FINAL.pdf

[7] Ryan Wiser at al., "Factors Influencing Recent Trends in Retail Electricity Prices in the US," (2025). sciencedirect.com/science/article/pii/S1040619025000612#sec0020

[8] Jay Barlow et al., "Wildfire Risk: Review of Utility Industry Trends," (2025). https://www.pnnl.gov/sites/default/files/media/file/Wildfire%20Risk%20Review%20of%20Utility%20Industry%20Trends_PNNL_July%202025.pdf

[9] Mohit Chhabra, "Powering Change" (2025). nrdc.org/sites/default/files/2025-03/PGE_Rates_Report_R_25-03-A_03.pdf

[10] CPUC, "2025 SB 695 Report: Report to the Governor and Legislature on Actions to Limit Utility Cost and Rate Increases Pursuant to PUC Sec. 913.1" (2025). https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2025/2025-sb-695-report_093025.pdf

These costs are continuing, particularly as other utilities which haven't previously spent large amounts on wildfire prevention catch-up. The California Public Utilities Commission (CPUC) forecasts that residential electricity rates will continue to increase above inflation, predicting average annual residential rate increases of 6 percent for PG&E and SDG&E, and 7 percent for SCE through 2028.[11]

Low-Income electricity customers pay more for wildfire costs

Utility wildfire spending has been disproportionately paid for by low-income customers because of their higher electricity needs and the structure of California's rate design.

Low-income households are overrepresented among households with higher-than-average electricity usage. Throughout IOU territory, low-income households comprise between 21-29 percent of the highest electricity users.[12] In comparison, higher income households are overrepresented among households with the lowest electricity use, comprising half of the population with the lowest electricity use. When overlapping factors are controlled for – ownership of a solar system enrolled in net energy metering (NEM), the climate zone of a household, the size of a household, and the age and type of appliances – the difference in consumption between these groups declines by 5-11 percent. This means that the total monthly per-kilowatt (kWh) electricity consumption is higher among low-income households in the state because they are less likely to have rooftop solar and more likely to live in a hot climate zone, which indicates a dependence on air conditioning.

Because of higher usage among low-income households, low-income customers pay for an outsized share of electricity spending. Costs approved by the CPUC in an IOU's revenue requirement are divided among customer classes, including residential customers, based on their portion of the spending, and divided into billing amounts based on a subjective billing design that incorporates varying priorities. This means that customers who use more pay a higher monthly bill because most costs are collected through a per-kWh (volumetric) charge.

High Electricity Prices Distort Climate Change Progress

Utility wildfire-related spending discourages necessary uses of electricity and sends a distortionary price signal against non-polluting fuels and electric end uses. Other tools for improving human adaptation to climate change – such as the use of air conditioning to cope with extreme heat – become more challenging for low-income households to access with rising electricity prices. The consequence of spending on wildfire adaptation predominantly through electricity rates is that the underlying causes and trends shaping wildfire risks become distorted for relevant regulators, individuals, and the insurance industry, impacting potential opportunities for long-term, holistic adaptation solutions.

[11] Ibid

[12] Severin Borenstein, "Should 'Energy Hogs' Shoulder More of the Utility Cost Burden?" (2024). https://kleinmanenergy.upenn.edu/research/publications/should-energy-hogs-shoulder-more-of-the-utility-cost-burden

Rising electricity rates distort the state's progress on reducing emissions

Electricity in California is increasingly cleaner and cheaper to generate.[13] This means that using electricity is increasingly beneficial to reduction GHG emissions and toxic air pollution, as compared to burning fossil fuels in buildings, vehicles and industry. Increasing the price of electricity makes clean electricity more expensive relative to polluting fossil fuels, which is detrimental at a time when substituting polluting fuels with zero-emission alternatives is a human health and climate priority.

Even though electricity is growing cleaner and cheaper to provide, the consumer costs of using electricity versus fossil fuels (natural gas, gasoline) still favor fossil fuels. This discrepancy occurs because utilities are required to spend on costs not related to the creation and transport of electricity, such as wildfire adaptation costs. As a result, the actual costs of providing electricity are 240 percent higher than the actual environmental and physical cost of serving customers. In comparison, natural gas is only 140 percent higher, and gasoline is 90 percent lower than their environmental and physical costs to serve customers.[14]

Low-income households currently bear the health burden of today's low costs of polluting fossil fuels. Higher electricity prices lower adoption rates of zero-emission vehicles and decrease the affordability of heat pumps to displace gas and propane furnaces. [15,16,17] Vehicles are a core driver of air pollution in California, which has some of the worst air quality in the nation.[18] Transitioning California vehicles to zero emission alternatives, in addition to the state's transition to zero-emission energy, would result in $169 billion in health benefits, and avoid 15,300 premature deaths, 440,000 asthma attacks and 2.16 million avoided lost workdays through 2050.[19] Indoor fuel-burning appliances — such as gas stoves, furnaces, water heaters and wood burning stoves — also contribute to outdoor and indoor air pollutants.[20] The concentration of indoor pollution exposure from these appliances depends on the appliance's age, maintenance, and proper ventilation, which may be more difficult to access for lower-income households and renters.

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[13] CPUC, "2024 California Renewables Portfolio Standard," (2024). cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/documents/energy/rps/2024/2024-california-renewables-portfolio-standard-rps-annual-report.pdf

[14] Mohit Chhabra, "Powering Change," (2025), pg. 10

[15] James Bushnell et al, "Electricity Prices and Electric Vehicle Adoption," (2022). https://www.nber.org/system/files/working_papers/w29842/w29842.pdf

[16] Ryan Shea et al, "Heat Pumps Can Lower Energy Bills for Californians Today," (2025). https://rmi.org/heat-pumps-can-lower-energy-bills-for-californians-today/

[17] Twilight Greenaway, "Do Heat Pumps Save You Money? In California, It Depends on Your Electricity Utility," (2025) https://insideclimatenews.org/news/15042025/california-expensive-electricity-affects-heat-pump-savings/

[18] American Lung Association, "2025 State of the Air Report," (2025). https://www.lung.org/getmedia/5d8035e5-4e86-4205-b408-865550860783/State-of-the-Air-2025.pdf

[19] American Lung Association, "Zeroing in on Healthy Air," (2021). https://www.lung.org/getmedia/13248145-06f0-4e35-b79b-6dfacfd29a71/zeroing-in-on-healthy-air-report-2022.pdf

[20] Anna Belova et al, "Literature Review on the Impact of Residential Combustion Final Report," (2022). https://www.lung.org/getmedia/2786f983-d971-43ad-962b-8370c950cbd6/ICF_Impacts-of-Residential-Combustion_FINAL_071022.pdf

To make up for these reduced cost-savings resulting from high electricity costs, achieving the state's emissions reduction target requires more spending from the state budget and incentive programs to bring down lifetime costs associated with the end use, or would require more stringent fossil fuel supply regulations or market-based pricing to right-size the costs of fossil fuels.

Electricity adaptation spending distorts underlying wildfire risk drivers and threatens other adaptation efforts

Paying for adaptation through electricity rates serves as a bandaid for grappling with social and geographic land use trends and natural resource risks throughout the state.

Paying for wildfire risk and damage through electricity bills distorts the urgency of action in other markets. With current growing levels of utility wildfire spending, the insurance industry, related regulators and the state are less likely to adapt their own planning, budgeting processes, and financial services to reflect the growing risks of climate change.

Additionally, preliminary data suggests that Californians in hot inland areas may be under-consuming and under-adopting air conditioning (AC) due to electricity costs.[21] Climate change driven extreme heat can cause heat exhaustion and heat stroke, worsen pre-existing health conditions, and increase emergency room visits, and is linked with adverse pregnancy and birth outcomes.[22] Further adoption and use of AC throughout California is a necessary adaptation to the rising risks of extreme heat, but is being insufficiently adopted by low-income households due to high electricity costs. Under California's approach, paying to prevent extreme wildfires through electricity bills is making it more challenging for Californians to adapt to the increasing health impacts of extreme heat.

Tax Spending Trails: Comparison of State Tax Spending versus Electricity Rate Spending on Wildfire Resilience

Wildfire adaptation spending from both the general budget and utilities has significantly increased in the last half decade.[23] However, spending on wildfire-related adaptation and rebuilding has been significantly larger from ratepayers than from taxpayers (Figure 2).

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[21] Lauren Kim et al, "Beat the Heat: Extreme Heat Risk Perceptions & Air Conditioning Ownership in California," (2021). https://climatecommunication.yale.edu/publications/beat-the-heat-extreme-heat-risk-perceptions-air-conditioning-ownership-in-california/

[22] EPA, "Extreme Heat," *webpage,* (accessed 2025). https://www.epa.gov/climatechange-science/extreme-heat#:~:text=Heat%2C%20especially%20when%20made%20worse,lead%20to%20hospitalization%20or%20death.&text=Heat%20can%20worsen%20pre%2Dexisting%20health%20conditions

[23] Legislative Analyst's Office, "Overview of State Wildfire Resilience Funding, Actions, and Considerations," (2025). https://lao.ca.gov/handouts/resources/2025/Overview-of-State-Wildfire-Funding-Actions-Considerations-042325.pdf

Source	Wildfire-related Investment (billions)	Time period
Total IOU Funds	$ 26.8	
Total State Funds	$ 7.9	
PG&E	$15.3	2019-2024 wildfire-related revenue requirement
SCE	$9.4	
SDG&E	$2.1	
General fund	$6.4	2019-2020 to 2028-2029 budget years
State Borrowing	$0.6 (0.9 unspent)	2025-2026 budget year

Figure 1. *Comparison of State Tax Budget and Ratepayer Wildfire Adaptation and Rebuilding Spending.* IOU wildfire-related costs borne by ratepayers include both mitigation spending (i.e., vegetation management, undergrounding), wildfire insurance/rebuilding costs, and rate of return related to the wildfire spending. These figures don't include authorized costs, which are higher, but are spread over a longer timeframe. General state budget spending includes resilience and forestry spending, as well as state budget rebuilding supplemental funding for wildfire events ($2.5 b 2025 LA wildfire rebuild support; $50 m for rebuilding from the 2018 Camp Fire/Woolsey/Tubbs fires in BY 20-21 and $225.8 m for forest health in BY 2020-2021). General fund spending doesn't include all potential adjustments to past year and out year authorized spending resilience enacted in the 2025-2026 budget year. For example, SB 840 (Limón, 2025) modifies the spending order of the continuous appropriations, which poses uncertainty about continued spending for CalFIRE wildfire prevention activities in the context of a low performance cap-and-invest scenario through 2028. *sources:* LAO, Overview of State Wildfire Resilience funding (2024); CPUC, SB 596 Report (2025); LAO, Proposition 4 2025-26 Spending Plan (2025); SB 3-x (Wiener, 2024); AB 4 (Gabriel, 2024); AB 74 (Ting, 2019).

California budget spending on wildlife and forest resilience between budget year 2020-2021 and budget year 2028-2029 has amounted to around $3.6 billion of spending.[24] Wildfire adaptation spending from the general fund has grown within the last two decades, with investment predominantly increased accelerating in budget year 2017-2018. The state provided additional $1.5 billion through long-term state borrowing within a voter-approved general obligation bond, a large portion of which remains unspent.[25] In comparison, the total that ratepayers pay for wildfire prevention, rebuilding and risk amounts to over $20 billion.

California's wildfire prevention spending sourced from the tax base has trailed in comparison to IOU revenue requirements paid for by ratepayers. A comparison of who pays for each revenue source demonstrates an opportunity to increase the equity of wildfire revenues.

Equity of California's Taxation Compared to Electricity Bills

One way to define the equity of a revenue source is by considering the horizonal and vertical fairness of the revenue.[26] Horizontal impacts refer to the fairness of the share of taxes paid for by people with the same level of income. Do two individuals that receive the same total income a year pay the same amount? Vertical fairness refers to whether entities and individuals with larger financial ability to pay provide a greater proportion of taxes – or an "ability to pay." Regressive

[24] LAO, "Overview of State Wildfire…" (2025).
[25] LAO, "The 2025-2026 Budget: Proposition 4 Spending Plan," (2025). https://lao.ca.gov/Publications/Report/4958
[26] Arianna Fano (Bipartisan Policy Center), "Equity in the U.S. Tax Code: Understanding Fairness in Taxation" (2024). https://bipartisanpolicy.org/explainer/equity-in-the-u-s-tax-code-understanding-fairness-in-taxation/

taxation refers to circumstances where the vertical fairness decreases (i.e., where people with lower incomes pay for a greater share of the revenues).

California's state tax base is predominantly composed of progressive sources. California state tax revenues are sourced through a combination of income tax, corporate tax, sales tax, and miscellaneous fees and revenues. California's personal income tax – which contributes and is projected to contribute through 2030 between 59-62 percent of the total state general fund – is highly progressive, as higher income individuals pay a larger effective share of their income for these taxes.[27] Corporate taxes, which contribute about 15-19 percent of the state budget, are paid proportionately but have no direct costs levied on lower income households.[28,29] Sales taxes – which contribute approximately 15 percent of total revenues – take up a larger proportion on low-income households' budgets, as they spend a larger share of their income to cover necessities as compared to wealthier households.[30] In combination, the state tax system results in a progressive vertical impact, although horizontal fairness moderately varies due to specific tax rebates and credit serving specific policy goals, such as offsetting childcare costs or providing a credit to low-income households (the earned income tax credit).

In comparison, spending that is paid for through California's electricity bills is inequitable on both a horizontal and vertical levels. First, two average individuals making the same amount of income but living in two climate zones will have very different total spending on their electricity bills – including on payments attributed to fixed system costs such as wildfire mitigation. Customers in hot inland areas who don't have NEM systems will spend significantly more on their monthly electricity bill, as compared to a single individual living in a temperate climate household, regardless of their income. This remains true even given income-based discounts, as these discounts are provided through a percentage basis. Electricity spending is not a vertically fair way of recouping social costs. Second, low-income Californians are overrepresented among the highest users and underrepresented amongst the lower users because of underlying characteristics (no NEM, hot climate zones, more inhabitants).[31] This regressivity of the revenue source occurs because the rate design used within the electricity sector is based on additional priorities that are intended to keep total system costs down, such as dividing costs based on usage and discouragement of wasteful uses of electricity.[32]

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[27] Kayla Kiston (California Budget & Policy Center), "5 Facts: California's Tax & Revenue System Isn't Fair for All: People with Lowest Incomes Pay Larger Share of Income in Taxes than Most Other Income Groups," (2022). https://calbudgetcenter.org/app/uploads/2022/03/5F-FP-Tax-Equity.pdf

[28] LAO, "The 2026-2027 Spending Outlook," (2025), Appendix Figure 1. https://lao.ca.gov/Publications/Report/5091

[29] Franchise Tax Board, "Business tax rate," (September 2025). https://www.ftb.ca.gov/file/business/tax-rates.html

[30] Ibid

[31] Severin Borenstein, "Should Energy…" (2024)

[32] James Bonbright, "Principles of Public Utility Rates," (1960). https://www.raponline.org/knowledge-center/principles-of-public-utility-rates/

Revenue Fairness Criteria	Electricity Bills	State Tax Base
Horizontal	**High discrepancy**	**Moderate discrepancy**
Vertical	**Regressive**	**Progressive**

Figure 2. *Summary of Fairness Criteria between California's Electricity and Tax Base Spending.*

Only recently have steps been taken to mitigate the inequity in the distribution of electricity bill costs. In 2024, the CPUC mitigated these impacts by increasing the portion of costs that are paid through a fixed charge, as compared to volumetric costs. This change is set to go into effect throughout the state starting this year.[33] However, the fixed charge is capped by the CPUC decision, meaning any new and ongoing wildfire-related spending continues to be paid for through per kWh rate increases. Phase 2 of the CPUC evaluating this issue will explore the possibility of an income-based fixed charge, which would further increase the vertical fairness of electricity bills as a revenue source for social spending. Additionally, limited amounts of utility wildfire recovery costs are not recovered by low-income discounted households – customers enrolled in the California Alternate Rates for Energy (CARE) and Family Electric Rate Assistance (FERA) financial assistance programs – and are instead recovered through other customers.[34]

Broader Economic Impacts Example: Upward Electricity Pressure on Grocery Prices Harms Low-income Households

Electricity also serves as a significant input into California's economy, as many services provided or goods produced within the state depend on electricity consumption. When electricity rates increase, businesses and consumers in various sectors throughout the state experience consequences associated with higher instate energy production costs.

As an illustrative example of the impact of electricity prices on the economy, rising agricultural, commercial, and industrial electricity rates creates an upward pressure on agricultural commodity prices, and, consequently, the grocery prices customers experience. For context, spending by California farm operations on electricity bills has increased by 32% above inflation between 2019 and 2023.[35] Higher grocery prices may force low-income households to make hard choices about skipping meals and exasperate food access challenges.

The Scale of Electricity Prices on California's Agricultural Sector

Electricity prices serve as an input into many parts of California's agricultural supply chain, including farm production-related electricity use, particularly resulting from water pumping,

[33] CPUC Energy Division, "CPUC Decision Cuts Price of Electricity Under New Billing Structure and Accelerates California's Clean Energy Transition" (2024). https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/demand-response/demand-flexibility-oir/ab205_factsheet_050824.pdf

[34] SB 901 (Dodd, 2018) §850.1(i)

[35] NRDC Calculation. Data source: CDFA, "2023-2024 California Agricultural Statics Review," (2025), table 'Farm Income Indicators 2019-2023', pg. 11, originally sourced from USDA Economic Research Service. https://www.cdfa.ca.gov/Statistics/PDFs/2023-2024_california_agricultural_statistics_review.pdf

food manufacturer electricity used in food heat and cooling processing, and food holding electricity costs. In total in the United States, energy and transportation costs comprise about 6-7.8% of total home retail grocery costs.[36]

As California shifts to a zero-carbon economy, electricity will grow to become a larger input into agricultural commodity markets, replacing fossil fuel energy sources. This is because California is encouraging shifts to zero-emission trucks, including electrification of truck refrigeration units, industrial heat pumps in the manufacturing and processing sector, and zero-emission forklifts.[37]

California is a significant producer of agricultural products, most of which are consumed within the state. Californians produce a significant mix of specialty crops, such as fruits, vegetables, animal products, and nuts.[38] In 2023, the weighted average of instate farm products that were exported was 24 percent.[39] Most agricultural products export half or less of the quantity produced instate, except for nuts, rice, cotton, and prunes. The same is true for the food manufacturing sector, as among large food processors between 2003 to 2008, a range of only 10 to 22 percent of the agricultural market was imported, with a roughly even split between imports and exports from total sectoral trade activity.[40] In order words, much of the perishable fruits and vegetables that Californians currently purchase originates from operations within state.

Short-Term Impacts of Electricity Price Spikes on the Food Industry

In the short term, unexpected electricity rate increases are borne by a combination of instate farmers and producers, who pass a portion of those costs onto consumers and independent retailers. Farming operations are largely considered price takers, meaning increasing short-term input costs will largely be passed through by reducing their profit margins.[41] Price input shocks may incentivize farmers to produce less in the near-term, depending on the conditions of their contracts, resulting in potential price increases to customers from reduced supply. An example of when this occurred was during the 2021-2022 California drought, where crop loss costs were split between farmers and consumers.[42] Short-term electricity price increases on food manufacturers and distributors – which are part of costs called agricultural "marketing costs" – are largely passed on to customers by retailers, who will modify prices to cover increases in wholesale costs.[43] Exceptionally, independent grocery retailers – smaller, non-branded retailers –

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[36] USDA, "Food Dollar Series – Food Dollar Application," Food dollar at home, based on 2023 real costs, relative to 2017 benchmark. https://data.ers.usda.gov/reports.aspx?ID=4045

[37] CARB, "Zero-Emission Forklifts" (accessed 2025); CARB, "Zero-emission Vehicle Regulation," (accessed 2025); SCAQMD, "Proposed Amended Rule 1146.2" (2025)

[38] CDFA, "2023-2024 California Agricultural Statistics Review," (2025). https://www.cdfa.ca.gov/Statistics/

[39] CDFA, "2023-2024: California Agricultural Exports," (2024). https://www.cdfa.ca.gov/Statistics/PDFs/2023-2024_california_agricultural_exports.pdf

[40] CARB, "Cap and Trade Rulemaking ISOR: Appendix K, Leakage Analysis" (2010), pg. K-22 https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2010/capandtrade10/capv4appk.pdf

[41] William Tomek & Harry Kaiser, *Agricultural Product Prices* (2014), pg. 230-234

[42] Josué Medellín-Azuara et al., "Economic Impacts of the 2020–22 Drought on California Agriculture," (2022) https://cawaterlibrary.net/wp-content/uploads/2022/11/20AmSf-Economic_Impact_CA_Drought_V01.pdf

[43] Vincent R. Nijs, Shuba Srinivasan & Koen Pauwels, "Retail-Price Drivers and Retailer Profits," pg. 474 (2007)

are price takers and will see reduced profits, in comparison to impacts on larger retailers.[44] Although these stores provide a smaller segment of total grocery supply, they are more likely to serve low-income and rural customers with less alternatives in the Western United States.[45] In response to increasing prices, wealthier households will have more capacity to weather rising costs through substituting cheaper options, unlike low-income households.[46]

In addition to potential grocery price impacts, short-term price shocks in electricity bills also mean less dispensable income to pay for necessities such as groceries, particularly for low-income households. Electricity consumption in the short run is inelastic, and low-income CARE/FERA consumers are less responsive to rising electricity prices as compared to higher income households.[47] Low-income households will decrease other expenditures rather than decrease energy consumption. As a result of decreased income for spending on groceries, short-run unexpected price shocks in energy bills increase the probability of food stress (whether a householder indicated its access to the quantity or quality of food is sufficient) and more money needed (whether a household states it needs more money to purchase enough food) in low-income households.[48]

This electricity price shock impact demonstrates the importance of why both electricity assistance and social food assistance programs like the Supplemental Nutrition Assistance Program (SNAP) are critical for household cost mitigation. In circumstances where social food assistance programs limit coverage or cost-of-living adjustments are less than local inflation (e.g., federal SNAP benefits COLA adjustments are based on CPI-U, not regional inflation[49]), low-income consumer impacts will persist.

Long-Term Impacts of High Electricity Prices on the Food Industry

In the long term, continued electricity rate increases can change the types and scale of agricultural production in California, which would reduce low-income access of these products and raise prices for consumers.

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[44] Sabine Benoit, Mario Kienzler, and Christian Kowalkowski, Intuitive pricing by independent store managers: Challenging beliefs and practices. (2020) *Journal or Business Research,* 115, 70-84. https://doi.org/10.1016/j.jbusres.2020.04.027

[45] Clare Cho & Richard Volpe (USDA Economic Research Service), "Independent Grocery Stores in the Changing Landscape of the U.S. Food Retail Industry," (2017). https://ers.usda.gov/sites/default/files/_laserfiche/publications/85783/ERR-240.pdf

[46] Tomek & Kaiser, pg. 9

[47] Jesse Buchsbaum, "Long-Run Price Elasticities and Mechanisms: Empirical Evidence from Residential Electricity Consumers" (2022). https://www.haas.berkeley.edu/wp-content/uploads/WP331.pdf

[48] Charlotte Tuttle & Timothy Beatty (USDA), "The Effects of Energy Price Shocks on Household Food Security in Low-Income Households," (2017) https://ers.usda.gov/sites/default/files/_laserfiche/publications/84241/ERR-233.pdf?v=94072

[49] USDA Food and Nutritional Service, "SNAP Cost-of-Living Adjustment (COLA) Information" (accessed 2025). https://www.fns.usda.gov/snap/allotment/cola

Rising electricity costs are passed on to customers. For every 1 percent increase in electricity prices, farmers pass on an additional 1.7 percent of costs to home grocery prices (food at home-CPI) and food manufacturers contribute 6.87 percent to home grocery prices.[50]

As a result of these expected price increases and their impact on consumer choice, rising electricity prices have been shown to decrease in instate production of fruits, nuts and hay (which serves as an input into animal products).[51] Shifting production would likely result in an upward pressure on costs to consumers. One model of systematic energy cost input increases in California predicted to result in large (67-76 percent) reductions of instate tomato, cheese, wet corn and sugar manufacturers, for example, which would increase out of state imports and consumer costs in this scenario by 1-2%.[52]

Reduced instate supply of fruits and vegetables, which would likely result in an upward pressure in consumer prices, is detrimental to long term nutritional access for low-income households. Consumer choices at the grocery store are determined by purchasing a 'shopping basket' that maximizes household needs relative to prices.[53]When food prices of a certain good rise, customers will substitute that good in a manner that continues to meet their shopping basket needs (e.g., pork serves as a substitute for beef). Low-income customers, however, are less elastic as lower cost food options often do not have substitutes.[54] This means that, in the face of an upward pressure on grocery prices, low-income households will compensate for high prices by purchasing lower quality foods, at discounted prices, or potentially even skipping and cutting the size of meals.[55]

This upward pressure on grocery prices additionally exacerbates the challenge of vegetable and fruit access in California. High costs of fruits and vegetables remain a challenge for low-income households in meeting their nutritional needs. Households living under the poverty line are less likely to purchase fruit and vegetables, although as income increases, consumption rises.[56] Surveys of low-income consumers indicate that vegetable prices are a barrier to fruit and vegetable consumption. In a sample of food insecure households in Oakland, cost, taste and perceived time associated with consumption were primary barriers to fruits and vegetable consumption.[57] In California, for a sample California low-income family of four to eat the USDA recommended sampling of food plans, the average low-income household in California would

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[50] Ronald Sands & Pail Westcott, "Impacts of High Energy Prices on Agricultural and Rural Economies," Appendix C: Energy Price Impacts on Retail Food Prices, (2011). https://www.ers.usda.gov/sites/default/files/_laserfiche/publications/44894/6814_err123_1_.pdf?v=59620

[51] Fiona Burling et al., "Groundwater and Crop Choice in the Short and Long Run," (2024). https://haas.berkeley.edu/wp-content/uploads/WP349.pdf

[52] Stephen Hamilton, Ethan Ligon, Aric Shafran and Sofia Villas-Boas, "Production and Emissions Leakage from California's Cap and-Trade Program in Food Processing Industries: Case Study of Tomato, Sugar, Wet Corn and Cheese Markets," (2016). https://ww2.arb.ca.gov/sites/default/files/cap-and-trade/meetings/20160518/calpoly-food-process-leakage.pdf

[53] Tomek & Kaiser, pg. 9

[54] Ibid

[55] Ibid

[56] Hayden Stewart, Noel Blisard, Dean Jolliffee, "Do Income Constraints inhibit Spending on Fruits and Vegetables among Long Income Households?" (2003), *Journal of Agricultural and Resource Economics*.

[57] Kim Mook, Barbara Laraia, Vanessa Oddo, Jessica Jones-Smith, "Food Security Status and Barriers to Fruit and Vegetable Consumption in Two Economically Deprived Communities of Oakland, California, 2013–2016" (2016). https://pmc.ncbi.nlm.nih.gov/articles/PMC4752515/pdf/PCD-13-E21.pdf

need to spend 43 to 70 percent of their food budget toward fruits and vegetables.[58] Multiple policy mechanisms are necessary to support instate nutrition adequacy and access for all Californians. However, an upward pressure on fruits and vegetable prices resulting from electricity prices entrenches this challenge. Where electricity price increases exceed social support, or where coverage is missed or inadequate, this lack of access to grocery necessities can worsen.

[58] Diana Cassady, Karen Jetter, Jennifer Culp, "Is Price a Barrier to Eating More Fruits and Vegetables for Low-Income Families?" (2007). https://www.researchgate.net/profile/Karen-Jetter/publication/5882319_Is_Price_a_Barrier_to_Eating_More_Fruits_and_Vegetables_for_Low-Income_Families/links/5c47b5ed92851c22a389742e/Is-Price-a-Barrier-to-Eating-More-Fruits-and-Vegetables-for-Low-Income-Families.pdf