Trends and drivers of utility costs in California

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Abstract:

Electricity affordability is a salient policy concern in California. We compare drivers of increasing utility costs and prices for three types of power providers in California: investor-owned utilities (IOUs), publicly-owned utilities (POUs), and community choice aggregators (CCAs). Since 2019, the IOU and CCA residential baseline electricity rates have increased by 44-80% after accounting for inflation, making them some of the most expensive power providers in the United States. POU prices, however, remained nearly unchanged. We compare long-term trends in capital assets, returns, and operation & maintenance expenses to identify sources of increasing utility costs. Across IOUs, generation expenses have decreased or remained in historical ranges. However, transmission and distribution (T&D) expenses have increased significantly and are the majority of overall costs. T&D operations and maintenance spiked post wildfires after years of relatively constant expenses despite aging and expanding electricity. CCAs, which procure their own electricity but use the IOU T&D network, reach price parity with IOUs because of high T&D costs as well as exit fees levied on them. POUs, servicing smaller territories with low wildfire risks, also expanded their T&D capital assets, operations, and maintenance expenses, but the increase is modest. We foresee continued price divergence among power providers due to wildfire mitigation costs, which will have important affordability consequences.

Introduction:

Affordable and reliable access to electricity is vital to decarbonizing our energy systems and adapting to climate change. Expensive electricity can reduce the adoption of clean electric technologies and consumers may forgo cooling and heating in extreme weather [1], [2]. California lies at the center of this challenge: the state has ambitious electrification and climate goals but some of the country's most expensive power providers.

California has three main types of power providers: investor-owned utilities (IOUs), publicly-owned utilities (POUs), and community choice aggregators (CCAs). IOUs are privately owned firms participating in the generation, transmission, and distribution of electricity. Owing to the capital-intensive nature of distribution and transmission assets used in electricity supply, these firms enjoy a monopoly in their territory: it is cheaper for a single firm to serve a particular area rather than build redundant infrastructure. In exchange for a service territory monopoly, IOUs accept the obligation to serve all customers and regulatory oversight of their electricity rates, investment returns, and overall costs by the state Public Utilities Commission (PUC) and Federal Electricity Regulatory Commission (FERC) [3], [4]. In 2022, IOUs serviced about 40% of California's total retail electricity demand.[5]

POUs and CCAs are additional power providers that operate on a non-profit basis. POUs are owned and operated by municipalities, irrigation districts, and city governments. They are governed by local laws and are not subject to PUC regulations. In 2022, POUs served roughly 25% of California's total retail electricity demand[5]. CCAs are recent entrants in the state's electricity landscape and are formed inside IOU territories. CCAs procure electricity independently but use IOU distribution and transmission networks to deliver it. In 2022, they served 23% of California's total electricity demand. Direct Access providers, "behind-the-meter" rooftop solar providers, one federal utility, and four small rural electric cooperatives meet the residual 14% of state electricity demand [5] and are not the focus of this paper. Figure 1 shows the service territories of the three key power provider types active in northern and southern California.

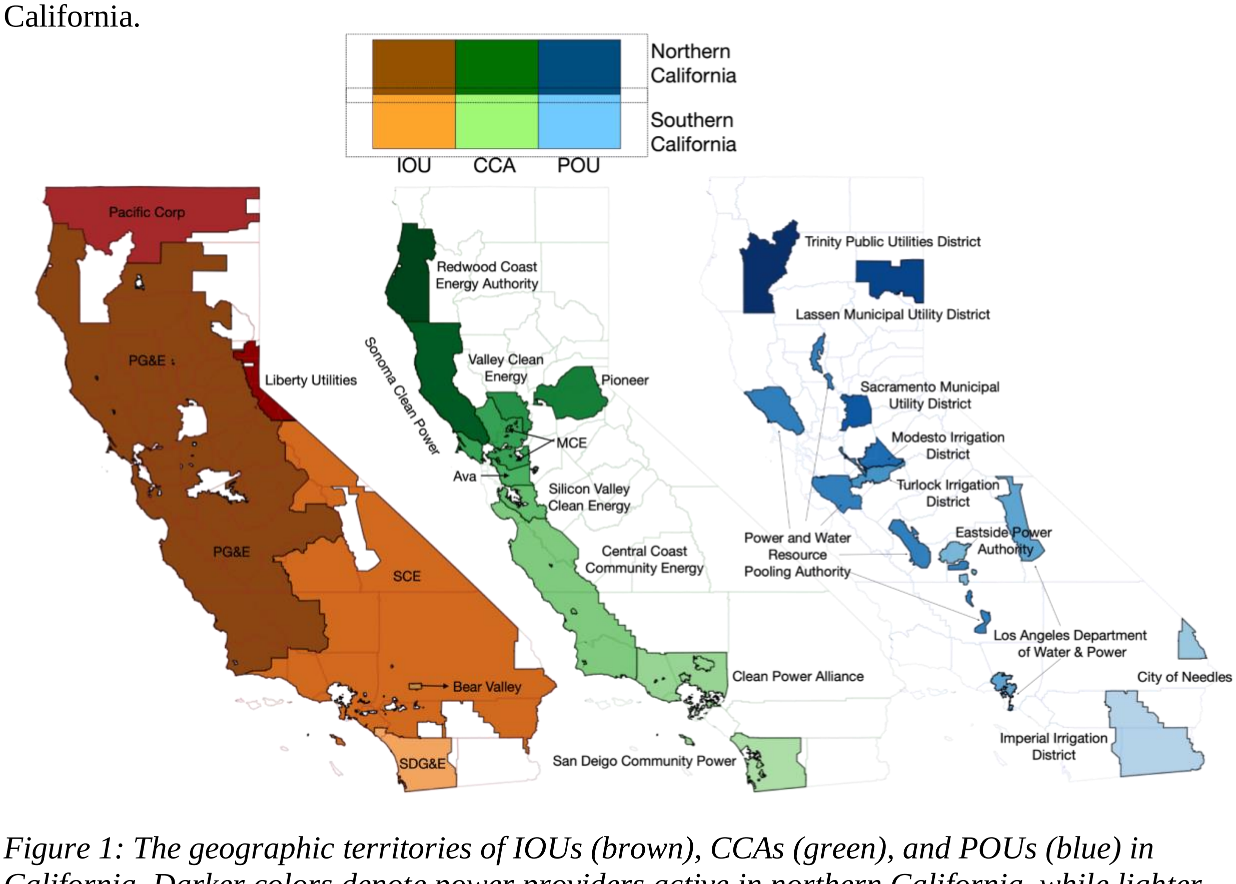

Figure 1: The geographic territories of IOUs (brown), CCAs (green), and POUs (blue) in California. Darker colors denote power providers active in northern California, while lighter colors denote those in southern California. CCAs are formed inside IOU territories. Source: California Energy Commission GIS open data [6], CalCCA [7].

2018 was a pivotal year for California's utilities. More than a decade after power lines caused wildfires in southern California, a transmission tower owned by PG&E, the largest IOU in northern California, started the Camp Fire. The Camp Fire remains the deadliest wildfire in California's history, killing eighty-five people and destroying the town of Paradise. PG&E filed for bankruptcy shortly after due to financial liabilities [8]. It also promised to mitigate wildfires through undergrounding, vegetation management, and enhanced sensor technologies across its 125,000 circuit miles of power lines [9].

Growing expenses were quickly reflected in electricity prices. Figure 2 compares PG&E's residential baseline rate (in $/kWh) to Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E) (IOUs), MCE Clean Energy and Clean Power Alliance (CPA) (CCAs), and Los Angeles Department of Water and Power (LADWP) and Sacramento Municipal Utility District (SMUD) (POUs). Prices have increased across IOUs and CCAs, but POU prices have remained low. By early 2024, PG&E charged its residential customers a baseline rate of 42 cents per kWh, up 20 cents since 2018, while SMUD and LADWP have increased prices by less than 5 cents per kWh. SMUD and LADWP serve about 13% of the statewide load—approximately equal to that of PG&E. Rates for commercial customers show similar trends (appendix). Table 1 details the power providers selected as case studies, encompassing about 60% of California's total electric load.

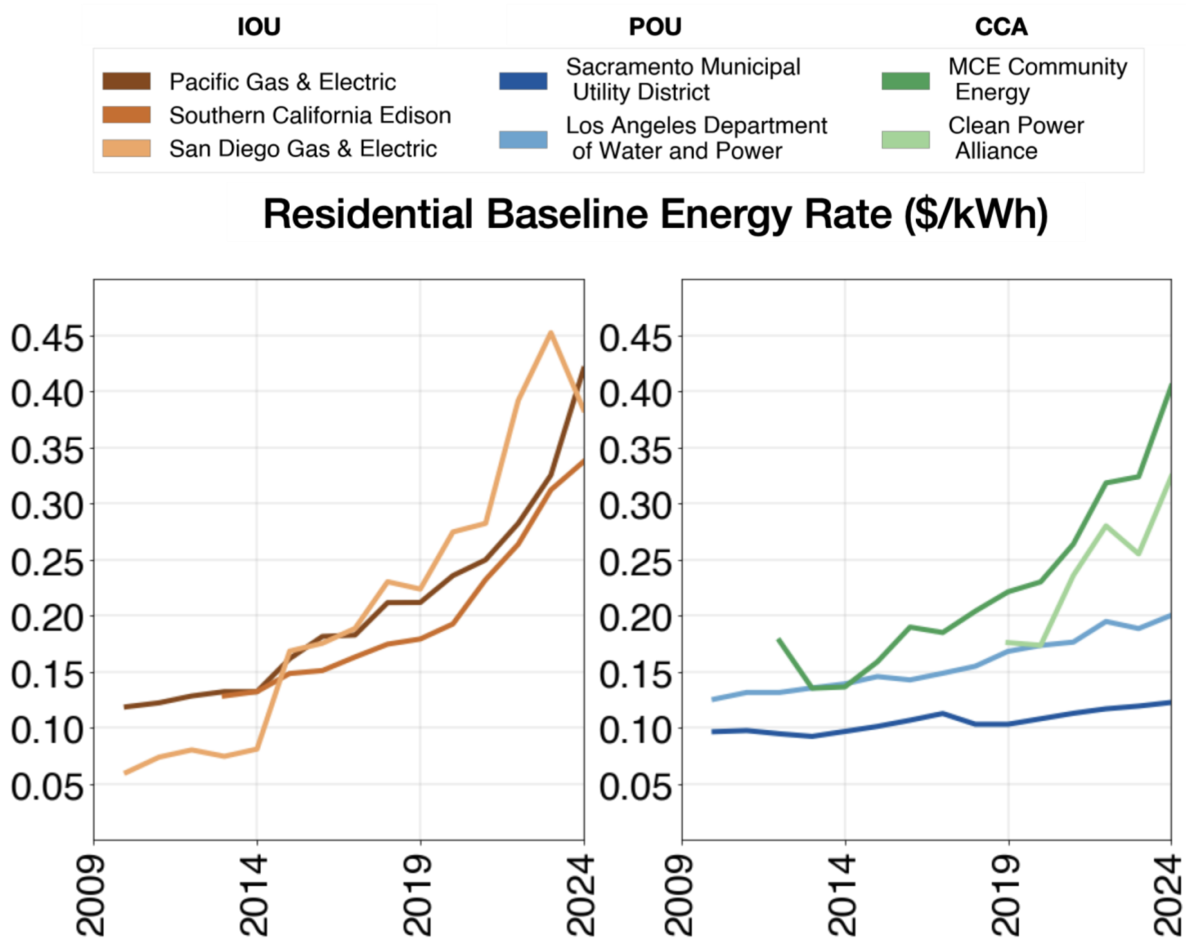

Figure 2: Residential and Commercial Tier 1 Energy Rate ($/kWh) for California IOU, POU, and CCA (nominal $). In addition to energy rates, residential and commercial bills include fixed charges ($/month) and minimum bills not shown in the figure. Source: Tariff books from websites of each IOU, POU, and CCA, detailed in Appendix.

Table 1: Residential, industrial, and commercial sales (in TWh) of power providers analyzed in this study

Power provider	Type	Residential sales (TWh)	Industrial sales (TWh)	Commercial sales (TWh)	Approx. area served in square miles
PG&E	IOU	12.0	11.8	7.4	70,000
SCE	IOU	22.5	4.0	28.4	50,000
SDG&E	IOU	3.9	1.2	2.6	4,100
SMUD	POU	4.8	2.1	3.7	900
LADWP	POU	8.5	1.2	12.1	465
MCE	CCA	2.8	0.0	2.6	-
CPA	CCA	5.3	1.5	4.1	-

Source: Electricity sales data from EIA Form 861, 2022 final release.[5] Service area is taken from power providers' web pages.[9], [10], [11], [12], [13] IOU customers receive bundled services (energy, transmission, distribution) from IOUs, while CCA customers receive energy services from CCAs using the IOU transmission and distribution network.

We use historical regulatory, financial, and rate data to contextualize California's key power providers and their growing costs. We analyze long-term trends in capital, returns, and operations and maintenance (O&M) expenses to identify the drivers of price hikes for IOUs and CCAs and the relative constancy of POU prices. Increasing utility costs and the growing price divergence between POU and non-POU prices have important affordability implications across California. The rest of the paper is organized as follows. Sections 1 and 2 provide historical cost trends for IOUs and POUs. Section 3 decomposes CCA electricity rates to identify sources of price increase, and section 4 concludes. Throughout this paper, all cost values are reported in real terms (2022$), and cost trends are normalized to the reference year 2010. While we focus on California's power providers, the lessons and insights apply nationwide as electricity demand increases and the grid faces reliability challenges [14], [15], [16].

1. Trends in returns and costs for California's Investor-Owned Utilities (IOUs)

IOUs are for-profit entities with geographic monopolies in their territories. PUCs regulate most costs in a periodic, multi-party, formal regulatory process called the 'rate case'. The Federal Energy Regulatory Commission (FERC) often regulates transmission costs with PUC input. The rate case determines IOUs' revenue requirement, which is the total costs of owning, operating, and maintaining the electricity grid, along with reasonable returns on assets and investments. Rates are then decided to ensure IOUs recover their revenue requirement.

Revenue requirement include operations and maintenance expenses, depreciation, taxes, and returns earned on capital investments (rate base). In 2023, O&M dominated the revenue requirement for major California utilities, accounting for 46% for PG&E and SDG&E and 34% for SCE. Depreciation and return on rate base follow, each comprising 20-30% of revenue requirement. Taxes make up 10% and less [1]. In the following sections, we present trends in rate base, rate of return, and O&M expenses for California's IOUs to identify drivers of increased utility costs. Due to a lack of comprehensive data, we present trends for both authorized and actual utility expenses. Authorized expenses are deliberated as part of the rate case and prospective in nature, while actual costs are taken from balance sheets and FERC Form 1[1].[17]

(a) Rate base

The rate base is the value of a utility's capital and assets minus depreciation. IOUs earn a regulated rate of return on their rate base. An increasing rate base—expansion of IOU capital and assets—raises the revenue requirement even if returns remain constant or decline marginally. Figure 3 shows the ratio of real generation, distribution, and transmission rate base in a year to that of a reference year (2010), and Table 2 provides the rate base for 2010, 2018 (the year of Camp Fire), and 2022 (all in 2022$). The California PUC provides the historical rate base of IOUs and annual reports for the California legislature on IOU costs (AB 67).[18], [19], [20], [21].

Since 2010, the total rate base has increased by an annual average of 4.6% (PG&E), 6.5% (SCE), and 9.1% (SDG&E). Distribution is the largest share of the overall rate base, followed by transmission and generation. Across the three IOUs, the generation rate base declined due to the growing share of power procured through wholesale energy markets. On the other hand, the transmission and distribution rate base has increased due to the expansion of wires, poles, transformers, and fixtures, particularly after wildfires. For example, PG&E's authorized distribution capital expenses grew from under $90 million in 2018 to nearly $600 million in 2020 [22, pp. 91–92]. Despite recent increases, PG&E has the smallest transmission and distribution rate base increase among the three IOUs. SCE, the largest utility in electricity sales, has doubled its transmission and almost tripled its distribution rate base since 2010. SDG&E, the smallest of the three IOUs, tripled its transmission rate base in less than five years with the construction of the Capistrano and Talega transmission line, with expected costs of $435 million.[23]

[1] FERC Form 1 is an annual report filed by major investor-owned utilities, which includes PG&E, SCE, and SDG&E xxxxx. FERC Form 1 data is cleaned and collated by the Catalyst Cooperative through the Public Utilities Data Liberation (PUDL) project. In this paper, we utilize Schedule 320 of Form 1, corresponding to operation and maintenance costs of electric utilities.

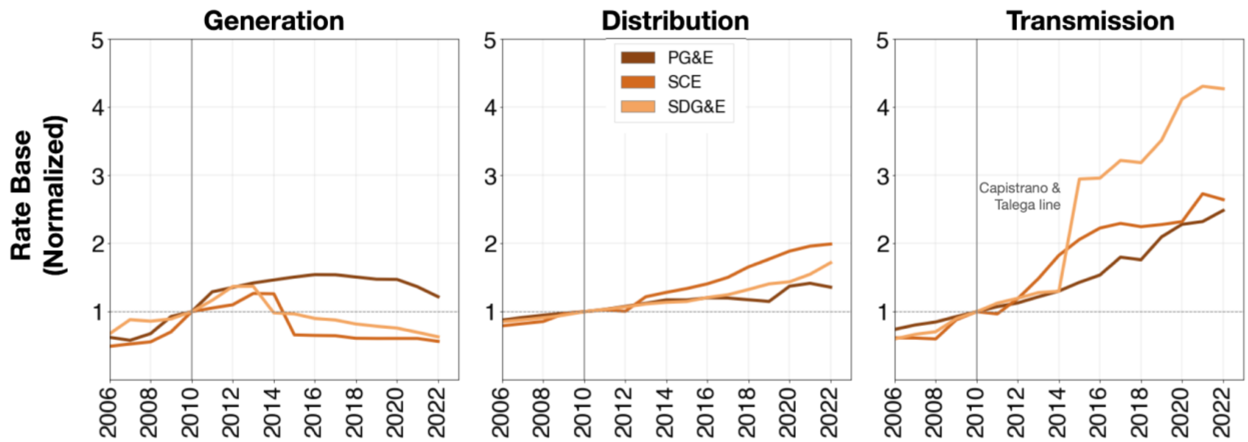

Figure 3: Ratio of rate base (in 2022$) for the three IOUs in generation, distribution, and transmission of a year to rate base (in 2022$) of the reference year (2010).
Source: California Public Utilities Commission Historical Electric Cost Data [18]

Table 2: Generation, Distribution, and Transmission rate base (in billion, $2022)

Utility	Year	Generation	Distribution	Transmission	Sum
PGE	2010	4.0	13.5	4.5	22.0
	2018	6.1	15.8	8.0	29.8
	2022	4.9	18.3	11.2	34.4
SCE	2010	4.2	13.8	2.8	20.8
	2018	2.6	22.9	6.2	31.7
	2022	2.4	27.6	7.3	37.2
SDG&E	2010	0.9	3.4	1.2	5.4
	2018	0.7	4.5	3.7	8.9
	2022	0.6	5.8	5.0	11.3

Source: California Public Utilities Commission Historical Electric Cost Data [18]

(b) **Rate of Return**
The rate of return (ROR) is the regulated return earned on the rate base. It is the weighted average cost of debt and equity issued by a utility to finance its capital investments.[24]. Actual ROR, on the other hand, reflects the total recorded profits earned in a year. Authorized and actual ROR can diverge due to a utility's operation efficiency, cost management, weather changes, and unexpected events such as wildfires [25].

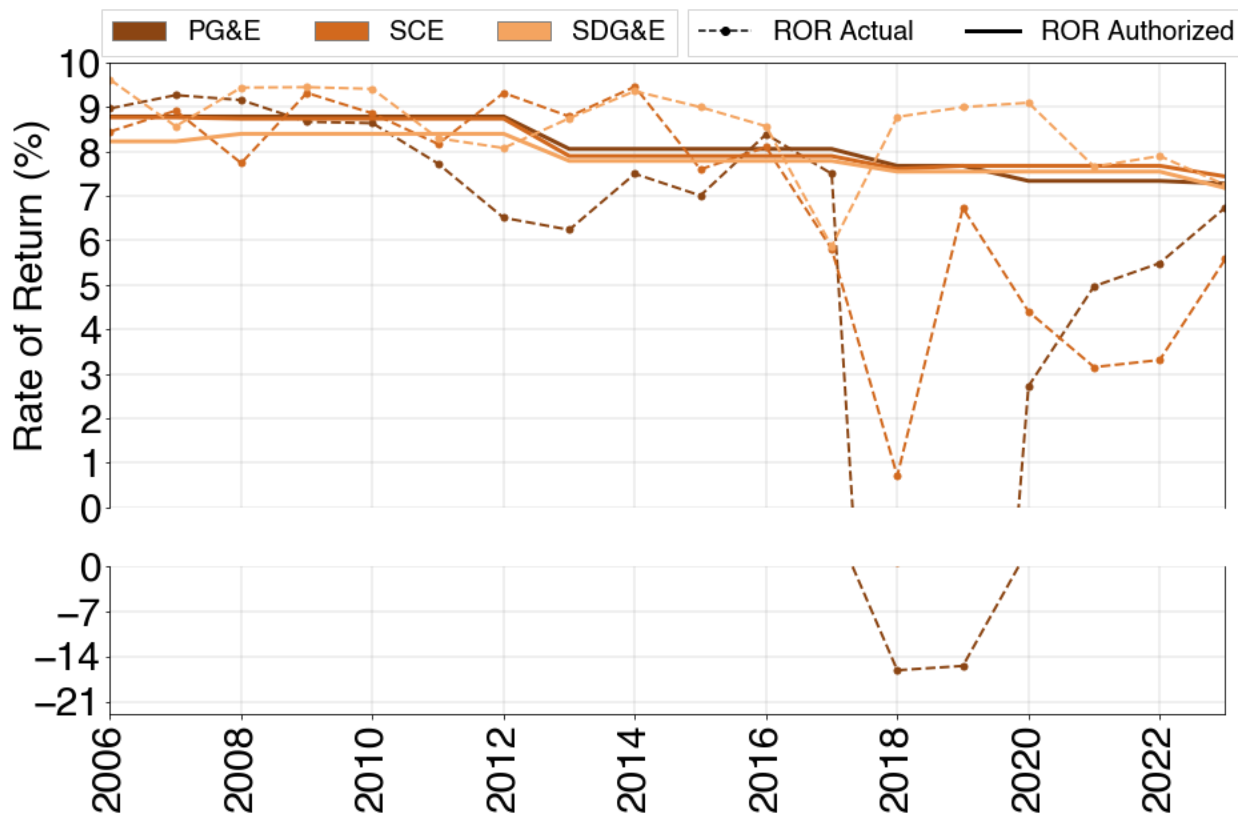

Figure 4: Authorized and actual rate of return for three California IOUs - PG&E, SCE, and SDG&E. Source: CPUC Historical Electric Cost Data [24]

Figure 4 shows the authorized and actual ROR earned by the California IOUs since 2006. The authorized ROR for California IOUs has declined from 8.77-8.4% in 2006 to 7.68-7.5% by 2022. In 2023, the authorized ROR was further reduced to 7.44% (PG&E), 7.27% (SCE), and 7.15% (SDG&E). The actual ROR for PG&E and SCE declined sharply in 2018, with negative values for two years for PG&E due to the damages of the Camp and Woolsey fires. SDG&E shows the opposite trend of actual ROR being higher than its authorized value: for 12 out of the last 15 years, SDG&E has earned more than its authorized ROR. Actual ROR can exceed authorized values. However, persistently higher-than-authorized ROR may indicate that utilities overstate expenses or don't pass on improved cost management and operational efficiency gains to ratepayers, instead preferring to increase returns [26].

A subcomponent of the ROR of interest is the return on equity (ROE). ROE measures the company's returns to its shareholders and is calculated by dividing net income by overall shareholders' equity.[27]

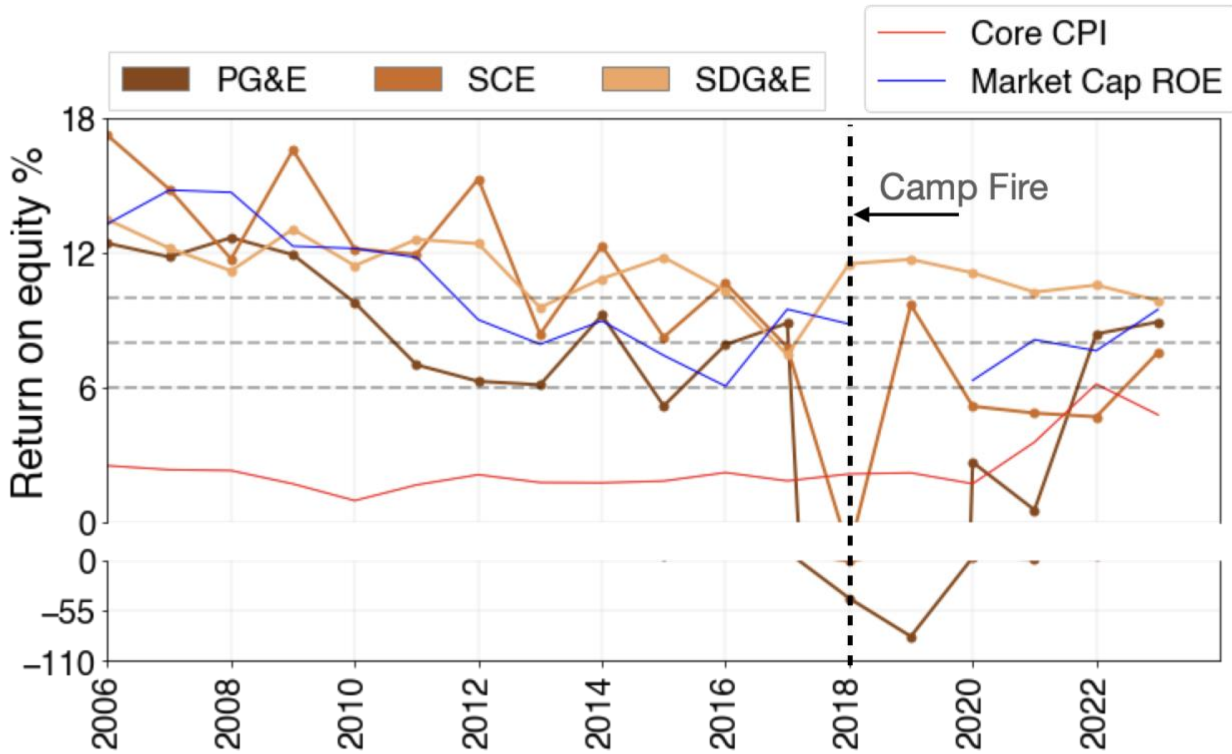

Figure 5: ROE for California IOUs compared to the core consumer price index and the market capitalization-weighted ROE for electric utilities in the United States. Source: ROE data from S&P Capital IQ pro database[28][2] and Core CPI from US Bureau of Labor Statistics.[29]

Figure 5 shows the actual ROE for the three IOUs since 2006. For comparison, we also plot market capitalization-weighted ROE for all electric utilities in the United States and the core consumer price index (inflation). ROE has declined for all three IOUs.

SCE's ROE declined from 18% in 2006 to 9.7% in 2019 and 7.6% in 2023. It is 1-3% below the US market-capitalization weighted ROE of electric utilities. PG&E's ROE declined from 12% in 2006 to roughly 8.9% in 2017. After the Camp Fire, PG&E recorded a negative ROE and filed for bankruptcy, but as of 2023, its ROE has recovered. Broadly, wildfire costs may be financed via lower shareholder returns or higher costs to ratepayers. Figure 5 shows that after the Camp Fire, PG&E's ROE rebounded to previous levels in a few years while rates have persistently increased. SDG&E's ROE declined from 13% in 2006 to 10% in 2023 but continues to be higher

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than the industry average for all years in the last decade except 2017.[3] Since 2006, SDG&E ROE has been higher than 10%, apart from 3 years. Research in regulatory economics has documented the equity premium puzzle where US utilities earn an ROE higher than various market benchmarks [25]. More recently, Werner and Jarvis have shown that the electricity utility ROE rises quickly when market capital costs increase. However, a proportional response is not seen when market capital costs decrease [30]. While California uses a formula adjustment mechanism to adjust ROE if bond yield changes beyond a "dead band," the IOUs face new and unique financial risks from wildfires, which may justify high ROE to attract private capital [25], [31]. However, elevated ROE at a time when IOUs are making significant capital investments in wildfire prevention would result in even more severe increases in revenue requirements and, consequently, in rates.

c) **Operations and Maintenance**

Operations and maintenance (O&M) is the largest component of revenue requirement.[32] O&M expenses include fuel costs, labor, rent, and capital maintenance costs, along with expenditures on wildfire mitigation measures such as vegetation management, network inspection, and repairs. Figure 6 shows O&M expenses normalized to the reference year (2010), and Table 2 provides O&M costs for 2010, 2018 (before Camp Fire), and 2022. O&M data are taken from FERC form 1, which documents utilities' expenses as reflected in the balance sheet. The utility does not earn a rate of return on O&M expenses.

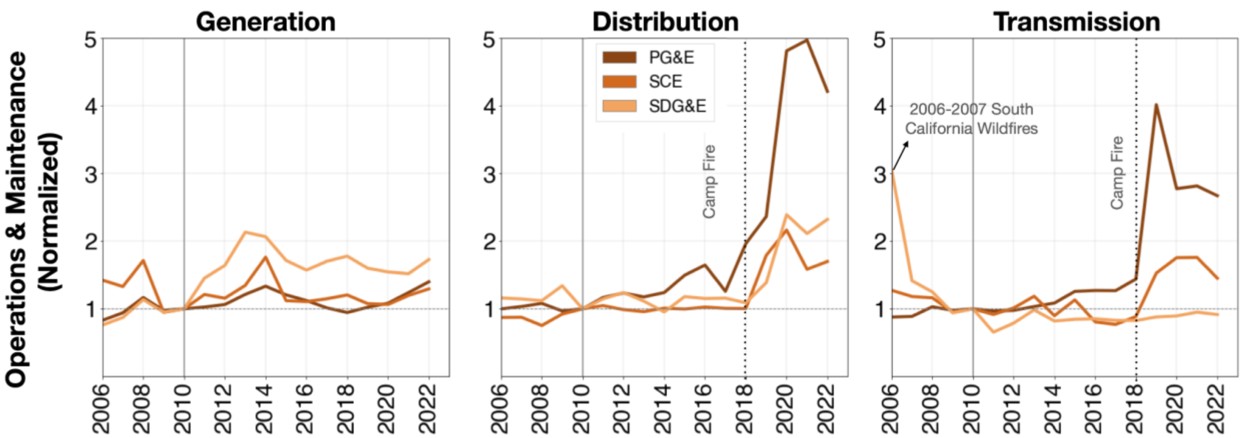

Figure 6: California IOUs' generation, distribution, and transmission operation and maintenance costs. The figure shows the ratio of a year's real costs (in 2022$) to that of a reference year (2010). Source: FERC Form 1 data via PUDL [17]

Table 3: Generation, Distribution, and Transmission Operations and Maintenance costs (billions of $2022)

Utility	Year	Generation	Distribution	Transmission	Sum
	2010	5.78	0.28	0.67	6.73
PGE	2018	5.47	0.40	1.32	7.19

[3] Industry average ROE data were unavailable for 2019.

	2022	8.10	0.74	2.84	11.68
	2010	5.17	0.34	0.61	6.11
	2018	6.23	0.30	0.61	7.13
SCE	2022	6.69	0.49	1.03	8.21
	2010	1.31	0.12	0.15	1.58
	2018	2.34	0.10	0.16	2.60
SDG&E	2022	2.27	0.11	0.34	2.72

Source: FERC form 1 data via PUDL [17]

O&M trends differ from those of rate base. Across the three IOUs, generation is the largest share of overall O&M expenses by a factor of four to six. Gen O&M costs include purchased power and fuel, rent, and maintenance expenses for utility-owned generators. Since 2019, real generation O&M costs have increased for all three IOUs. While the increase for SCE and SDG&E is within historical ranges, the generation O&M expenses peaked for PG&E in 2022. All three IOUs source over 75% of their power from external purchases, and the increase in generation O&M costs is due to rising natural gas and wholesale power prices [17], [21].

While far smaller in magnitude than generation O&M, T&D O&M has increased sharply since 2019 due to post-wildfire vegetation management, liability insurance, and catastrophic event expenses [21] (figure 6). PG&E, in particular, increased its T&D O&M expenses by four and five factors after remaining more or less constant despite an aging and growing network of power lines. California PUC also noted these patterns as “indicative of an overall pattern of inadequate inspection and maintenance of PG&E's transmission facilities” after the 2018 Camp Fire [33]. In 2018-2020, PG&E spent around $0.8 billion (in 2022$) on maintenance of overhead lines. By 2020-2023, it was more than doubled to around $2 billion (in 2022$) [17]. A similar response was seen when SDG&E power lines caused the 2006-07 wildfires that burned over 200,000 acres and destroyed over 1,300 homes [34]. The transmission O&M expenses tripled immediately but declined by 2010 and have since remained relatively constant. These trends suggest that investments in T&D O&M increased sharply and temporarily in response to utility-caused wildfires.

Growing capital and operating expenses on T&D network will continue to increase IOU costs. California's areas most susceptible to wildfires mainly lie in IOU territories (Figure 7). IOUs must continue investing in hardening and maintaining their network infrastructure to prevent future wildfires.

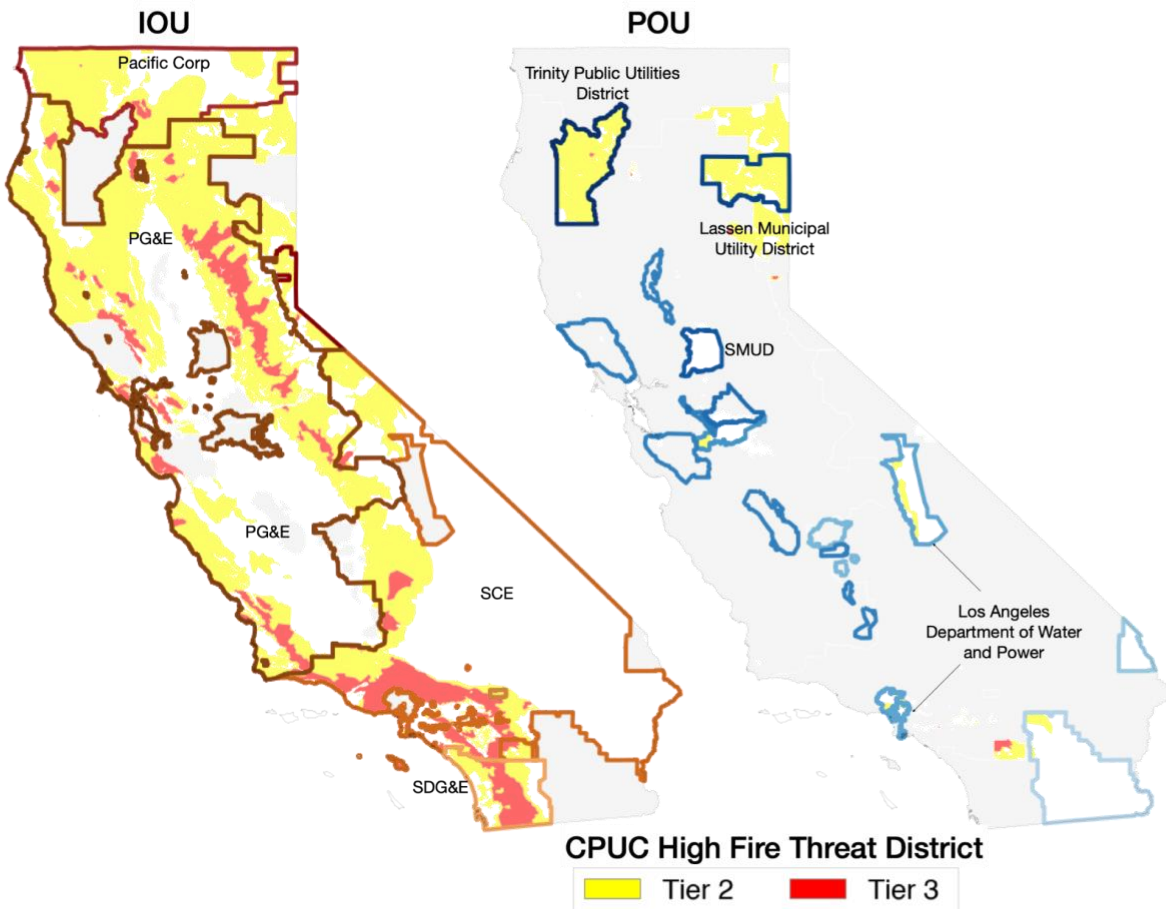

Figure 7: High fire threat districts in IOU and POU territories. Fire threat districts are outlined based on the "likelihood and potential impacts on people and property from utility-related wildfires." Tier 2 denotes higher risk, while Tier 3 denotes extreme risk. Source: CPUC Fire Threat Maps [35] and California Energy Commission GIS open data [6]

Depreciation and taxes are the two remaining components of IOU revenue requirements. Capital investments are initially financed upfront by IOUs but spread out to ratepayers over their useful lifetime through annual recovery of depreciation costs. Between 2012 and 2022, combined generation and distribution depreciation had grown by 26% in real terms [21]. Utilities spent almost $5 billion on depreciation in 2023, excluding transmission (PG&E $2.4 billion, SCE $2.1 billion, and SDG&E $0.4 billion). This is similar in magnitude to the returns earned on the rate base of roughly $4.5 billion (PG&E $1.7 billion, SCE $2.3 billion, and SDG&E $0.4 billion)[32]. Depreciation will continue to increase as network capital expenses rise. Additionally, the revenue requirement includes various taxes, such as property and income taxes, which aren't directly assessed on consumers' bills. Taxes on generation and distribution have declined by 38% in real terms since 2012 and are the smallest component of revenue requirement.[21] In 2023, the IOUs recovered roughly $1.5 billion on taxes as part of the revenue requirement (PG&E $0.6 billion, SCE $0.8 billion, and SDG&E $0.2 billion).[32]

2. Trends in Costs for California's Publicly Owned Utilities

POUs are non-profit entities owned and operated by cities, municipalities, and irrigation districts. Their expenses and electricity rates are decided considering each territory's strategic priorities and public feedback. POUs are outside the regulatory purview of the PUC. While POUs do not use precise revenue requirement formulations as used for IOUs, they must still adhere to their internal governance rules when setting their electricity rates.

This section examines the two largest POUs in the state – Sacramento Municipal Utility District (SMUD) and the Los Angeles Department of Water and Power (LADWP). In 2022, SMUD served ~650,000 customers throughout the Sacramento area, while LADWP served ~1.4 million customers in the greater Los Angeles region and Owens Valley [13], [36]. The combined load of SMUD (10 terawatt-hours) and LADWP (22 terawatt-hours) is approximately equal to half of the entire POU load served in California and slightly larger than PG&E's bundled service load [5] but servicing a very small territory in comparison. We present capital, operations, and maintenance expenses for SMUD and LADWP to understand their cost drivers and possible sources of rate divergence relative to IOUs.

(a) Depreciable Utility Plant

The depreciable utility plant is the total property, plant, and equipment assets a POU owns to service its generation, distribution, and transmission needs. It serves as an indicator of POU capital costs and does not include depreciation. While the scale of POUs' depreciable utility plant differs from that of IOUs', the trends are similar. Figure 8 and Table 4 provide trends and values of generation, distribution, and transmission utility plants in service (in real terms).

The total depreciable utility plant for the two POUs has grown by 37% in real terms since 2010, primarily driven by a 47% increase in the distribution rate base, the largest component across all POUs. Since 2010, distribution assets have increased roughly 50% for LADWP and 20% for SMUD, while transmission assets have almost doubled for both the POUs. Like IOUs, POU generation assets have relatively declined since 2014, while T&D assets have increased.

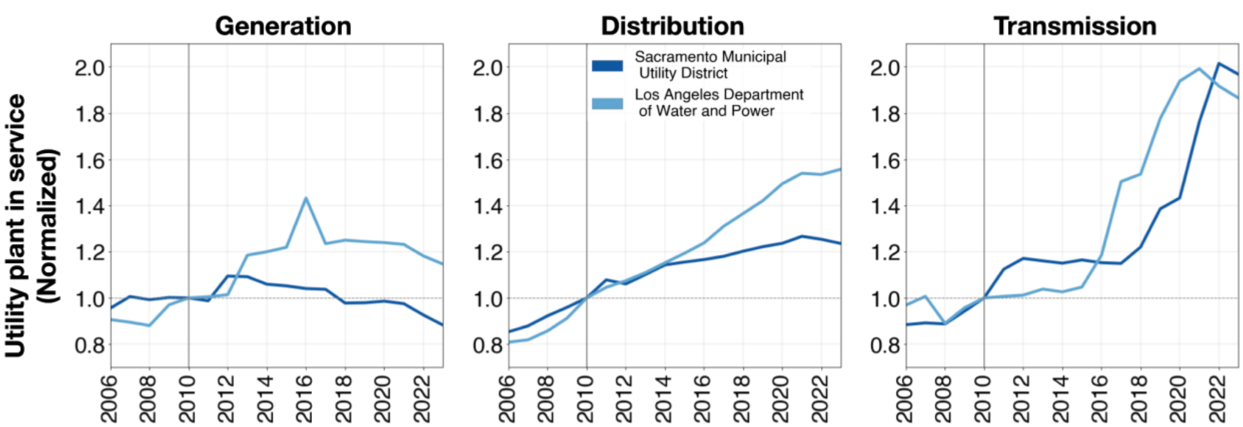

Figure 8: Generation, distribution, and transmission depreciable utility plant assets of LADWP and SMUD. The figure shows the ratio of a year's real costs (in 2022$) to the real costs of the

reference year (2010). Source: Annual financial statements of SMUD and LADWP, provided in Supplementary Materials.

Table 4: Generation, Distribution, and Transmission depreciable utility plant assets of SMUD and LADWP (billions of $2022)

Utility	Year	Generation	Distribution	Transmission	Sum
SMUD	2010	1.91	2.22	0.32	4.44
	2018	1.86	2.67	0.38	4.92
	2022	1.77	2.79	0.63	5.19
LADWP	2010	5.41	7.51	1.22	14.14
	2018	6.76	10.25	1.88	18.89
	2022	6.39	11.52	2.35	20.25

Source: Annual financial statements of SMUD and LADWP, provided in Supplementary Materials.

(b) **Operations and maintenance**

POUs incur operational and maintenance costs for their infrastructure. Figure 9 and Table 5 show O&M trends and values for LADWP and SMUD. We present a combined O&M expense value due to a lack of disaggregation by generation, distribution, and transmission in their financial statements. POU O&M costs have increased modestly, with an increase of 9% for LADWP and under 10% for SMUD, except for 2008 and 2022. The 2008 spike was due to high wholesale prices and increased electricity consumption [37], while the recent 2022 increase was due to an unplanned outage of SMUD's Cosumnes Power Plant, which temporarily forced it to rely on more expensive purchased power [38]. In the same period, IOU's overall O&M expenses have increased by ~35% (SCE) and more than 70% (SDG&E and PG&E). POU O&M expenses will remain relatively constant due to limited exposure to high-fire threat districts. SMUD does not serve any high-fire threat areas, but LADWP has some Tier 2 territory in the Owens Valley (Figure 7).

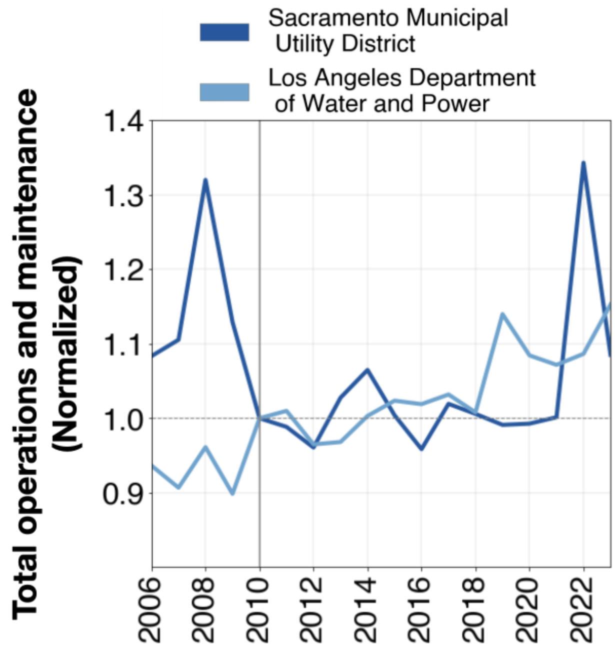

Figure 9: Total operations and maintenance costs for LADWP and SMUD. The figure shows the ratio of a year's real costs (in 2022$) to the real costs of the reference year (2010). Source: Annual financial statements of SMUD and LADWP, provided in Supplementary Materials.

Table 5: Total operations & maintenance costs of selected POUs (billions of $2022)

Utility	Year	Total O&M
SMUD	2010	1.54
	2018	1.55
	2022	2.07
LADWP	2010	3.49
	2018	3.52
	2022	3.79

Source: Annual financial statements of SMUD and LADWP, provided in Supplementary Materials.

The analysis shows that POUs have similar capital investment trends as IOUs but differ in O&M expenses. Like IOUs, POU generation assets are declining while their network infrastructure investments are growing. However, POU O&M expenses have increased modestly in contrast with IOU O&M expenses, potentially due to their relatively limited wildfire exposure.

3. Relationship between IOU and CCA Rate Increases

The third type of power provider of interest is community choice aggregators (CCAs). CCAs procure power through wholesale markets and independent power providers but continue to use IOU distribution and transmission infrastructure to deliver electricity to consumers [39]. While many CCAs positioned themselves as an alternative to the IOUs, their ability to offer customers substantial bill savings is limited. A CCA can set its generation charges but is assessed the same transmission and distribution charges as its parent IOU. As Figure 10 shows, network costs form a large portion of the overall rate charged to the customer, so the T&D drivers of price increases discussed in the previous sections apply equally to IOU and CCA customers [40], [41], [42]. CCAs will only be insulated from overall price increases if their generation cost savings—the only thing they control—are large enough to offset T&D hikes.

However, CCA rates also diverge from IOU rates with respect to a surcharge they must pay through a mechanism known as the Power Charge Indifference Adjustment (PCIA). When large swaths of residential load departed IOUs for CCA service, IOUs had already procured generation resources to serve those customers, and losing CCA customers' generation revenue would subsequently cause a cost shift onto the remaining IOU customers. The PCIA is determined by the CPUC through a dedicated regulatory proceeding and is meant to be set at such a level as to offset this adverse effect [43]. Then, a CCA's net savings will be the generation procurement savings minus the PCIA charge. A relatively high PCIA and/or small-generation procurement savings may even result in a CCA customer paying more than an IOU customer.

For California's two largest CCAs, MCE and CPA, Figure 10 contextualizes the magnitude of network charges, generation charges, and PCIA fees using data from Joint Rate Comparison mailers produced by IOUs and CCAs. While these CCAs consistently offer lower generation rates than their parent IOUs, the PCIA often ends up being approximately equal to the difference in generation costs between the IOU and CCA, rendering total rates very similar. As IOU rates continue to rise, driven by T&D costs, CCA rates will likely follow a similar trend.

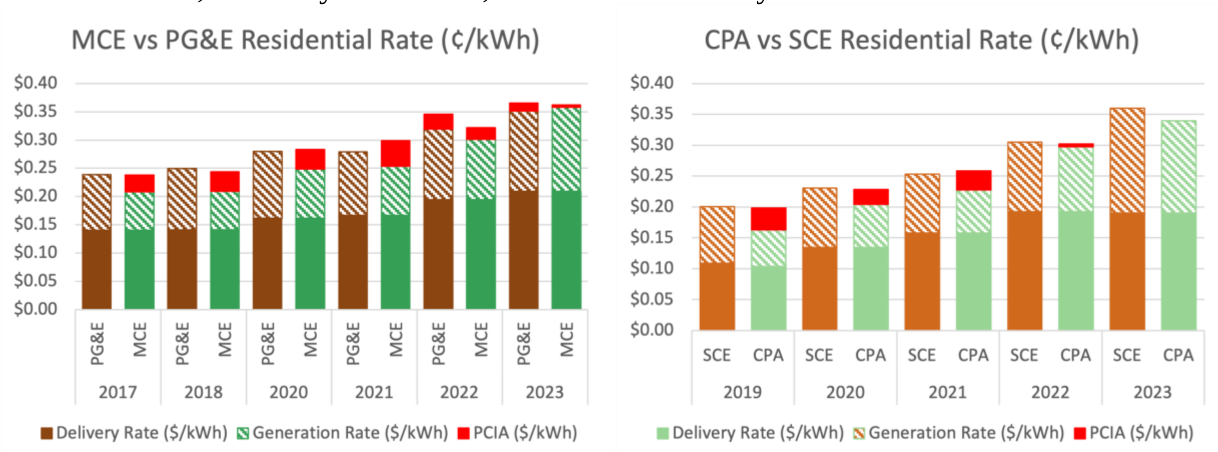

Figure 10: Comparison of the average residential rate, by component, faced by CCA customers versus the rate charged to IOU customers in the same geographic service territory.[4] The left panel compares MCE with PG&E, while the right panel compares CPA with SCE. Source: Joint Rate Comparisons prepared by CCAs and IOUs. [40], [41], [42]

Conclusion

Rising electricity prices have become a high-priority concern for policymakers and consumers alike in California. Electricity prices are high and rapidly increasing in IOU and CCA territories, while prices remain low in POU territories. Our study helps clarify and refine the debates around electricity affordability in a system facing the dual challenges of decarbonization and climate change adaptation. The state has ambitious renewable energy integration and electrification goals yet faces mounting pressure to harden the grid against wildfires.

While significant supply-side changes continue to occur and utilities' generation costs have increased, our calculations demonstrate that network cost increases are the more significant drivers of bill increases. These T&D expenditures—capital investments in grid hardening, maintenance costs of overhead lines, and vegetation management—are important for wildfire mitigation. Across all power providers, qualitative trends for capital investments are similar: a flattening or reduction in generation assets and an increase in T&D assets. IOU T&D assets have increased by an average of 97% in real terms between 2010 and 2022, while POU T&D depreciable utility plant has increased by an average of 51% in the same time frame. However, a source of divergence is operations and maintenance expenses: total IOU O&M has increased by an average of 51% in real terms between 2010 and 2022, while the comparable increase for POUs is just 17%. Notably, the IOU O&M increases correlate with the years following damaging wildfires. This suggests that network O&M expense increases tend to be reactive rather than proactive management for an aging and expanding grid.

Despite this upward trend in IOU T&D spending, the trend for IOU profits in the aftermath of wildfires is somewhat more complex. The ROR has trended downward over time, and PG&E even reported a negative ROR in the immediate years following the Camp Fire. Historical evidence from SDG&E shows that one possible outcome is the strong recovery of the ROE and a temporary, reactive spike in O&M expenditures. Indeed, PG&E's returns appear to have already returned to previous ranges; more time will be needed to determine whether PG&E's O&M expenses will remain persistently high.

Finally, though our work confirms that POUs have tended to be insulated from such severe cost increases, we caution that our analysis is not causal. Our findings, therefore, should not be taken to imply that municipalization itself will necessarily relieve bill pressure. The case of CCAs shows that even under a (partial) public nonprofit structure, exposure to wildfire hardening costs will result in upward pressure on bills. CCAs also reach price parity with IOUs due to the PCIA exit fees levied on them.

[4] Starting 2022, PG&E has begun reporting that there is also a PCIA applicable to their bundled customers, which they say was previously bundled into the generation rate. This "IOU-PCIA" is often larger than the corresponding CCA-PCIA.

Formally quantifying the impact of a public vs private governance model alongside the importance of many other factors, such as vertical integration, a more concentrated service territory, and a lack of HFTDs (as shown in Figure 7) would be a useful direction for future study.

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