

ISSUE BRIEF

Transmission Costs in the California Independent System Operator Grid: Balancing Needed Investments with Customer Affordability



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When California households and businesses consume power, they pay for electricity — and much more. Part of their bills help fund the maintenance and construction of transmission lines, the complex network of infrastructure that moves electricity from power plants, solar fields, wind farms and other energy generation facilities so that it can be efficiently distributed to customers. Transmission costs within the California Independent System Operator (CAISO) transmission grid have been rising rapidly for the past decade and more investment in transmission is being called for to meet the state’s clean energy goals. It’s important to carefully understand the impacts before investing in new transmission; those costs will impact the affordability of electricity for decades to come.

Transmission charges will increase for all CAISO customers, some more than others, as California’s economy transitions toward clean energy. The federally regulated CAISO acts as an “air traffic controller” that manages and controls approximately 80% of the state’s bulk transmission grid. The CAISO also operates an energy marketplace for buying and selling power to market participants. Twenty public power utilities that each serve 500,000 or more customers receive transmission service from the CAISO grid.

Transmission in Municipal Balancing Authority Areas

Outside of the 80% of the California grid served by the CAISO, municipal balancing authorities manage transmission for the other 20%. These entities, such as the Los Angeles Department of Water and Power and the Balancing Authority of Northern California balancing authorities, could face higher transmission costs in the future, even though they are not bound to the CAISO’s market and transmission cost allocation rules. For some municipal utilities, potentially expensive but necessary transmission upgrades will be essential for reaching California’s goal of 100% clean energy. They will need better coordination during the permitting process and protection from CEQA litigation to finish their transmission projects in a timely manner that doesn’t significantly raise customer rates.

The CAISO identifies its future transmission needs through an annual Transmission Planning Process (TPP). The costs of projects selected and built through these processes are allocated through the Transmission Access Charge (TAC),



Electrical transmission towers near Lancaster, California.

which requires nearly all electric customers within the CAISO to pay transmission owners through electricity usage. Because there are multiple components of the TAC, the cost allocation of transmission varies by region.¹

Customers pay TAC costs based on the amount of electricity used during a billing period; the more electricity a customer consumes, the costlier its TAC. For example, customers in hotter regions of California tend to rely more heavily on air conditioning, so they pay higher monthly TAC costs because they consume more electricity. Another factor worth considering is that statewide electric load is expected to increase significantly during the coming decades, as a growing number of Californians charge electric vehicles at home and use electric appliances like heat pumps. This electrification inevitably will incur higher TAC costs for California customers.

Large investments in transmission are expected to support load growth and help meet California's ambitious clean energy goals.

During the coming decades, it's likely that transmission on the CAISO grid will need to be expanded significantly to support the delivery of new renewable and clean energy resources such as large-scale solar, onshore and offshore wind farms, and battery storage. Additional transmission also will be needed to meet California's ambitious 100% by 2045 clean energy goal and the electric load growth necessary for the widespread deployment of electric vehicles. In March 2022, the CAISO Board approved 23 transmission projects, costing \$2.9 billion in total. This is more than 13 times the average yearly transmission costs approved during the prior five years. Separately, the CAISO also has produced a 20-year transmission outlook study that predicts another \$30.5 billion in transmission investment costs through 2040.

Transmission costs in California have increased steeply and will continue to rise; costs already are significantly outpacing the national average.

Transmission costs have tripled in the past decade. In 2011, the TAC for Northern California was \$11.70

per megawatt-hour (MWh) of electricity, including both high- and low-voltage TAC costs. By 2022, it increased to \$34.10 per MWh. Based on California's planned and anticipated transmission upgrades, this upward cost pressure could lead to another 43% increase to TAC by 2030, reaching \$48.7 per MWh, and a potential 98% increase by 2040, reaching \$67.5 per MWh. This means the monthly cost of transmission for an average Northern California residential customer could rise from \$27 in 2022 to \$37 by 2030, and \$54 in 2040 — a 100% increase over 18 years. Customers who live in the Central Valley and use more electricity to keep their homes cool could pay \$90 per month in transmission costs by 2040, up from about \$45 today.

To put this in context, Northern California's transmission costs will be more than two and a half times the national average in 2022. Nationwide residential electric customer spending on transmission is expected to further increase 86% by 2040, but in Northern California it may rise an estimated 100%. **The result is electric customers in California could be paying almost three times the national average for transmission in 2040.**

Rushed investments to build out additional transmission could lead to higher electric prices and make California's climate goals more difficult and more expensive to achieve.

California has some of the highest electric rates in the country. Even though publicly owned utilities' (POU) rates in California are on average 15% lower than the state's investor-owned utilities, POU rates have still increased 67% faster than the national Consumer Price Index and 51% more than the national average for electric rates. Rate increases are unavoidable as utilities invest in the transition to a 100% clean electric grid, make investments that address wildfire mitigation, and build out a system capable of accommodating renewable and clean energy resources, building and transportation electrification. More costly electric bills, however, will slow down the adoption of electrification and impede California's climate progress. That's why it is vitally important to ensure that transmission investments are prudent, well studied, and cost effective.

1. Traditionally in the electric utility industry, transmission tends to be classified as high voltage. However, because of pricing and other differences, there are actually two types of "high-volume" transmission: high-voltage and low-voltage. This difference in pricing is as follows: the high-voltage TAC for powerlines above 200 kV is paid by every CAISO customer, whereas the costs for the low-voltage TAC varies by region.