2025 California Green Innovation Index

17TH EDITION

2025

California Green Innovation Index

17TH EDITION

This marks the release of the 17th edition of Next 10's California Green Innovation Index. The 2025 edition continues the shift in format for our readers that we introduced in 2021: a fully online, immersive experience for the Index that allows our readers to dig deep into the data, jump straight to the issues most important to their work, and easily find, interact with, and share the most critical climate and clean energy trends facing the state. This year's edition also continues to include interactive charts, allowing readers to dig even deeper into the data.

This overview provides a snapshot of some of this year's key takeaways. You can learn more about these trends and others at **GreenInnovationIndex.org**. We're excited for you to experience our fourth online edition of the California Green Innovation Index, and we hope it can be useful to your work.

As the federal government rolls back environmental protections and funding, it is more important than ever that California continue its climate leadership. While the state is well-position to expand our clean energy economy, challenges remain for the state to meets its renewable energy, transportation, and climate goals. Key takeaways from this year's analysis include:

View the entire index at
GreenInnovationIndex.org

California unlikely to meet 2030 climate goal despite real progress since pandemic shutdown.

Emissions decreased by 3% from 2022 to 2023, after falling by 2.4% from 2021 to 2022. More importantly, GHG emissions in 2023 were also 2.4% lower than during the economic shutdown due to the COVID-19 pandemic in 2020, showing that California continued to reduce emissions even after the economy reopened and regular activity resumed. However, the state still needs to reduce emissions faster to meet the SB 32 goal of 40% below 1990 levels by 2030 on time. To meet the goal, emissions would need to fall by 4.4% per year on average. From 2019 to 2023, emissions fell on average by 2.8% annually. At that rate, the state would meet the goal in 2035—two years earlier than calculated based on last year's emissions.

2022 → 2023

CALIFORNIA GHG EMISSIONS **DECREASED** BY:

3%

A RECORD **DECREASE** OUTSIDE OF A RECESSION YEAR

2023

GREENHOUSE GAS EMISSIONS WERE

2.4%

LOWER THAN IN 2020

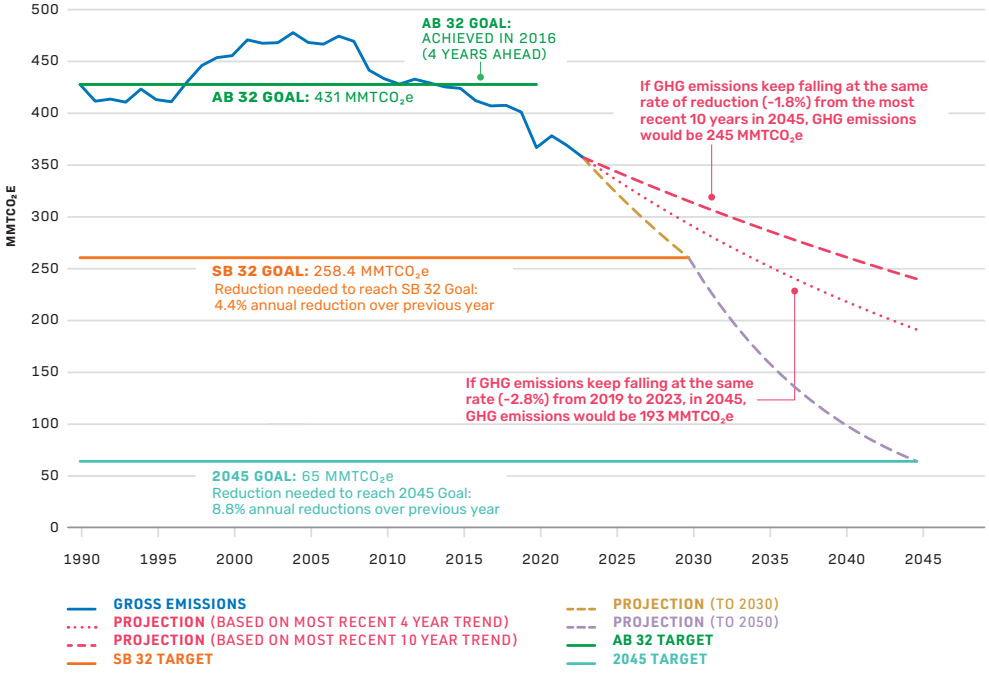
THE STATE NEEDS TO **REDUCE** EMISSIONS BY

4.4%

EACH YEAR TO MEET 2030 GOAL

Figure 1. GHG Emissions and Projected Reduction Goals

CALIFORNIA, 1990-2045



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory Analysis by CEC Economics. NEXT 10 / SF · CA · USA

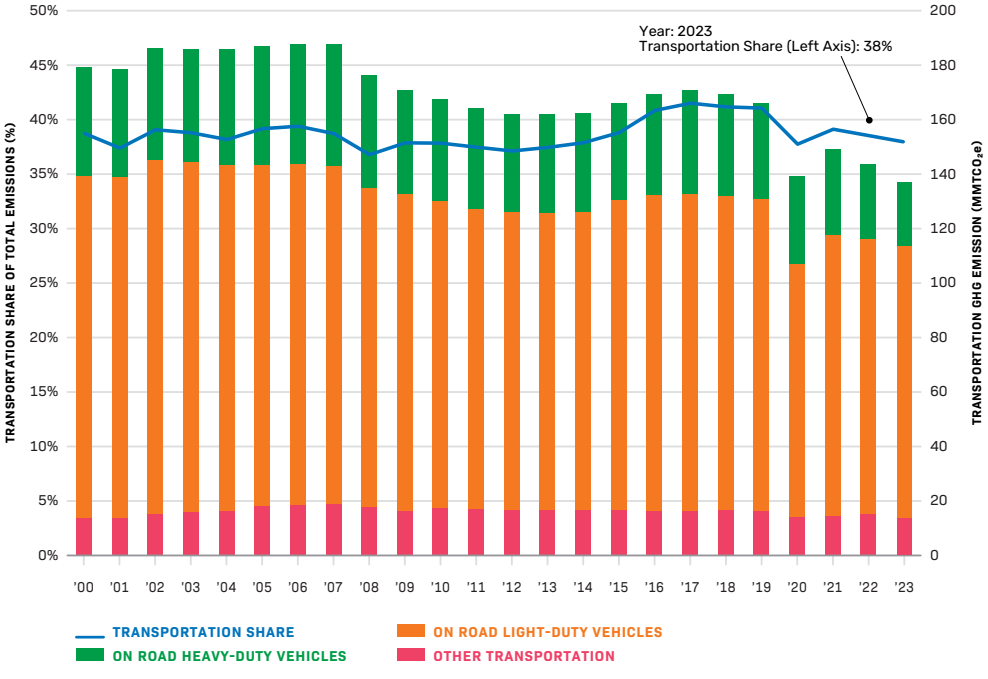
Even though emissions decreased in 2023, California now needs to reduce emissions at a greater rate to meet the 2030 goal. In 2022, emissions only need to be reduced by 4.2% each year and by 4% in 2021. However, emissions reductions are improving. From 2006 to 2016, emissions reductions averaged 1.2% annually, while from 2016 to 2023, the reductions averaged 2% per year. To meet the 2045 goal of 85% below 1990 levels, the state would need to reduce its emissions at a pace of 8.8%—more than double—assuming the 2030 goal is met on time.

Emissions from transportation continue to fall.

The transportation sector continues to be the largest-emitting sector in California, comprising 38.1% of total emissions in 2023 compared to 38.7% in 2022. However, emissions from this sector decreased by 4.6% from 2022 to 2023—the most of any sector. This was driven by a significant 17.2% reduction in emissions from heavy-duty vehicles due increasing use of renewable and biodiesels. In 2023, emissions from heavy-duty vehicles remained 33.1% below pre-pandemic 2019 levels. On the other hand, emissions from passenger vehicles fell by 0.5% from 2022 to 2023, and by 12.9% from 2019.

Figure 2. GHG Emissions from the Transportation Sector and as a Share of Total GHG Emissions

CALIFORNIA, 2000 - 2023



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory - by Sector. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

In 2024, the share of new registrations from light-duty pickup trucks, mini-vans, and SUVs reached a new height, breaking 70% for the first time, making up 72.7% of new light duty vehicle registrations—up from 69.4% in 2023. This continues a trend of consumers preferring these types of vehicles more than cars and sedans. In 2024, total light truck registrations increased by 4.4% to 1.23 million vehicles while car sales fell by 10.9% to 480,900—less than half a million for the first time.

2023

EMISSIONS FROM TRANSPORTATION WERE **BELOW** PRE-PANDEMIC 2019 LEVELS BY

17.4%

GHG EMISSIONS FROM THE TRANSPORTATION SECTOR WERE

38.1%

2021 → 2023

EMISSIONS FROM HEAVY-DUTY VEHICLES HAVE **FALLEN** TO

27.1%

IN JUST TWO YEARS

2023 → 2024

NEW ELECTRIC LIGHT-DUTY PICKUPS, SUVS AND VANS SALES **INCREASED** BY

48%

2024

ZEV PICKUPS, SUVS, AND VANS MADE UP

51%

OF LIGHT-DUTY ZEV REGISTRATIONS COMPARED TO

43%

IN 2023 AND

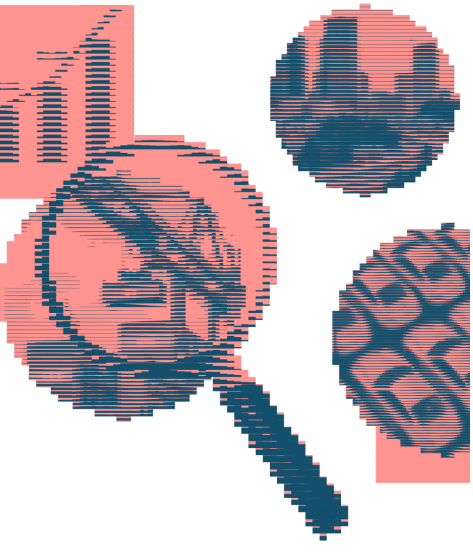
34%

IN 2022

THE PERCENTAGE OF REGISTERED VEHICLES ON-ROAD THAT ARE ZEVS REACHED

6.5%

UP 5.2% FROM 2023

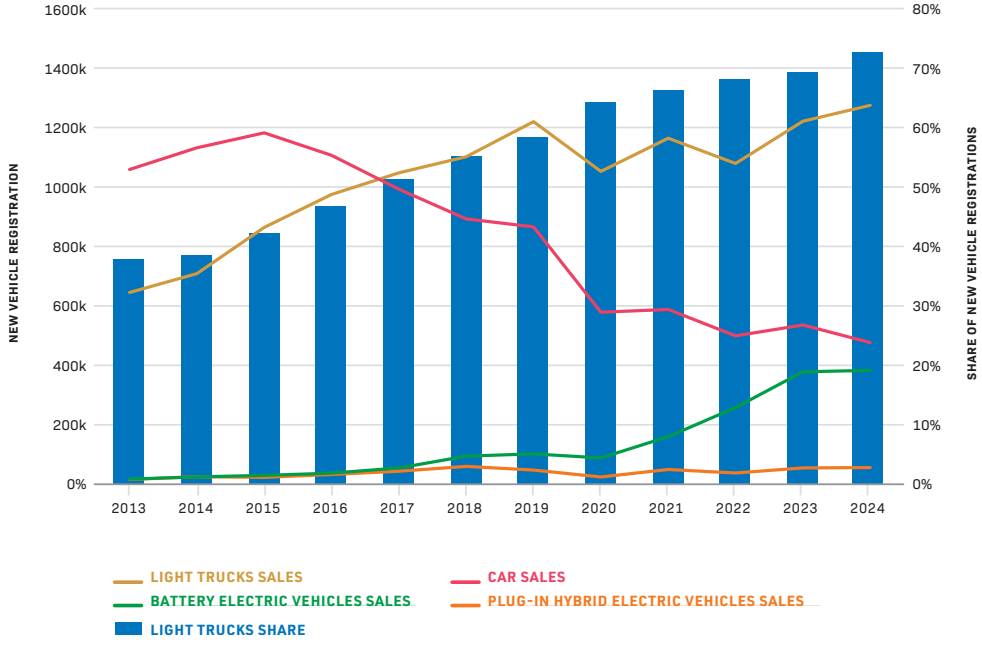


California likely to meet ZEV goals before credits were eliminated.

California met the 2025 goal of 1.5 million zero-emission vehicles (ZEVs) on road in April 2023. BEVs and PHEVs accounted for a quarter (25.5%) of new vehicle registrations in 2024, slightly more than the 24.7% in 2023. To reach the 2030 goal of 5 million ZEVs on-road, ZEV registrations in California need to increase by an annual average of 17.5% from 2025 to 2030, revised downwards from the 18.6% needed between 2024 and 2030. While ZEV adoption slowed in 2024, the year-over-year increase was still 25.3% but 2025 is projected to be the first year where new EV sales are lower than the year before.

Figure 3. New Light Registrations and as Percentage of Total New Light Vehicle Registrations

CALIFORNIA, 2013-2024



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: New light vehicles only and does not include used vehicles and vehicles coming off lease. Cars include subcompact, compact, mid-size, large sedans, and sports cars. Light trucks include pickup trucks, mini vans, large vans, and SUVs. Data Source: AutoCount data from Experian, California New Car Dealers Association. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

Meeting the 2025 goal early put California in a better position to meet the 2030 goal of 5 million ZEVs on-road. However, the EV tax credits from the Inflation Reduction Act were eliminated and that may make it more difficult to meet the future goals. While EVs were a record high 29.1% of new car sales in California from July to September,[1] one research group has estimated that EV sales could fall by 16% to 38% without the tax credits.[2]

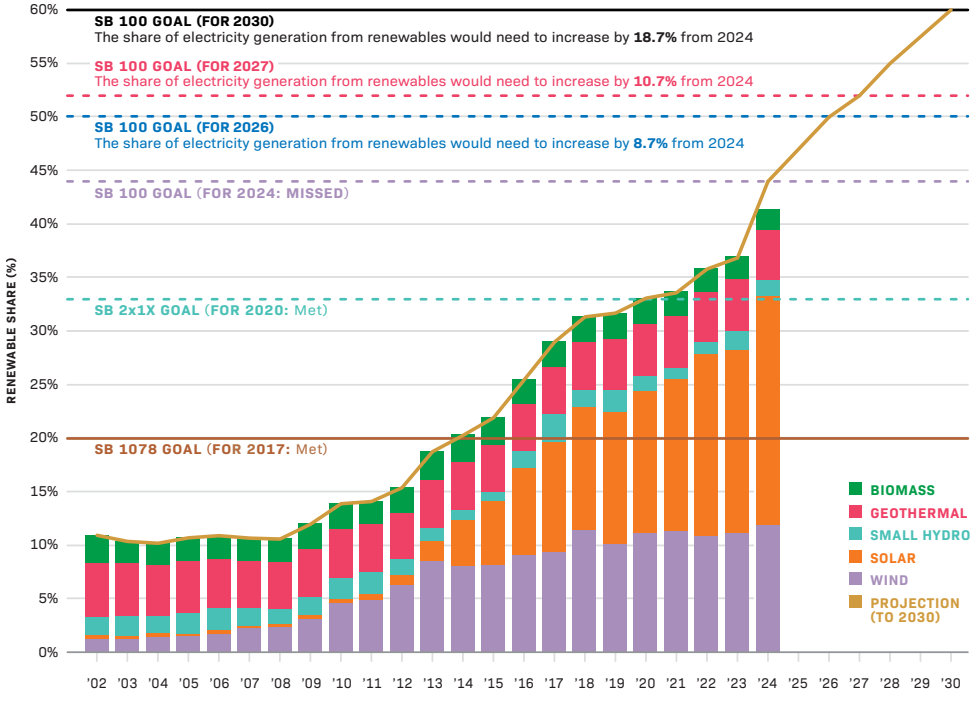
KEY FINDING 4

California misses renewable energy target despite record gains.

In 2024, the share of renewable sources[3] in California's power mix (including imports) increased to 41.3%, a rise of 4.4% compared to 2023 and the biggest increase on record. This is significant as renewable energy generation has been somewhat stagnant in recent years and renewables only made up 36% of the power mix in 2023. Despite this impressive achievement, the state missed the interim SB 100 goal of procuring 44% of retail electricity sales from RPS-eligible renewable sources by the end of 2024. However, it could meet the 2026 goal of 50% on time if it maintains this pace.

Figure 4. California's Path to 60% RPS Goal by 2030

ASSUMING LINEAR GROWTH



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Renewables do not include large hydroelectric sources exceeding 30 megawatts. Data Source: California Energy Commission; U.S. Department of Energy, Energy Information Administration. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

To meet the 2026 goal of 50% of generation from RPS-eligible renewable sources on time, the share of electricity generation would need to increase by a total of 8.7% from 2024 to 2026. To meet the 2027 goal of 52%, it would need to increase by a total of 10.7% from the 2024 level and by 18.7% from the 2024 level to meet the 2030 goal of 60% on time. If California maintains or increases the pace of renewable deployment, it is possible to meet these upcoming goals on time.

2024

SOLAR AND WIND

ARE THE LARGEST RENEWABLE SOURCES, MAKING UP

21.3%

AND

11.9%

RESPECTIVELY, OF THE STATE'S TOTAL POWER MIX

GENERATION FROM IN-STATE AND IMPORTS SOLAR **INCREASED** BY:

23.8%

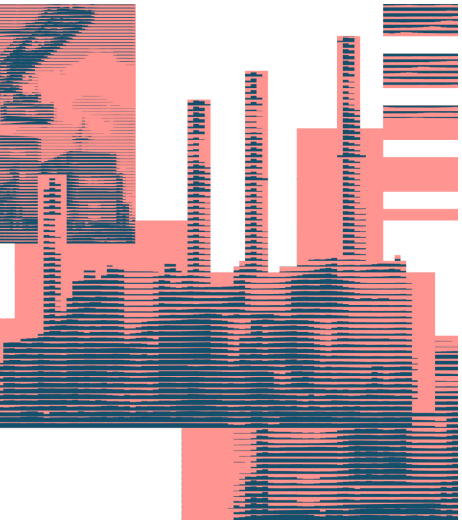
COMPARED TO 2023

2008 → 2024

THE AVERAGE YEARLY GROWTH RATE IN RENEWABLES IN CALIFORNIA WAS

1.9%

COMPARED TO 0.9% IN THE REST OF THE U.S.



KEY FINDING 5

Fossil fuels hit record low share of the power mix.

The share of fossil fuels in California's power mix continues to decrease. The share of generation from fossil fuels fell to 36.3% in 2024, a drop of 2.1% and the lowest on record. Even as recently as 2021, the share from fossil fuels was 41.1%. Although natural gas remains the largest share (34%) of the power mix, it fell by 8.2% to 86,479 GWh in 2024—the second-lowest level on record since the 86,248 GWh in 2019. Meanwhile, electricity generation from RPS-eligible renewable sources and large hydroelectric accounted for over half (52.3%) of the power mix for the first time in 2024—an increase of 3.7% from 2023.

2024

GENERATION FROM FOSSIL FUELS **DECREASED** TO

36.3%

A RECORD LOW

SOLAR MADE UP OVER HALF OF CALIFORNIA'S RPS-ELIGIBLE RENEWABLE GENERATION AT

51.6%

FOR THE FIRST TIME

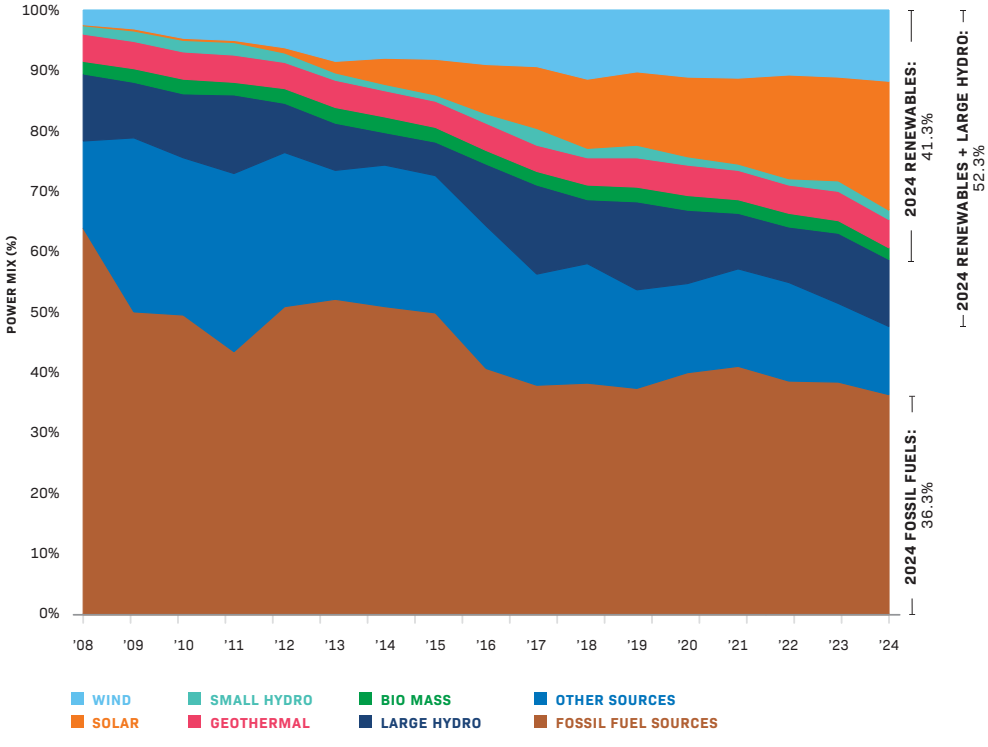
THE **INCREASE** IN RENEWABLES MOSTLY DUE TO SOLAR AND WIND WHICH NOW MAKE UP

33.2%

OF THE POWER MIX

Figure 5. California Power Mix Percentage by Source

CALIFORNIA, 2008 - 2024



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Fossil Fuel Sources = Coal, Oil, and National Gas; Other Sources = Nuclear, Unspecified, and Other. Data Source: California Energy Commission. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

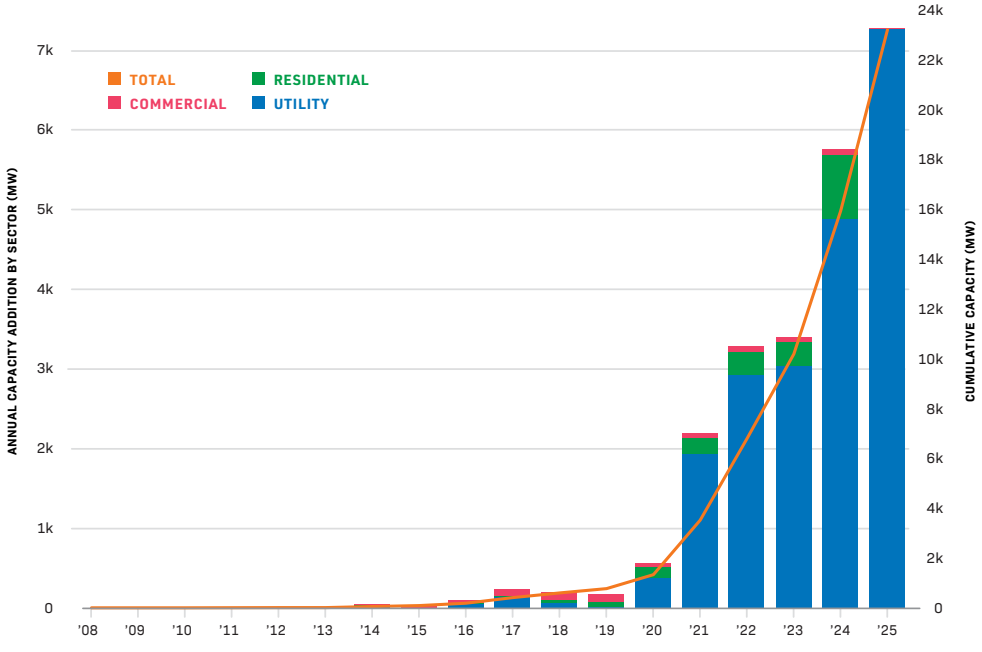
California's power mix comes from a range of sources. The second-largest share after natural gas is solar, which made up 21.3% of the power mix in 2024. Wind accounted for 11.1% while the share from geothermal was 4.6%. In-state generation from nuclear, which is carbon-free but not a renewable energy source, accounted for 9.9% of the power mix in 2024, an increase of 13.7% since a record low in 2019. Generation from large hydro, which is greatly influenced by drought conditions year-to-year, accounted for 11.1% in 2024.

Energy storage capacity in California continues to skyrocket.

Utility-scale storage, such as lithium-ion battery and long-duration, is essential for incorporating more renewable energy to the grid and it has grown significantly in California since 2020. In 2024, California added 5,743 MW (5.7 GW) of energy storage, an increase of 69.2% compared to the 3,394 MW (3.4 GW) added in 2023. As of April 3, 2025, California had added 23.2 GW of energy storage cumulatively, with over half of the capacity (12.2 GW) added after 2023. In 2024, utility-scale lithium-ion battery storage projects expanded into 29 counties across the state, up from 25 in 2023 and only 11 in 2022. The largest share of which (30%) are in Riverside County.

Figure 6. Energy Storage Power Capacity in California, by Sector

2007 – 2025 YEAR-TO-DATE



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Data last updated on April 3, 2025. Data Source: California Energy Storage System Survey, California Energy Commission. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

The California battery storage industry proliferated starting in 2021 and the landscape of energy storage projects in California is rapidly evolving. The average storage duration for lithium-ion energy storage systems that became operational in 2024 were significantly longer in California (3.6 hours) than the rest of the U.S. (2.3 hours). Most of the projects in the interconnection queue, which is the line to connect to the grid, in 2024 were energy storage projects (standalone, hybrid, or paired with another technology such as solar), which totaled 135 GW, and of which over half came from solar projects paired with battery storage systems (73 GW).

2024

CALIFORNIA ADDED

5,743MW

OF ENERGY STORAGE
WHICH IS AN **INCREASE** OF

69.2%

COMPARED TO THE 3,394 MW
ADDED IN 2023

OF THE AMOUNT ADDED

4,881MW

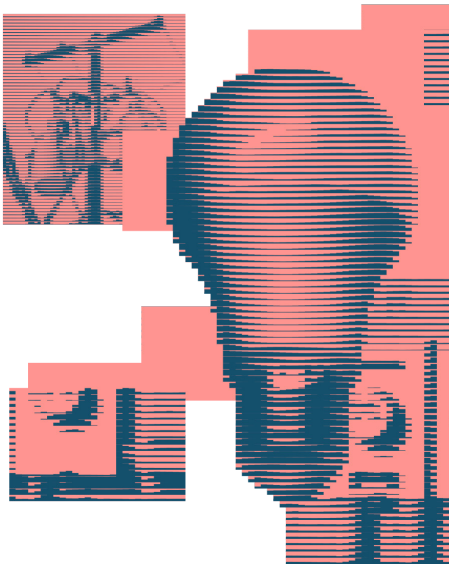
WAS UTILITY-SCALE
ENERGY STORAGE

2025

IN THE FIRST THREE MONTHS,
CALIFORNIA **ADDED**

7,272MW

TO THE GRID –
MORE THAN IN ALL OF 2024



California's average residential electricity bills are now higher than the U.S. average.

Despite having the most expensive kilowatt-hour electricity rates, California's residential electricity bills had been below the U.S. average for years. However, California's once-held advantage of having a lower average residential electricity bill compared to the rest of the U.S. has vanished in the wake of the pandemic. In 2013, residential electricity bills were 19.8% below the national average, but it has shifted to 5.8% higher than the U.S. average in 2023. On the other hand, California has consistently maintained its price advantage in the industrial sector with average California electricity bills 28.1% lower than the U.S. average in 2023—though the cost per kilowatt-hour ($0.19/kWh) was more than double the national average of $0.08/kWh.

2013 → 2023

RESIDENTIAL ELECTRICITY RATES IN CALIFORNIA **INCREASED** BY

44.6%

TOTAL U.S. RESIDENTIAL RATES INCREASED MODESTLY BY

2.3%

2022 → 2023

RESIDENTIAL RATES **GREW** IN BOTH CALIFORNIA AND THE U.S. BY

9.9%

AND

2.6%

RESPECTIVELY

Table 1. Electricity Prices and Bills (Inflation Adjusted) by Sector

CALIFORNIA AND THE REST OF THE U.S.

SECTOR	REGION	PRICE PER KWH 2023	AVERAGE MONTHLY BILL 2013	AVERAGE MONTHLY BILL 2023	10YR % CHANGE
RESIDENTIAL	CALIFORNIA	$0.30	$114.00	$145.00	26.9%
	FLORIDA	$0.15	$162.00	$168.00	4.2%
	ILLINOIS	$0.16	$106.00	$105.00	-1.3%
	NEW YORK	$0.22	$151.00	$126.00	-16.7%
	OHIO	$0.15	$142.00	$125.00	-12.3%
	PENNSYLVANIA	$0.18	$141.00	$143.00	1.8%
	TEXAS	$0.14	$163.00	$166.00	1.9%
	UNITED STATES	$0.16	$142.00	$137.00	-3.9%
INDUSTRIAL	CALIFORNIA	$0.19	$4,077.00	$4,513.00	10.7%
	FLORIDA	$0.09	$7,733.00	$5,344.00	-30.9%
	ILLINOIS	$0.08	$44,920.00	$50,906.00	13.3%
	NEW YORK	$0.07	$16,477.00	$12,100.00	-26.6%
	OHIO	$0.07	$18,261.00	$15,518.00	-15.0%
	PENNSYLVANIA	$0.08	$14,545.00	$20,807.00	43.1%
	TEXAS	$0.07	$6,278.00	$2,525.00	-59.8%
	UNITED STATES	$0.08	$8,781.00	$6,272.00	-28.6%
COMMERCIAL	CALIFORNIA	$0.24	$1,025.00	$1,274.00	24.2%
	FLORIDA	$0.12	$815.00	$749.00	-8.2%
	ILLINOIS	$0.11	$762.00	$682.00	-10.6%
	NEW YORK	$0.18	$1,253.00	$908.00	-27.5%
	OHIO	$0.11	$787.00	$665.00	-15.5%
	PENNSYLVANIA	$0.11	$619.00	$457.00	-26.1%
	TEXAS	$0.09	$814.00	$767.00	-5.8%
	UNITED STATES	$0.13	$834.00	$763.00	-8.6%

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Energy Information Administration, State Energy Data System; U.S. Department of Commerce, Bureau of Economic Analysis. Analysis by CEC Economics. NEXT 10 / SF · CA · USA

Additionally, California's average monthly commercial electricity bill has become considerably more expensive relative to the U.S. average during the last decade—from 22.9% higher in 2013 to 67% higher in 2023. California has the second-highest residential rates ($0.30/kWh), second-highest commercial rates ($0.24/kWh), and the fourth-highest industrial rates ($0.19/kWh). The state of California can no longer depend solely on mild weather and energy efficiency measures to mitigate the impact of high utility bills. Rising rates have been driven by wildfire-related expenses, insurance, and other capital expenditures.

About Next 10's California Green Innovation Index

Next 10's *California Green Innovation Index* tracks the state's progress in reducing greenhouse gas emissions, spurring technological and business innovation, and growing businesses and jobs that enable the transition to a more resource-efficient economy. The 2024 *Index* is the 17th edition published by Next 10.

Next 10 is an independent, nonpartisan organization that educates, engages and empowers Californians to improve the state's future. Next 10 was founded in 2003 by businessman and philanthropist F. Noel Perry. Next 10 is focused on innovation and the intersection between the economy, the environment, and quality of life issues for all Californians.

Advisors to the California Green Innovation Index

Next 10 thanks the following expert advisors for their generous time and guidance on this project over the last twelve editions:

Dan Adler
Senior Advisor for Climate Finance, Governor's Office of Business and Economic Development

Merrian Borgeson
California Climate and Energy Policy Director, NRDC

Morrow Cater
Founding Principal, Cater Communications

Ralph Cavanagh
Retired Energy Co-Director, NRDC

Kate Gordon
CEO, California Forward

Michael Hanemann
Professor & Julie A. Wrigley Chair in Sustainability, Department of Economics, Arizona State University

Hal Harvey
CEO, Energy Innovation: Policy and Technology LLC

Elliot Hoffman
CEO, REV

Mark Jacobson
Prof. of Civil and Environmental Engineering, Director of the Atmosphere/Energy Program, Stanford University

Dan Kammen
Class of 1935 Distinguished Professor of Energy in the Energy and Resources Group and the Goldman School of Public Policy. Director, Renewable & Appropriate Energy Laboratory, U.C. Berkeley

Joel Makower
Chairman and Executive Editor, GreenBiz Group Inc.

Walter McGuire
Owner, McGuire & Co., Inc./Flex Your Power

Manuel Pastor
Professor of Sociology and American Studies & Ethnicity, Director of the USC Program for Environmental and Regional Equity, University of Southern California

Former State Senator Fran Pavley
Environmental Policy Director, USC Schwarzenegger Institute

Wendy Pulling
Director, ESG Integration, University of California, Office of the Chief Investment Officer

Dan Skopec
Vice President, Regulatory Affairs, Sempra Energy Utilities

James (Jim) Sweeney
Professor of Management Science and Engineering, Senior Fellow at Precourt Institute for Energy, Stanford University

Tim Woodward
Managing Director, Prelude Ventures LLC

Endnotes

1. "California sets EV sales record in Q3 2025 ahead of tax credit expiry." EV Infrastructure News. October 15, 2025. Available at: https://www.evinfrastructurenews.com/ev-networks/california-sets-ev-sales-record-in-q3-2025-ahead-of-tax-credit-expiry
2. "EV sales surge in the U.S. ahead of Sept. 30 tax credit deadline." NPR. September 30, 2025. Available at: https://www.npr.org/2025/09/30/nx-s1-5557153/ev-tax-credit-sales-spike
3. RPS-eligible resources include biomass, small hydro, geothermal, solar, and wind.

To learn more, visit greeninnovationindex.org

www.next10.org