Recent California Greenhouse Gas Reduction Initiatives

By John Benson

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1. Introduction

Note: the title text was used in a Microsoft Bing query: the following response resulted:

California reduces greenhouse gas emissions through a statewide Cap-and-Trade Program, the Greenhouse Gas Reduction Fund (GGRF), and legally mandated targets such as cutting emissions 40% below 1990 levels by 2030 and achieving carbon neutrality by 2045. These efforts include investments in clean transportation, renewable energy, building efficiency, methane reduction, and community-focused climate programs.

California's climate policy is built on several major laws and programs as described in section 2.

2. KEY LAWS AND TARGETS

AB 32 (2006): *Required returning emissions to 1990 levels by 2020 — achieved in 2014.*[1]

SB 32 (2016): *Mandates reducing emissions 40% below 1990 levels by 2030.*[2]

AB 1279 (2022): *is the California Climate Crisis Act, which sets a legal target for California to reach net-zero greenhouse gas emissions by 2045 and maintain net-negative emissions thereafter, with at least an 85% reduction below 1990 levels by that year.*

See reference 1 footnote below.

AB 1279 is the most recent and comprehensive of these bills, and is described below.

<u>Key Provisions:</u>

Carbon Neutrality Goal: The state must achieve net zero greenhouse gas emissions as soon as possible, but no later than 2045, and then maintain net negative emissions.

CARB's Role: The California Air Resources Board (CARB) must update its Scoping Plan to identify and recommend measures to meet these goals, including policies for carbon dioxide removal and carbon capture, utilization, and storage (CCUS) technologies

Annual Reporting: CARB must submit annual reports tracking progress toward the targets

Contingency: The bill's operation is contingent on the enactment of SB 905 (2021–22)

[1] https://calepa.ca.gov/climate-dashboard/
[2] https://clee.berkeley.edu/publications/california-climate-policy-dashboard/

Implementation Path

The 2022 Scoping Plan for Achieving Carbon Neutrality, required under AB 1279:

Significant fossil fuel combustion reductions via clean technologies and fuels.

Further cuts to short-lived climate pollutants.

Expansion of natural and working lands actions for carbon sequestration.

Deployment of carbon capture and storage projects

Significance

AB 1279 strengthens California's climate commitments by:

Setting a clear, legally binding 2045 deadline for net-zero.

Mandating net-negative emissions after 2045.

Embedding carbon removal technologies into the state's climate strategy.

Creating accountability mechanisms through CARB's annual reporting and updated Scoping Plans.

2.1. Cap-and-Trade Program:

Covers major emitters (power plants, refineries, industry).

Sets a declining emissions cap and allows trading of allowances.

Auction revenue funds the Greenhouse Gas Reduction Fund (GGRF).[2]

2.2. Greenhouse Gas Reduction Fund (GGRF)

Financed by Cap-and-Trade auctions.

Supports programs that reduce emissions and benefit disadvantaged communities.

Funds clean transportation, energy efficiency, methane reduction, wildfire resilience, and more. [3]

3. Major Programs Reducing Emissions

3.1. Clean Transportation

Incentives for zero-emission vehicles (ZEVs), including rebates and fleet transition programs.

California reached 1.5 million ZEVs sold ahead of schedule.

[3] https://ww2.arb.ca.gov/our-work/programs/california-climate-investments/california-climate-investments-funded-programs

3.2. Renewable Energy

3.2.1. Renewables Portfolio Standard (RPS):

60% renewable electricity by 2030

100% clean electricity by 2045

In 2023, 67% of electricity came from carbon-free sources.

3.2.2. Low Carbon Fuel Standard (LCFS)

Requires fuel producers to reduce lifecycle carbon intensity.

3.2.3. Building and Appliance Efficiency

Efficiency standards have saved consumers over $100 billion in 40 years.

3.2.4. Methane and Agricultural Emissions

Programs supporting dairy methane reduction and alternative manure management.

3.2.5. Natural and Working Lands

Investments in wetlands, forests, and watershed restoration to enhance carbon sequestration.

4. Progress to Date

2023 emissions were 121 MMT[4] lower than 2004, equivalent to removing 26.2 million cars from the road for a year.

California is on track to meet its 2030 and 2045 climate targets according to the 2022 Scoping Plan.

4.1. Public Health and Community Benefits

At least 50% of climate investments benefit disadvantaged and low-income communities.

Climate strategies are projected to prevent over 5,600 premature deaths in 2045.

California's greenhouse gas reduction strategy integrates regulation, market mechanisms, and large-scale public investment to drive a transition toward a low-carbon, climate-resilient economy.

5. Benefits of Climate Action in California

- 67% Carbon-Free Electric Grid
- 52% Decrease in greenhouse gas emissions from electric power from 2008 - 2023
- 2,213,296 Zero-emission vehicle sales through 2024
- $100 billion in consumer savings from energy efficiency standards
- $200 billion value of avoided health impacts in 2045
- 544,604 Clean energy jobs in California in 2023

[4] MMT = Million metric tons of carbon dioxide equivalents.

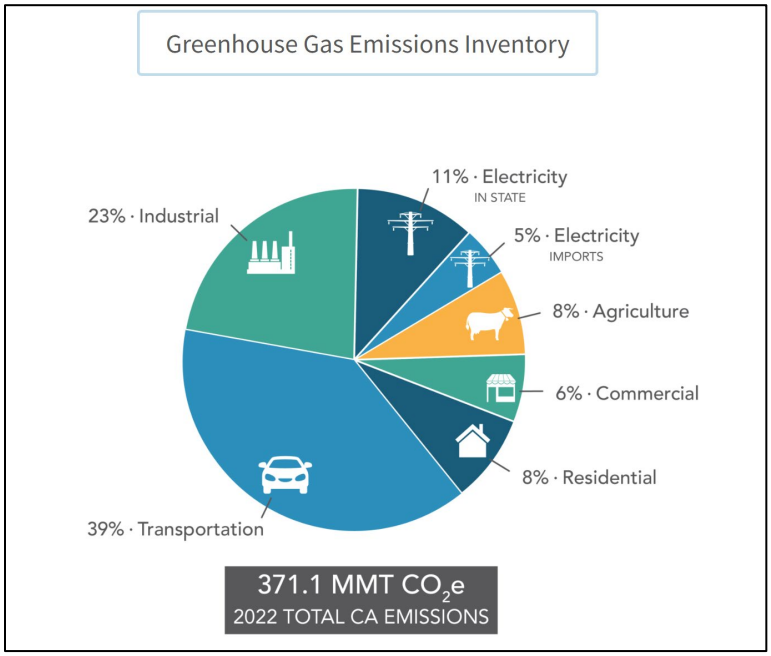
5.1. Overview

What is climate change? Climate change is a long-term shift in average weather patterns. It is caused mainly by burning fossil fuels for energy, which releases greenhouse gases. These gases form a blanket of pollution over the earth that traps heat in the atmosphere. This effect, also known as global warming, is causing our planet to overheat, leading to more severe wildfires, droughts, floods, and more.

Why does climate change matter? Eight in ten Californians agree that global warming is a serious threat to California's future economy and quality of life (PPIC[5]). In California, climate change is already causing more destructive wildfires, disrupting our water supplies, impacting our farmlands, and causing more heat waves and flooding.

Solutions: California is committed to creating a cleaner, healthier, and more prosperous future in a way that uplifts all Californians. Our ambitious climate efforts have led to many tangible benefits, such as improved air quality, cleaner cars, and affordable clean energy. California has become a global leader in climate action and has many climate partnerships around the world.

What is driving climate change? There are many sources of pollution that contribute to climate change. In California, transportation is the largest source of greenhouse gas emissions, accounting for 39% of total statewide emissions in 2022. The 2000 – 2022 Greenhouse Gas Emissions Inventory describes each of the slices in the pie chart below in more detail. It also summarizes major annual changes and long-term trends in greenhouse gas emissions.[6]



[5] PPIC = Public Policy Institute of California
[6] https://ww2.arb.ca.gov/ghg-inventory-data

5.2. Reducing Pollution while Growing the Economy

California is on track to meet the goals of The California Global Warming Solutions Act, or Assembly Bill 32 (AB 32), and we are doing so while growing our economy. California is the 5th largest economy in the world for the seventh consecutive year, with a nominal GDP of nearly $3.9 trillion in 2023 and a growth rate of 6.1% since the year prior, according to the U.S. Bureau of Economic Analysis (BEA). On a per capita basis, California is the second largest economy in the world.

As of 2025, California is ranked the 4th largest economy in the world by nominal GDP, ahead of Japan and India.[7]

Latest data and ranking

According to the International Monetary Fund's 2025 projections and U.S. Bureau of Economic Analysis (BEA) data, California's nominal GDP is about $4.30 trillion, placing it behind only the United States ($30.6T), China ($19.4T), and Germany ($5.01T)

This ranking reflects California's 2024–2025 growth, which saw it overtake Japan in 2024 and maintain this spot into 2025.

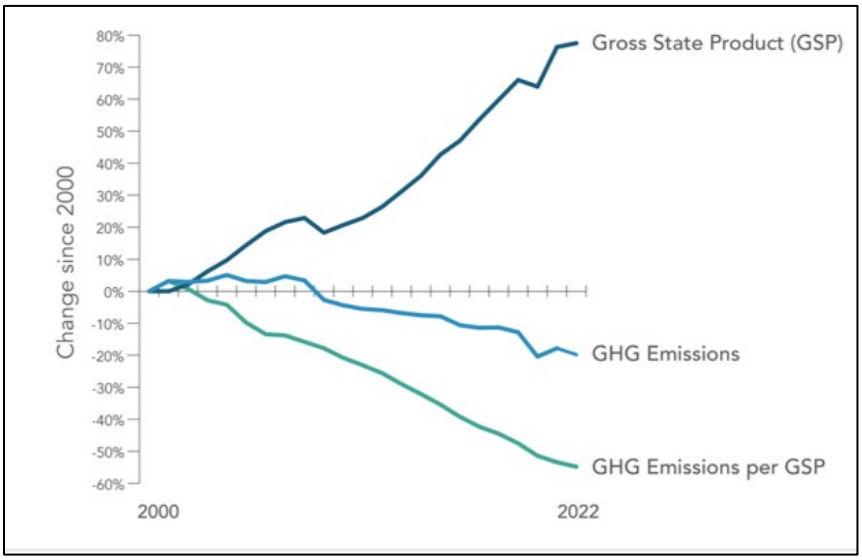
How it compares to other economies

4th: California – $4.30T

5th: Japan – $4.28T

6th: India – $4.13T

This is a shift from early in 2025, when some reports noted California slipping to 5th due to Japan's economic growth and a stronger yen. However, the most recent IMF and BEA data show California regaining the 4th position.



[7] Response to a Microsoft Bing query: Does California have the fourth or fifth largest economy in the world?

5.3. What is California doing to combat climate change?

5.3.1. Water Resiliency

In fiscal year 2024-2025, the State Water Board provided $2 billion to water systems in about 390 communities for projects that capture and recycle more water, clean up and recharge groundwater, expand access to safe drinking water and sanitation and improve stormwater management. When complete, these projects will benefit over 18 million Californians, or 46% of the state's population. Since 2019, the State Water Board distributed over $11 billion in financial assistance.

5.3.2. Transportation -- Zero-Emission Vehicle Package

This $10.1 billion ZEV package builds on Governor Newsom's first-in-the-nation action to shift the automotive industry entirely to all electric by 2035, utilizing California's market dominance to accelerate the transition to zero-emission vehicles across the world and dramatically reduce the state's reliance on fossil fuels. Electric vehicles have become one of the state's top exports, and California represents half of the United States' ZEV market. These actions are tackling the single largest culprit of pollution in California – the tailpipe.

5.3.3. Public Health

Compared to a 1975 passenger vehicle, today's cars are over 99 percent cleaner. Cleaner cars mean cleaner air. A 2017 Air Resources Board study shows that the cancer risk from exposure to the state's most significant air toxics declined 76 percent over a 23-year period in California, a direct result of regulations targeting unhealthful emissions from these air pollutants. Diesel particulate matter, which is emitted mainly from trucks and buses and is responsible for most of the airborne cancer risk in California, declined 68 percent, as a result of the State's regulatory efforts to clean up diesel exhaust.

5.3.4. Agriculture

Agriculture is California's most water-dependent industry. We have reduced on-farm water use by 14 percent from levels present in 1990, while increasing food production by 38 percent. Water use efficiency is in part on how farmers and ranchers are adapting. SWEEP has made grant awards to 1,111 projects covering 168,000 acres. $123.5 million has been awarded to date, with more than $70.5 million in matching funds. CDFA received $50 million in 2021. Of that, $10.8 million was awarded to Socially Disadvantaged Farmers and Ranchers, while $4.5 million was invested in projects that benefit Priority Populations.

5.3.5. Carbon-Free Electric Grid

In 2023, 67% of California's total electricity generation came from renewable and non-greenhouse gas sources such as solar, wind, hydropower, and nuclear power. 43% of the state's retail electricity sales were served by Renewable Portfolio Standard-eligible sources such as solar and wind. The Renewable Portfolio Standard requires that California's electricity comes from 60% carbon-free resources by 2030, 90% by 2035, 95% by 2040, and 100% by 2045. We are on track to meet these targets.

5.3.6. Forestry and Wildfire

In 2023, more than one million acres of treatments were conducted on about 700,000 acres, with many acres receiving multiple treatments such as thinning, prescribed fire and tree planting to improve forest health and community resilience. Prescribed fire treatments more than doubled between 2021 and 2023.