



Moody's Climate, Green Energy, and Sustainability Report

2025

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2025

Executive Summary

Sonoma County, CA

Climate & Sustainability

Sonoma County's green energy and climate-related industries are steadily expanding, with local employment accounting for approximately 1% more of the workforce than in 2010. This growth reflects Sonoma County's broader commitment to expand renewable energy generation, storage, efficiency, and environmental management. Despite current federal policies deprioritizing climate action—such as the withdrawal from the Paris Agreement and cuts to clean energy funding—the long-term outlook for the region remains optimistic.

California and Sonoma County's commitment to renewable energy, technological innovation, and local initiatives have positioned the region as a leader in sustainability. For instance, recent state legislation aims to streamline geothermal permitting, which will be key to furthering local renewable potential.

While macroeconomic uncertainty, policy volatility, and rising recession risks present headwinds for this industry, strong fundamentals—including surging electricity demand from data centers and AI applications—support continued growth. Moreover, Sonoma's natural resources, sustainable agriculture practices, and investments in workforce training further enhance its resilience and leadership potential in this field.

Looking ahead, advances in storage, such as next generation batteries and solar efficiency, carbon capture, and bioenergy offer promising tailwinds for the climate and green energy industry. Albeit, Sonoma, along with the rest of the United States, must remain vigilant as economic downturns, triggered at the national level, could threaten local public and private investment.

Nevertheless, Sonoma County remains uniquely poised to remain a national driver of clean energy innovation and climate consciousness that will strengthen its green economy for the long term.



Recent Performance. Sonoma County's green energy/climate/sustainability industries are growing in importance. While specific granular data at the NAICS level that would only include these industries are not available for Sonoma County, we can look at several broad categories that cover various industries within renewable energy generation, energy storage, energy efficiency and environmental management. These industries will include jobs beyond green energy/climate/sustainability but will include most jobs in the county related to green energy.

These industries have grown significantly over the last 15 years. The share of total employment in the county rose from around 1.6% in 2010 to about 2.5% in 2025.

Macro drivers. The U.S. economy was performing exceptionally well at the start of the year, but because of big, haphazard swings in economic policy, the economy is suddenly struggling. The mounting global trade war and haphazard Department of Government Efficiency cuts to government jobs and spending have created unprecedented uncertainty and are weighing on the collective psyche.

The most likely baseline outlook for the economy is that the Trump administration's policies will diminish the U.S. economy but not derail it. Moody's Analytics assumes that the president will pivot on his policies in time to avoid recession. That will happen when push comes to shove, and it becomes clear that without a change in policy course, stock prices will decline further, and the economy will suffer a downturn.

A helpful rule of thumb is that for every sustained percentage point increase in the U.S. effective tariff rate, consumer price inflation in the subsequent year will increase by 10 basis points, and real GDP will decline by almost 7 basis points. This reflects the pass-through of the tariffs to consumer prices, including the effects of currency movements,

the expected retaliation by other countries, the fallout on the stock market and other financial conditions, and the angst among consumers, businesses and investors created by heightened uncertainty and the actual economic consequences of the trade war.

Based on our assumptions and given these rules of thumb, we do not expect the trade war to result in a recession. But this is only because we expect the president to ease up on the tariffs later this year and to unwind all but those imposed on China by the summer of 2026. This will coincide with another already scheduled redo of the United States-Mexico-Canada Agreement, including further restrictions on Chinese trade with Canada and Mexico. We expect the trade war to be all but over by the midterm congressional elections.

Of course, trade policy is not the only economic policy that will weigh on economic growth.

There are the DOGE cuts to government jobs and spending. So far, the cuts have been small, but even if they eventually do not amount to much, the seeming chaos they create throughout the government is unnerving and risks important government functions ultimately failing.

There is also the more restrictive immigration policy, most significantly the stepped-up deportation of immigrants. This has not happened yet, but the administration appears to be gearing up for it, which could be a problem for industries that regularly struggle to find workers and rely on immigrants to fill in. The construction, agriculture, leisure and hospitality, manufacturing, and distribution industries are most at risk.

Fiscal policy, including tax and spending policies, is also set to change, but only modestly, given the budget constraints with minor macroeconomic consequences that will play out over a longer time period. The same holds for an anticipated easing in regulations.

Adding it all up, Trump's economic policies are expected to reduce real GDP by 0.8 percentage point in the year ending in the fourth quarter of 2025.

Industry drivers. A crosscurrent of headwinds and tailwinds will spell some uncertainty in the near term, but prospects are bright further out. The Trump administration has deprioritized renewable energy projects and has tried to withhold federal funding for climate and clean-energy projects. The administration is also limiting who can issue permits for renewable energy projects on public lands, which would slow permitting.

Shortly after his inauguration in January, Trump signed an executive order withdrawing the United States from the Paris Agreement for a second time, citing the need to prioritize American industries. Trump's policies instead focus on expanding fossil fuel projects and reducing regulations on greenhouse gas emissions.

This is a blow to global climate initiatives. Sweeping aid cuts in the U.S. jeopardize nearly 10% of global climate finance, risking the \$300 billion annual target set at COP29. Under former President Joe Biden, U.S. climate finance surged seven-fold, driven by USAID and multilateral funds such as the U.N.'s Green Climate Fund. Trump's cancellation of \$4 billion in GCF pledges, withdrawal from the Paris Agreement, and targeted dismantling of USAID risk erasing \$7 billion in annual contributions. On the local front, deregulation remains a roadblock but is underway, notably for geothermal energy. Governor Gavin Newsom signed legislation in October that allows counties to handle environmental reviews for geothermal exploration. This will help streamline the permitting process for the newly established Geothermal Opportunity Zone. Sonoma Clean Power aims to produce enough geothermal energy to serve more than 1 million homes. Still, the permitting process has been slowing recently,

and the unique nature of geothermal development requires an extensive exploration phase before construction can begin.

Underlying fundamentals for renewable energy are extremely strong. Electricity demand is surging, and new power generation is coming over-whelmingly from solar and battery plants. The Energy Information Administration has reported that wind, solar and battery plants will represent 93% of the new power capacity that is expected to come on line this year. Generative AI—which requires much more energy than a standard online search—advanced manufacturing and data centers will require a rapidly growing amount of energy to sustain the pace of growth expected in the next decade, providing a strong tail-wind for renewable energy.

Long-term outlook. Sonoma County's long-term economic outlook for green energy, climate and sustainability industries is favorable, driven by its proactive environmental policies, natural resources, and strong community commitment to sustain-

ability. The county's abundant sunshine and open spaces position it well for expanding solar energy projects, while its proximity to geothermal resources, including the Geysers—the largest geothermal field in the world—creates unique opportunities for sustainable energy production.

Furthermore, Sonoma's agriculture sector, particularly its wine industry, is increasingly adopting sustainable practices such as water-efficient irrigation, carbon sequestration in vineyards, and renewable energy installations, aligning with consumer preferences for eco-conscious products. Workforce development programs focused on training in renewable energy installation, sustainable agriculture, and climate-resilient infrastructure will be critical to ensuring growth. With its blend of environmental stewardship, innovative energy initiatives, and thriving local industries, Sonoma County is well positioned to become a leader in California's green economy, fostering economic resilience in the face of climate challenges.

Upside risks. Advances in energy storage technologies such as next-generation batteries or solar panel efficiency could dramatically lower costs and increase deployment. Similarly, innovations in carbon capture, hydrogen production or bioenergy could unlock new opportunities in the green economy.

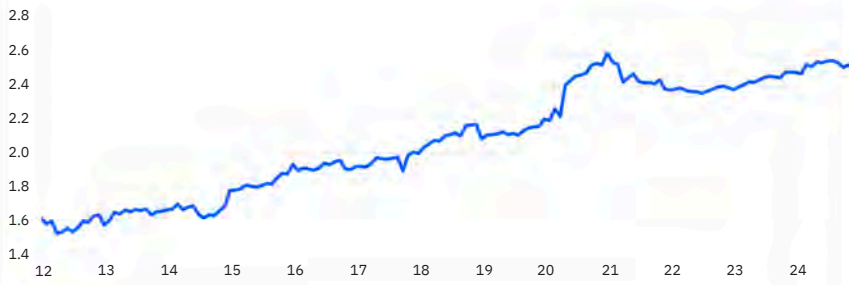
Downside risks. Recession odds are growing uncomfortably high, and this would deal a body blow to green energy, climate and sustainability industries. A recession would reduce both public and private investment. Governments facing budget constraints may scale back subsidies, tax credits or infrastructure spending for renewable energy projects and climate resilience efforts. Private companies and investors may deprioritize long-term sustainability initiatives in favor of short-term cost-cutting measures, slowing the innovation and deployment of technologies such as solar, wind and energy storage.

*Colin Seitz
March 2025*



Green Energy, Climate and Sustainability Employment Inches Higher

Employment in green energy, climate and sustainability-adjacent industries, Sonoma County, % share of total

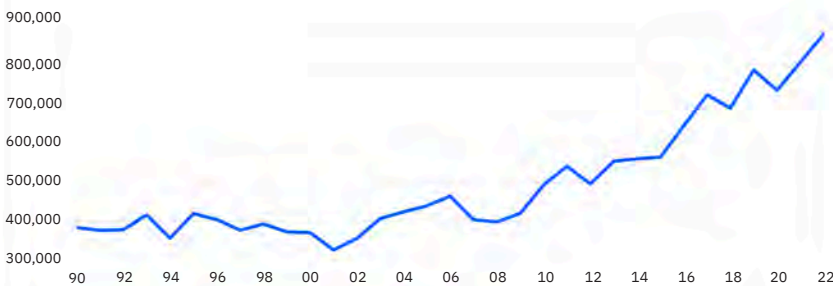


Sources: BLS, Moody's Analytics

While highly estimated, Sonoma's cluster of climate-adjacent industries is climbing higher. These industries contain jobs within renewable energy generation, energy storage, energy efficiency, and environmental management and have commanded a growing share of the local and global economy. Growing demand for clean energy and technological advancements will keep green technology industries humming, even as the U.S. administration's priorities shift away from climate change.

Renewable Energy Consumption Surges

Renewable energy consumption, California, BTU bil, NSA

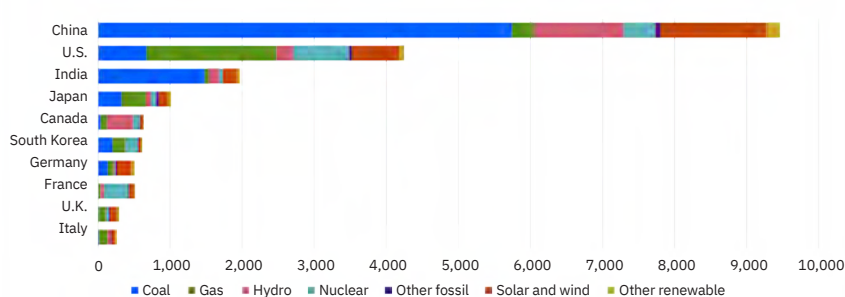


Sources: Energy Information Administration, Moody's Analytics

California's renewable energy consumption is surging due to falling costs, technological innovations, and the state's commitment to addressing climate change. Strong government policies such as clean energy mandates and incentives are accelerating the transition. With ambitious goals to reduce carbon emissions, California's outlook for renewable energy remains strong, positioning the state as a leader in clean energy adoption.

Electricity Mix Remains Fossil Fuel-Heavy in Top Global Economies

Electricity generation by source in top 10 global economies, TWh, 2023

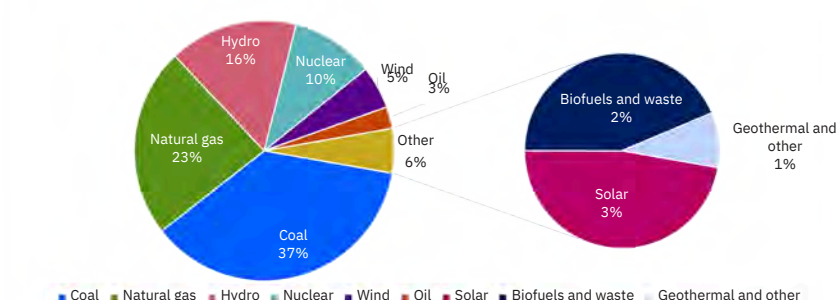


Sources: Ember, Moody's Analytics

The push for renewable energy is well underway, but global electricity generation remains extremely fossil fuel-heavy. In the U.S., recent growth is increasingly coming from alternative sources such as hydro, solar, wind and other renewable sources. Still, there is plenty of room to run, and growing electricity needs from advanced manufacturing and data centers will provide a runway for more electricity generation from renewable sources.

Global Energy Mix Dominated by Coal

World gross electricity production by source, 2019



Sources: IEA, Moody's Analytics

Global electricity production relies heavily on coal, which still accounts for a significant portion of energy generation. However, this dependence highlights the urgent need for cleaner alternatives, signaling a strong outlook for renewable energy. As nations strive to reduce emissions and meet climate goals, the transition to renewables is expected to accelerate, driving future growth in clean energy production.

About Moody's Analytics

In an increasingly interconnected and complex operating environment, organizations face challenges decoding the intricacies of the global economy. Moody's Analytics Economics team delivers timely and in-depth data, forecasts and analysis of the global economy's latest developments and trends—empowering organizations and policymakers to identify and manage risks, seize new growth opportunities, respond to geopolitical threats, and thrive in an ever-evolving landscape.

The Economics team has more than 35 years of dedicated experience in economic forecasting and research. Leveraging our team's global coverage and local expertise, our economists provide unrivalled insight on pivotal economic topics, including labor markets, housing and consumer spending, among others, across the Americas, Europe, the Middle East, and APAC. We also provide real-time monitoring of economic indicators, scenario analysis, and thought leadership on critical themes such as monetary and fiscal policy and sovereign risk—all of which support decision makers and policymakers in strategic planning, product and sales forecasting, stress testing, credit risk management, and investment decisions.

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