

California: An Energy And Economic Analysis

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California is rich in both conventional and renewable energy resources. It is the country's most populous state and has the second largest energy consumption in the nation, second only to Texas. California has large energy resources, but also one of the lowest per capita energy consumption rates in the country. The state is frequently hailed as a leader on energy policy and California's policies are leading to higher energy prices.

California's regulations have driven up energy prices, and the regulations will continue to push those prices up. For example, California motorists are required to use a special motor gasoline blend called California Clean Burning Gasoline, making California have one of the highest gasoline prices in the lower 48 states. California has also enacted regulations to increase the price of energy in an effort to reduce carbon dioxide emissions. These excessive regulations do not help California's jobs outlook, nor will it help the state balance its budget.

California Energy and Economic Facts

Real Gross Domestic Product per Capita	\$46,041	11th highest
Unemployment Rate	9.4%	3rd highest
Gasoline Price, per Gallon	\$3.934	4th highest
Electricity Price, per Kwh	13.75 cents	8th highest

Sources: Bureau of Economic Analysis, <http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=1>, Bureau of Labor Statistics, <http://www.bls.gov/web/laus/laumstrk.htm/>, AAA Fuel Gauge Report, <http://fuelgauge.report.aaa.com/> (May 8, 2013)
Energy Information Administration, Electric Power Monthly, February 2013, Table 5.6B, http://www.eia.gov/electricity/monthly/current_year/february2013.pdf

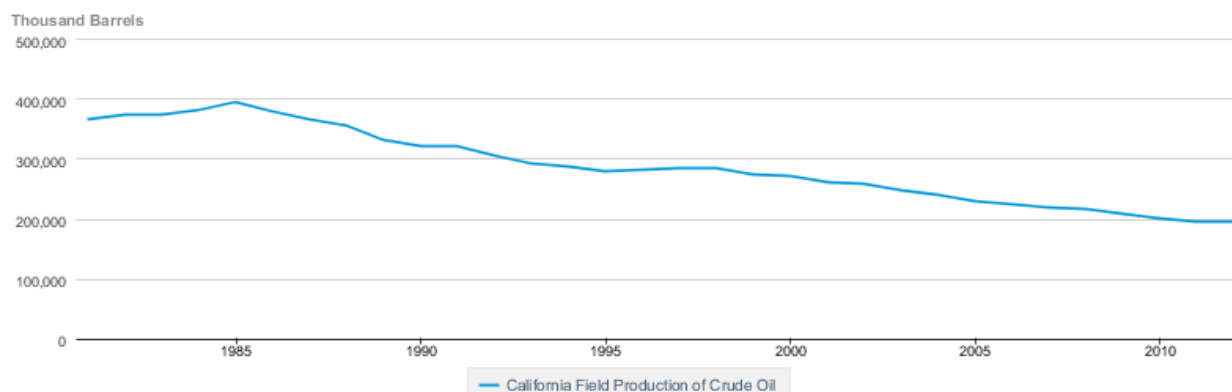


Petroleum

California is the fourth largest producer of crude oil in the nation, after Texas, North Dakota, and Alaska. In 2012, California produced more than 8 percent of total U.S. oil production. California has large crude oil and substantial natural gas deposits in six geological basins, located in the Central Valley and along the Pacific coast. Most of those reserves are concentrated in the southern San Joaquin Basin. Seventeen of the country's 100 largest oil fields are located in California, including the Belridge South oil field, the third largest oil field in the contiguous United States. In addition, Federal assessments indicate that large undiscovered deposits of recoverable oil and gas lie offshore in the federally administered Outer Continental Shelf (OCS), which in 2008 was

reopened by the Bush administration and Congress for potential oil and gas leasing, but which has not been included in the Obama Administration's 2012-2017 OCS Leasing Plan.

California Field Production of Crude Oil



 Source: U.S. Energy Information Administration

Source: [U.S. Energy Information Administration](#)

Drilling operations are concentrated primarily in Kern County and the Los Angeles basin, although substantial production also takes place offshore in both state and federal waters. California has a permanent moratorium on new offshore oil and gas leasing in its state waters due to issues regarding the perceived cumulative impacts of offshore oil and gas development and the possibility of marine oil spills. Development on existing State leases, however, is not affected and can still occur within offshore areas leased prior to the effective date of the moratorium.

While the moratorium on oil and gas leasing in federal waters expired in 2008, the Obama administration has not included areas off the California coast in its 5-year offshore lease plan. Further, on May 3, 2013, the Bureau of Land Management (BLM) issued a press [release](#), announcing the postponement of 4 parcels of public lands covering 1,278 acres that were to be offered for oil and gas lease sales in California on May 22, 2013. BLM has indicated that the lease sales would not occur in California during this fiscal year [allegedly due to the sequester](#) budget cuts, despite the fact that leasing increases revenue to the U.S. Treasury and that the cancellation is in violation with the [Mineral Leasing Act of 1920](#), which requires each state office to conduct four lease sales a year.^[i]

A network of crude oil pipelines connects production areas to refining centers in the Los Angeles area, the San Francisco Bay area, and the Central Valley. California refiners also process large volumes of Alaskan and foreign crude oil received at ports in Los Angeles, Long Beach, and the Bay Area. Crude oil production in California and Alaska is in decline due to state and federal lease policies. As a result, California refineries have become [increasingly dependent on foreign imports](#).

California ranks third in the United States in petroleum refining capacity and accounts for more than one-tenth of total U.S. capacity. California's largest refineries are highly sophisticated and are capable of processing a wide variety of crude oil types and are designed to yield a high percentage of light products like motor gasoline. To meet strict federal and state environmental regulations, California refineries are configured to produce cleaner fuels, including reformulated motor gasoline and low-sulfur diesel.

Most California motorists are required to use a special motor gasoline blend called California Clean Burning Gasoline. And, in the ozone non-attainment areas of Imperial County and the Los Angeles metropolitan area, motorists are required to use California Oxygenated Clean Burning Gasoline. While there are five ethanol production plants in central and southern California, most of California's ethanol supply is transported by rail from corn-based producers in the Midwest.

Because California requires specific and unique fuel blends and because California's petroleum market is relatively isolated, California motorists are vulnerable to short-term spikes in the price of gasoline. As a result, California refineries often operate at close to maximum capacity. When an unplanned refinery outage occurs, replacement supplies are brought in via marine tanker, which can take two to six weeks due to the state's strict fuel requirements.

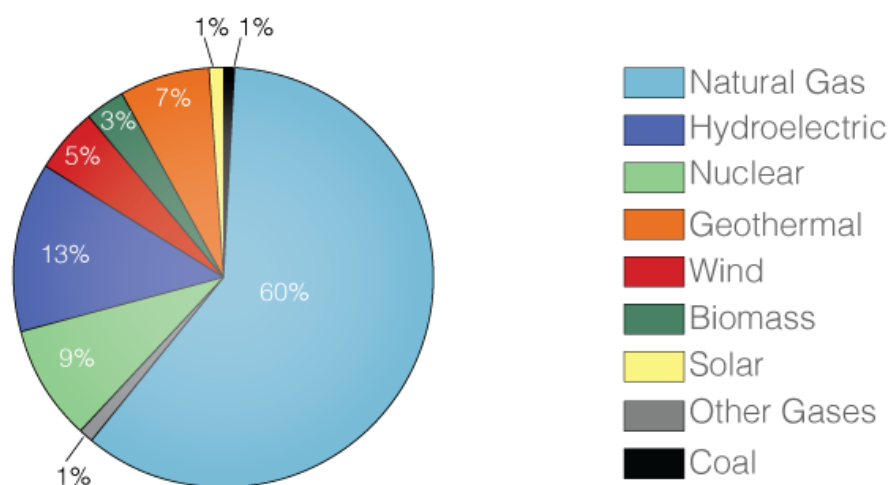
Natural Gas

California natural gas production accounts for about 1 percent of total U.S. production. Production takes place in basins located in northern and southern California, as well as offshore in the Pacific Ocean. As with crude oil production, California natural gas production is in decline. State supply has remained relatively stable due to supplies received by pipeline from the Rocky Mountains, the Southwest, and western Canada. California natural gas markets are served by two natural gas trading centers, the Golden Gate Center in northern California and the California Energy Hub in southern California. Natural gas storage facilities within the state help to stabilize natural gas supplies from potential vulnerabilities.

Electricity

Natural gas-fired power plants generate over one-half of the state's total electricity generation. California is the third largest hydroelectric power producer in the United States behind its northern neighbors, Washington state and Oregon. In 2012, hydroelectric power generated 13 percent of California's electricity. Nuclear power plants generated 9 percent of the state's total generation in 2012. As of mid-2012, California had just one of its two nuclear plants operating. Its [2,160-megawatt](#) Diablo Canyon nuclear plant near San Luis Obispo is still operating. Its 2,150-megawatt San Onofre nuclear plant between Los Angeles and San Diego went off-line in January 2012 and was ordered by the Nuclear Regulatory Commission to stay off line while tubing wear issues are investigated. Due to strict emission laws, only a few small coal-fired power plants operate in California, generating less than one percent of the state's electricity. A California law also forbids utilities from entering into long-term contracts with conventional coal-fired power producers.

California Generation Shares, 2012 (Percent)



Source: [U.S. Energy Information Administration](#)

Renewable Energy

California ranks second in the nation, behind Texas, in electricity generation from non-hydroelectric renewable energy sources. The state generates electricity using wind, geothermal, solar, fuel wood, and municipal solid waste/landfill gas resources. Substantial geothermal and wind power resources are found along the coastal mountain ranges and the eastern border with Nevada. High solar energy potential is found in southeastern California's deserts.

California is the top producer of electricity from geothermal energy in the nation, generating 7 percent of its electricity in 2012. A facility known as "The Geysers," located in the Mayacamas Mountains north of San Francisco, is the largest complex of geothermal power plants in the world, with more than 700 megawatts of installed capacity, and has been operating for decades.

California is the nation's third largest generator of wind energy, behind Texas and Iowa, generating 5 percent of the state's electricity.

The world's largest solar power facility operates in California's Mojave Desert and a number of new solar power plants are under construction. The Bureau of Land Management is giving priority status to [5 solar project proposals](#) in California that will be constructed on federal lands. To further boost renewable energy use, California's Energy Action Plan includes incentives that encourage Californians to install solar power systems on their rooftops. The state leads the nation in the total number of homes that have solar panels installed and leads the nation in electricity

generated from solar power, generating [one-third](#) of the solar-powered central station electricity in the United States in 2012.

Some Examples of California Electricity Initiatives Gone Awry

In 2000 and 2001, when California initially deregulated its electricity generation business, it suffered an energy crisis characterized by electricity price instability and four major blackouts that were caused by a supply and demand imbalance. Multiple factors contributed to this imbalance, including: a heavy dependence on out-of-State electricity providers, drought conditions in the northwest that reduced hydroelectric power generation, a rupture on a major natural gas pipeline supplying California power plants, strong economic growth leading to increased electricity demand in western States, an increase in unplanned power plant outages, and unusually high temperatures that increased electricity demand for air-conditioning and other cooling uses. Following the energy crisis, the California State government re-regulated the industry and created an Energy Action Plan designed to eliminate outages and excessive price spikes. The plan calls for optimizing energy conservation, building sufficient new generation facilities, upgrading and expanding the electricity transmission and distribution infrastructure, and ensuring that generation facilities can quickly come online when needed.

In 2006, California amended its renewable portfolio standard to require investor-owned utilities, electric service providers, small and multi-jurisdictional utilities, and community choice aggregators to provide at least 20 percent of retail sales from renewable sources by the end of 2010 and 33 percent by the end of 2020. California has also adopted other policies to promote energy efficiency and renewable energy, including energy standards for public buildings, power source disclosure requirements for utilities, and net metering.

California's renewable portfolio standard of 33 percent by 2020 is making its Independent System Operator of its electricity grid worried regarding reliability and dependability of its future electricity generating sources. Some examples will demonstrate the reason. Early in the summer of 2006 as well as on later occasions, California faced record heat conditions that strained its ability to meet a peak demand of 50,000 megawatts. The resources at that time included 2,323 megawatts of wind capacity. However, wind's average on-peak contribution over the month of June was only 256 megawatts or barely 10 percent of the nominal amount.[\[ii\]](#) This example shows that data on installed wind capacity is of little or no value in predicting the actual power the system can get from it at peak times.

Another example occurred in August, 2012, when the California Independent System Operator issued a "flex alert" that called for a reduction in use of lights, air conditioning, and appliances, i.e. the call was for electrical conservation in order to avoid black-outs. At that time, California had 4,297 megawatts of installed wind capacity, but less than 100 megawatts were operating at 11 am on August 9, 2012, or just [0.02 percent](#) of electricity demand. While solar was contributing more at 11 am than wind, by 5 pm when demand was at its highest, solar's electrical generation output waned and wind's output was increasing but not enough to meet demand. Wind's more sizable generation levels do not occur until the late night or very early morning hours when they are least needed. The California Independent System Operator has on many occasions expressed concerns about its ability to maintain reliability in the face of a 33 percent renewable portfolio standard for 2020 that will require a tripling of wind and solar power production.[\[iii\]](#)

California State Regulatory Environment

Although affordable energy is a vital component of a healthy economy, regulations frequently increase energy costs. Regulations imposed in the name of reducing carbon dioxide and greenhouse gas emissions are especially costly. Carbon dioxide is a natural byproduct of the combustion of all carbon-containing fuels, such as natural gas, petroleum, coal, wood, and other organic materials. Today, there is no cost-effective way to capture the carbon dioxide output of the combustion of these fuels, so any regulations that limit carbon dioxide emissions will either limit the use of natural gas, petroleum, and coal, or dramatically increase their prices.

Below is a summary of California's regulatory environment:

- **California has a cap on** greenhouse gas emissions that was enacted in September 2006 by the California State Legislature. [The Global Warming Solutions Act, A.B. 32](#), caps greenhouse gas emissions at 1990 levels by 2020. It was the first state program to impose a cap on greenhouse gas emissions and include enforceable penalties.[\[iv\]](#)
- **California is a member** of the Western Climate Initiative (WCI), a regional agreement among some American governors and Canadian premiers to target greenhouse gas reductions. The central component of this agreement is the eventual enactment of a cap-and-trade scheme to reduce greenhouse gas emissions 15 percent below 2005 levels by 2020. Arizona, Montana, New Mexico, Oregon, Utah and Washington have all left the WCI, *leaving California as the only state remaining*.
- **California has a de facto ban** on new coal-fired power plants. An interim greenhouse performance standard requires that all new baseload generation produce no more greenhouse gases than a combined-cycle gas turbine power plant.[\[v\]](#)
- **California requires** utilities to sell a certain percentage of electricity from renewable sources. The state's renewable portfolio standard (RPS) requires utilities to provide 33 percent of their retail electricity sales from renewables by 2020.[\[vi\]](#) The electricity must either be produced in-state or produced out-of-state and delivered into the state by qualified renewable generating sources. For most technologies the renewable facility had to have been constructed after September 26, 1996 to be counted towards the RPS.
- **California imposes** a feed-in tariff for renewable energy, requiring investor-owned utilities to purchase renewable energy at an increased price. Utilities must buy all renewable generation under 3 megawatts within their service territories, until they hit a statewide total cap of 750 megawatts. Large public utilities must also set up programs to buy all renewable generation under 3 megawatts. By increasing the cost of renewable energy, this law increases electricity prices for consumers and businesses.
- **Most Californians are required** to use a special blend of gasoline called California Clean Burning Gasoline.[\[vii\]](#) In Imperial County, and the Los Angeles metropolitan area, motorists are required to use California Oxygenated Clean Burning Gasoline. Also, **California imposes** a low carbon fuel standard (LCFS) that was issued by former Governor Arnold Schwarzenegger, Executive Order S-01-07, requiring a 10 percent reduction in the carbon intensity of all transportation fuels.[\[viii\]](#)
- **California imposes** automobile fuel economy standards, which are regulations on greenhouse gas emissions from new vehicles. Assembly Bill 1493, passed in 2002, allows the California Air Resources Board to develop regulations to reduce greenhouse gas emissions from passenger vehicles if the state received a waiver from U.S. Environmental Protection Agency (EPA). The Obama administration awarded the waiver to California.[\[ix\]](#)
- **California's Air Resources Board** has mandated that **zero emission vehicles** (cars with zero emissions of tailpipe pollutants) comprise [15 percent of new-car sales by 2025](#).

Those vehicles comprise less than 1 percent of new car sales today.^[x] Tesla, an electric car manufacturer, for example, has reaped large benefits from California's push for electric vehicles. Tesla can make as much as \$35,000 extra on each sale of its luxury Model S electric sports sedans (\$250 million this year) through state environmental credits that it can sell to other auto manufacturers that need to buy credits to satisfy California regulations. Adding in Federal tax credits and state rebates, the total comes to as much as \$45,000 per car, selling for over \$100,000 each.

- **California requires** new residential and commercial buildings to meet energy efficiency standards. The state's specific code, from Title 24, Part 6, exceeds the requirements of the 2009 International Energy Conservation Code (IECC) and is mandatory statewide.^[xi] The IECC, developed by the International Code Council, is a model code that mandates certain energy efficiency standards. Buildings must also meet requirements set by CALGreen, the statewide green building code. CALGreen includes provisions to ensure the reduction of water use by 20 percent, improve indoor air quality, divert 50 percent of new construction waste from landfills, and inspect energy systems (i.e. heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to make sure that they're working according to design.^[xii] The 2008 Standards took effect January 1, 2010. The [2013 Standards](#) are scheduled to take effect January 1, 2014.^[xiii] [Assembly Bill 1103](#), passed in 2007, also requires all non-residential buildings to report their annual energy use.^[xiv] Beginning in 2010, commercial building owners must disclose annual energy use and Energy Star ratings to potential buyers, lessees, and financiers. In 2005, former Governor Arnold Schwarzenegger issued Executive Order S-20-04, requiring a 20 percent reduction from 2003 levels in grid-based energy use in state buildings by 2015.^[xv] New and renovated state buildings must also meet the silver LEED standard. The silver LEED standard is one level of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. A wide variety of independent state agencies must also seek new energy efficiency standards. Lastly, Assembly Bill 532, passed in 2007, requires solar energy equipment to be installed by 2009 on any public building or facility where such an installation is cost-effective.
- **California imposes** state-based appliance efficiency standards. The state's Appliance Efficiency Regulations include mandates for consumer audio and video products, metal halide lamp fixtures, pool pumps, general service incandescent lamps, water dispensers, walk-in refrigerators and freezers, hot tubs, commercial hot food holding cabinets, under cabinet fluorescent lamps, and vending machines.^[xvi] Additionally, Assembly Bill 1109, passed in 2007, requires the California Energy Commission to impose minimum efficiency standards for all general purpose lights.^[xvii]
- **California allows** utilities to "decouple" revenue from the sale of electricity and natural gas. By allowing utilities to decouple, California has enabled its utilities to increase their revenue by selling less electricity and natural gas.

Conclusion

California often takes credit for being a leader among the states in setting policy and serving as an example, but the question is where is California leading? California is rich in conventional and renewable energy resources, but instead of using these conventional energy resources, the state puts obstacles in the way of conventional energy, which is leading to much higher energy prices for Californians. California has one of the [highest gasoline prices in the continental United States](#) despite being a large oil producer and despite being home to large oil deposits. California has the [highest residential electricity](#) rates in the western United States—33 percent higher than Nevada's, 44 percent higher than Arizona's, and 58 percent higher than Oregon's. These higher prices are the direct outcome of California's burdensome regulation on the use and production of energy, and that regulation costs the state and its residents, jobs, investment and revenue. Its

policies are making the state poorer, in much the same way similar policies in Europe have contributed to economic stagnation there.

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- [xv] Cal. Exec. Order No. S-20-04 (July 24, 2004)
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- [xvii] A.B. 1109 (Cal. 2009)