

# CALIFORNIA ENERGY

COMPARING PRODUCTION, CONSUMPTION & SPENDING  
IN ALL 50 STATES



April 2016

## Overview

California has the largest population and largest economy in the United States. As a result, one would expect California to lead the country in energy spending and energy consumption.

- In fact, though California leads the United States in total energy consumption, it's spending is far surpassed by Texas, and its per capita consumption and expenditures are among the lowest in the country. In other words, the state's energy use is high but also efficient.
- The state's low per capita consumption is partially attributable to energy prices that are higher than the national average—the higher the cost of energy, the lower the demand. **However, even as California's total consumption remains high, the state produces more renewable energy than any other state except Washington.**

Looking forward, California's renewable energy policy mandates and incentives will help encourage even more renewable energy production down the road. While in recent years growth in renewable energy has slowed relative to many other states, the state nonetheless remains a key contributor to renewable energy use in the United States.

At the same time, California is one of the largest producers of fossil fuels in the country, bolstered by the emergence of hydraulic fracturing ("fracking"). Although fracking has not transformed the economy of California as it has in states like North Dakota or Pennsylvania, it appears to have slowed a long trend of declining crude oil production in the state. Falling oil prices may not have a substantial impact on California's oil production in the short term, but if the low prices persist, they may come to have a significant impact on production over the long term. The state must also be cautious of the effect of falling oil and natural gas prices on other states, where oil and gas extraction represents a much larger share of the state's overall economy. Struggling economies in those states could weaken the U.S. economy overall and, in turn, dampen economic growth in California.

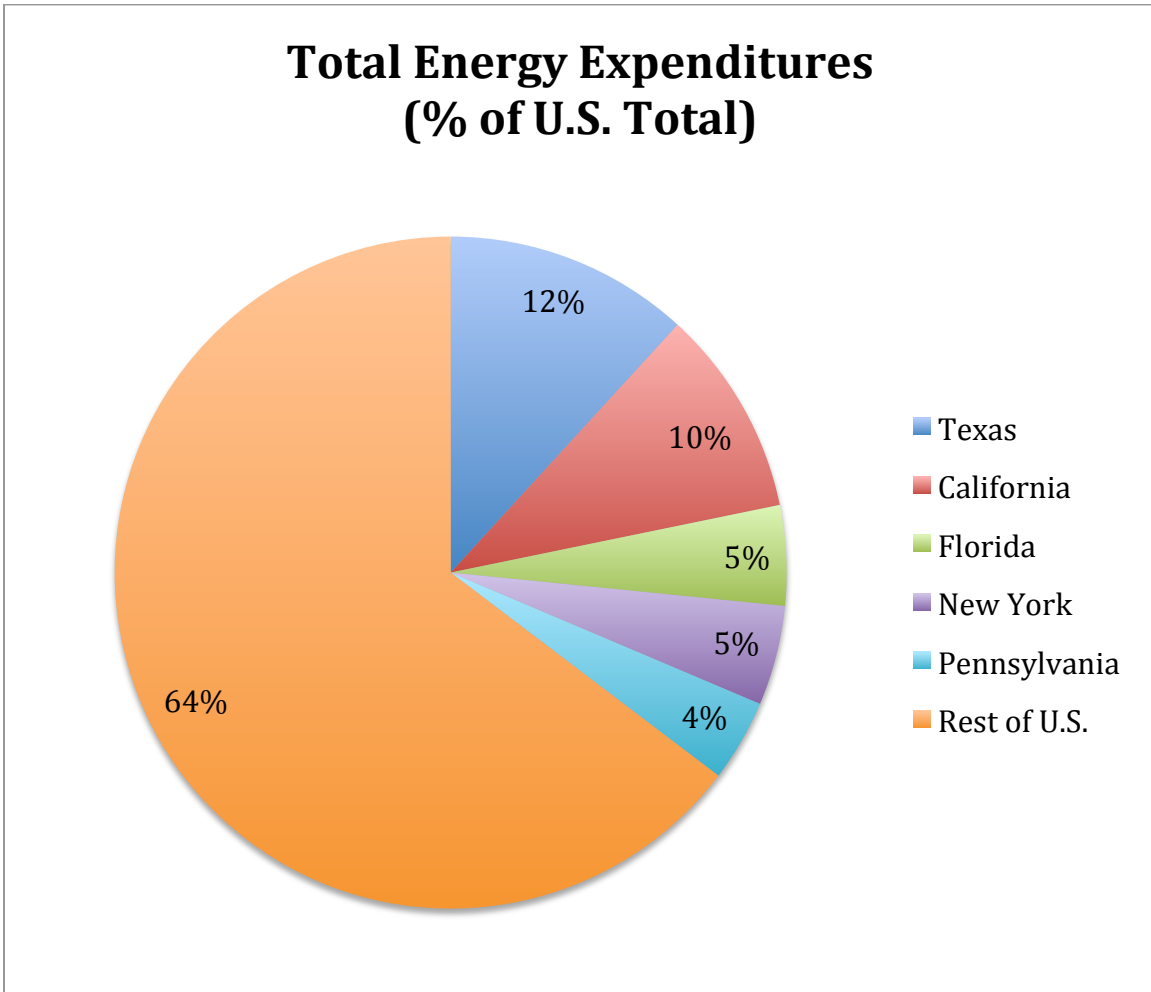
## California's Energy Expenditures are Topped Only by Texas

California leads all U.S. states in population by 10 million residents, and it also has the largest gross domestic product (GDP) in the country, so it would be expected that California's total energy expenditures would be the highest in the nation. Indeed, according to the U.S. Energy Information Administration (EIA) for 2013,<sup>1</sup> California

---

<sup>1</sup> 2013 is the most recent year of available data.

stands near the top in total energy expenditures, at \$136.9 billion (10.0% of all U.S. energy expenditures). However, its expenditures are well below those of Texas, at \$162.1 billion (11.8% of the U.S. total). The states that spend the most on energy are the states with the largest populations and largest state economies, with Florida (\$66.2 billion), New York (\$66.0 billion), and Pennsylvania (\$54.1 billion) rounding out the top five states.



Total population plays an important role in residential energy spending. California’s residential energy expenditures are higher than in any other state, at \$20.4 billion (8.1% of the U.S. total). Texas (\$18.7 billion), New York (\$18.6 billion), Florida (\$13.4 billion), and Pennsylvania (\$12.6 billion) round out the top five states. Weather plays an important role in residential (and other types) of energy spending. California is by far the largest state by population, with Texas in a distant second, but while California and Texas residents face extremely hot summers in some areas, winters in California and Texas are milder than in New York or Pennsylvania, where residents face both hot summers and cold winters. In California and Texas, cooling costs lead to high energy expenditures, but in both New York and Pennsylvania, heating costs play a large role.

California also leads the country in commercial energy expenditures at \$20.4 billion (11.4% of the U.S. total). New York (\$16.0 billion), Texas (\$12.9 billion), Florida (\$9.9 billion), and New Jersey (\$6.9 billion) round out the top five. Economic activity drives commercial energy expenditures. California, New York, Texas, and Florida have the four highest GDPs of all states, while New Jersey has the eighth highest GDP. GDP in California is significantly higher than in any other state, at 13.4% of U.S. GDP. Texas ranks second at 9.3% of U.S. GDP. Robust business activity helps generate high commercial energy use.

Business activity also helps to generate high industrial energy use. Oil and gas extraction and refining play an important role, as well. Texas leads the country by a wide margin in industrial energy expenditures at \$57.5 billion (24.6% of the U.S. total). Louisiana, another major oil-producing state, ranks second at \$18.5 billion. California, a significant oil producer and home of several large oil refineries, ranks third at \$14.1 billion. However, industrial energy spending is a much smaller component of overall energy expenditures in California than in Texas or Louisiana. Industrial energy expenditures in California represent just 10.3% of the state's total energy expenditures, compared to 35.5% in Texas and 46.8% in Louisiana. Pennsylvania, the nation's hub for natural gas production, has the fourth highest total industrial energy expenditures at \$9.9 billion. Ohio, which, like Pennsylvania, serves as one of the country's manufacturing hubs, ranks fifth at \$8.5 billion. A mix of a large energy sector and heavy manufacturing combined with factors such as high economic activity drive state industrial energy expenditures.

California, a major commuter state, has the highest transportation energy expenditures in the country, at \$82.0 billion (11.5% of the U.S. total). Texas is the only other state close to having as much transportation energy expenditures as California at \$73.0 billion. Florida (\$38.7 billion), New York (\$27.9 billion), and Ohio (\$25.9 billion) all have much lower total transportation energy expenditures. These states are characterized as having very large economies with economic centers that are dispersed across large geographical areas. Each of these states boasts at least one major port, which fuels the states' transportation and logistics industries, which in turn drive statewide expenditures on gasoline, diesel, and jet fuel. California is home to the two largest ports in the country in the Port of Los Angeles and the Port of Long Beach. Trade activity is a key component of the state's transportation energy expenditures and, in turn, its total energy expenditures.

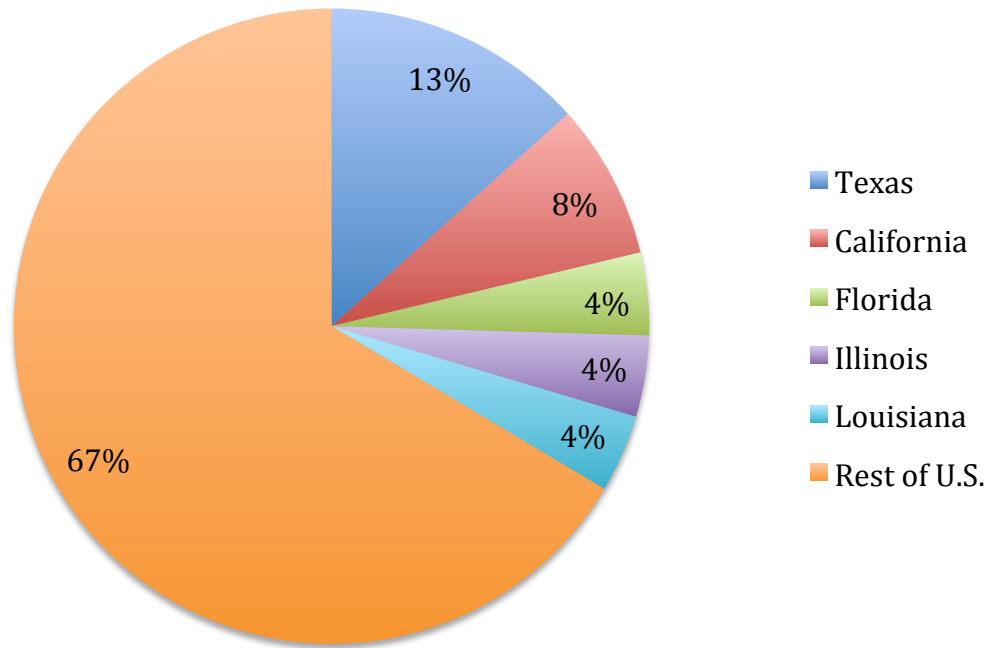
California's total energy expenditures are the second highest in the country, with categories like transportation energy expenditures leading the nation. However, on a per capita basis, the state is among the country's most efficient energy users. In 2014, California had the fourth lowest annual per capita energy expenditures among all states, at roughly \$3,563. New York led the nation in efficiency (\$3,350), with Florida (\$3,375), Arizona (\$3,434), and Nevada (\$3,646) not far behind.

High-population states such as California, New York, and Florida with high commercial and residential energy expenditures used energy much more conservatively than low-population states such as North Dakota (with the country's highest per capita expenditures at \$10,539) and Wyoming (with the country's third-highest per capita expenditures at \$9,358). States with substantial natural resource production and industrial development also tend to have higher per capita expenditures, such as Alaska (with the second-highest per capita expenditures in the country at \$9,596 per capita), Louisiana (with the fourth-highest per capita expenditures at \$8,545) and Texas (with the fifth-highest per capita expenditures at \$6,114). California's total energy spending may appear substantial in the aggregate, but much of that is due to its population and commercial density rather than inefficient usage.

## **California Shows High Total Energy Consumption but Low Per Capita Consumption**

Texas not only spends the most on energy in total dollars, it consumes the most energy, at 13.3% of total U.S. consumption. California energy consumption represents 7.9% of the U.S. total, with Florida (4.2%), Illinois (4.1%), and Louisiana (3.9%) rounding out the top five states. The highest energy users tend to be the largest states, but some states clearly bear higher energy costs than others. Compare California to Texas. Texas' total energy consumption is 68.4% higher than that of California, yet its total energy expenditures are only 18.3% higher than those of California.

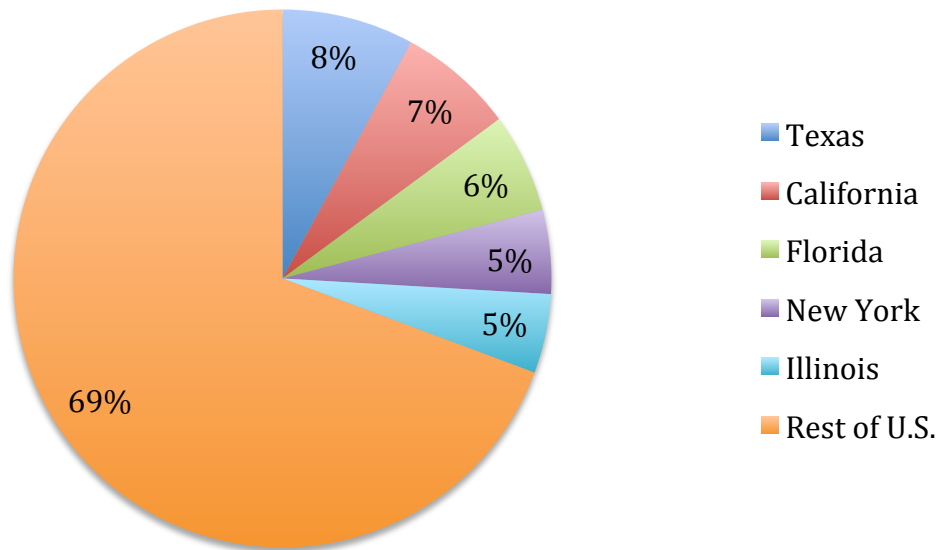
## Total Energy Consumption (% of U.S. Total)



Indeed, the relatively low cost of energy in Texas and Louisiana help to drive energy consumption up in those states. In 2013, the average cost of energy nationwide was 21.4 cents/kWh. By comparison, the average cost of energy was much lower in Texas at 18.9 cents/kWh and Louisiana at 15.9 cents/kWh. The cost of energy was substantially higher than the national average in California, at 24.8 cents/kWh. Relatively high energy costs help encourage California residents and businesses to use energy more efficiently.

Texas leads the country in residential energy consumption, at 8.0% of the U.S. total. California ranks second at 7.0%, while Florida (5.5%), New York (5.1%), and Illinois (4.8%) round out the top five states. These are the five largest states by population. Population size, impacted to some degree by energy costs and climate, drives state residential energy consumption.

## Residential Energy Consumption (% of U.S. Total)



Those factors and a state's overall economic activity drive its commercial energy consumption. Texas leads the country in commercial energy consumption at 9.0% of the U.S. total. California is second at 8.3%, while New York (6.3%), Florida (5.4%), and Illinois (4.5%) round out the top five. These are the states with the five highest GDPs in the United States. Other states with high commercial energy consumption, such as Ohio, Pennsylvania, and New Jersey, also have some of the country's highest GDPs.

States with large populations and energy sectors generate a high amount of industrial energy usage. Texas leads the nation in industrial energy usage with 21.0% of the U.S. total, while Louisiana is ranked second at 8.2%. California ranks third at 5.8%. Oil production and refineries are an important component of each of these states' industrial energy usage. Indiana and Pennsylvania, two states with large manufacturing bases and major energy producers in their own right, round out the top five states, each generating 4.2% of the U.S. total.

Although California has the highest transportation energy expenditures of any state, it is not the largest transportation energy consumer. Texas leads the nation at 11.5% of the U.S. total. California's transportation energy consumption represents 10.9% of the U.S. total. U.S. trade and logistics hubs Florida (5.5%), New York (3.9%), and Illinois (3.6%) round out the top five states. High costs of fuel increase total transportation energy expenditures in California, while Texas offers relatively cheap fuel prices. At the same

time, as efficiently as Californians use transportation energy (the state has the 17th lowest per capita transportation energy consumption), lower prices could drive consumption up even further.

California has earned its reputation for energy conservation, as the state has the fourth-lowest per capita energy consumption at just 200 million Btu (British thermal units), behind only Rhode Island and New York (each at 184 million Btu) and Hawaii (197 million Btu). California's per capita residential energy consumption (39 million Btu) is second lowest in the country behind Hawaii (25 million Btu). New York's per capita residential energy consumption, third-lowest in the nation, is significantly higher at 54 million Btu. California's per capita commercial energy consumption ranks second-lowest in the country at 39 million Btu, behind only Hawaii (28 million Btu).

It is California's per capita transportation and industrial energy consumption that lags somewhat behind. California has the 17th-lowest transportation energy consumption per capita, at 76 million Btu, which is impressive considering how much higher its transportation energy expenditures are than any other state, but California is well behind the nation's leaders, such as New York, which has the lowest per capita consumption at 53 million Btu.

California has the 12th-lowest per capita industrial energy consumption, at 47 million Btu, but the state trails New York (19 million Btu), which has the lowest per capita consumption, and Florida (24 million Btu), which has the fifth-lowest per capita consumption. However, California is well ahead of other major oil- and natural gas-producing states in this category. Pennsylvania (103 million Btu) has the 28th-lowest per capita consumption, while Texas has the fifth-highest per capita consumption (248 million Btu). Louisiana leads the nation in per capita consumption at 553 million Btu.

## **California Remains a Leader in Renewable Energy Production, but Growth is Tepid**

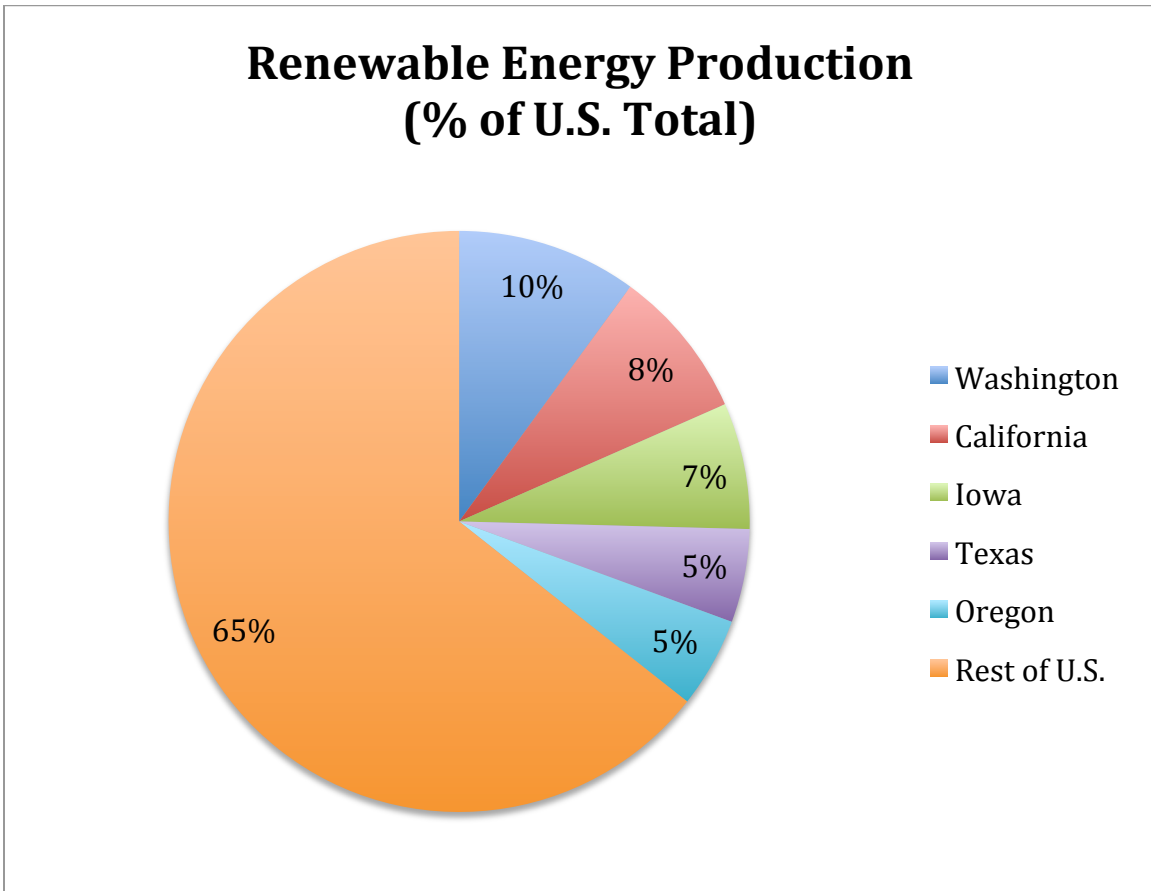
As of 2013, California is the second-highest renewable energy-producing<sup>2</sup> state, with 8.3% of total U.S. renewable energy production. California trails only Washington at 10.0% of the U.S. total. Washington, however, gains much of its renewable energy through large hydroelectric power generation. California generates the most renewable energy in the country from all other sources, such as solar and wind power. Iowa (7.4%), Texas (5.2%), and Oregon (5.0%) round out the top five states. Although California has a large and growing renewable energy production sector, the state does not have the strongest growth in production in recent years. In fact, from 2008 to 2013, renewable

---

<sup>2</sup> Renewable energy includes hydroelectric power, geothermal, solar, wind, wood biomass, ethanol, biodiesel, and waste biomass.



energy production increased at only the 29th-fastest rate (25.4%) among U.S. states. From 2003 to 2013, California’s renewable energy production increased at the 9th-lowest rate (6.0%).



Leaders in renewable energy production growth from 2003 to 2013 include Kansas (505.8%), Colorado (441.6%), Iowa (403.2%), North Dakota (373.9%), and Wyoming (338.2%). In 2003, each of these states had a very small renewable energy production industry. Growth can take place much faster when the starting point is smaller. Indeed, in 2013, California’s total renewable energy production was over six times greater than that of Colorado and North Dakota and nearly five times greater than that of Kansas. Remarkably, Iowa has transformed into one of the country’s leading producers of renewable energy within the past ten years. In 2003, California’s total renewable energy production was 536.4% higher than that of Iowa. In 2013, California’s production was just 13.0% higher than that of Iowa. Iowa has an abundant supply of vegetables and livestock from which to produce biodiesel.

Renewable energy production is growing in most states but not all. States showing negative renewable energy production growth from 2003 to 2013 include Rhode Island (-30.8%), Louisiana (-19.9%), Connecticut (-8.4%), and Alaska (-3.9%). A few of the states above have shown a turnaround in growth in renewable energy production in recent

years. From 2008 to 2013, growth was positive in Louisiana (8.8%), Connecticut (8.2%), and Alaska (44.2%). However, production in Rhode Island fell by 10.6% in that time.

Renewable energy production in some of these states and in California, where growth is relatively small, appears likely to increase in the near future. According to MoneyTree, U.S. industrial energy venture capital funding, which is primarily composed of renewable energy funding, decreased from \$3.4 billion in 2011 to \$2.7 billion in 2012 to \$1.4 billion in 2013 before rebounding to \$1.9 billion in 2014. **In the first quarter of 2015, funding had already reached \$1.3 billion.**

### California Leads the Nation as a Solar Energy Producer

California stands at the forefront of solar energy production in the United States. According to data from Go Solar California, the state leads the nation in total solar projects at nearly 490,000, with the most megawatts installed at 3,868 MW. The state's total amount of energy production from solar is expanded at a rate of higher than 50% each year from 2012 to 2014. Indeed, according to the California Energy Commission, from 2009 to 2014, California's solar photovoltaic and solar thermal energy production increased over 15-fold—from only 419.3 MW in 2009 to 6,915.2 MW in 2014. In that time, net solar energy production increased from 851,000 MWh to 12.6 million MWh—an over 13-fold increase. California's renewable energy mandates ensure that solar energy production continues to grow in the future.

The State of California has committed to encouraging renewable energy production in the form of policy mandates for producers and incentives for consumers. The state's renewable portfolio standard, as established by SB350 in late 2015, requires half of the state's electricity to come from renewable sources by 2030. In addition, SB350 requires the energy efficiency in homes, offices, and factories be doubled.<sup>3</sup> California homebuilders can receive a tax rebate under the state's New Homes Solar Partnership for installing solar energy panels on homes, while the California Solar Initiative provides rebates for solar installations on residential, commercial, government, industrial, nonprofit, or agricultural buildings.<sup>4</sup> These policies will help California to continue to grow as a renewable energy producer in the years ahead.

---

<sup>3</sup> Megerian, Chris and Javier Panzar, "Gov. Brown Signs Climate Change Bill to Spur Renewable Energy, Efficiency Standards." *The Los Angeles Times*. Oct. 7, 2015.

<sup>4</sup> *California Energy Commission*, "California Renewable Energy Overview and Programs."

## Report Data Points “Top 5”

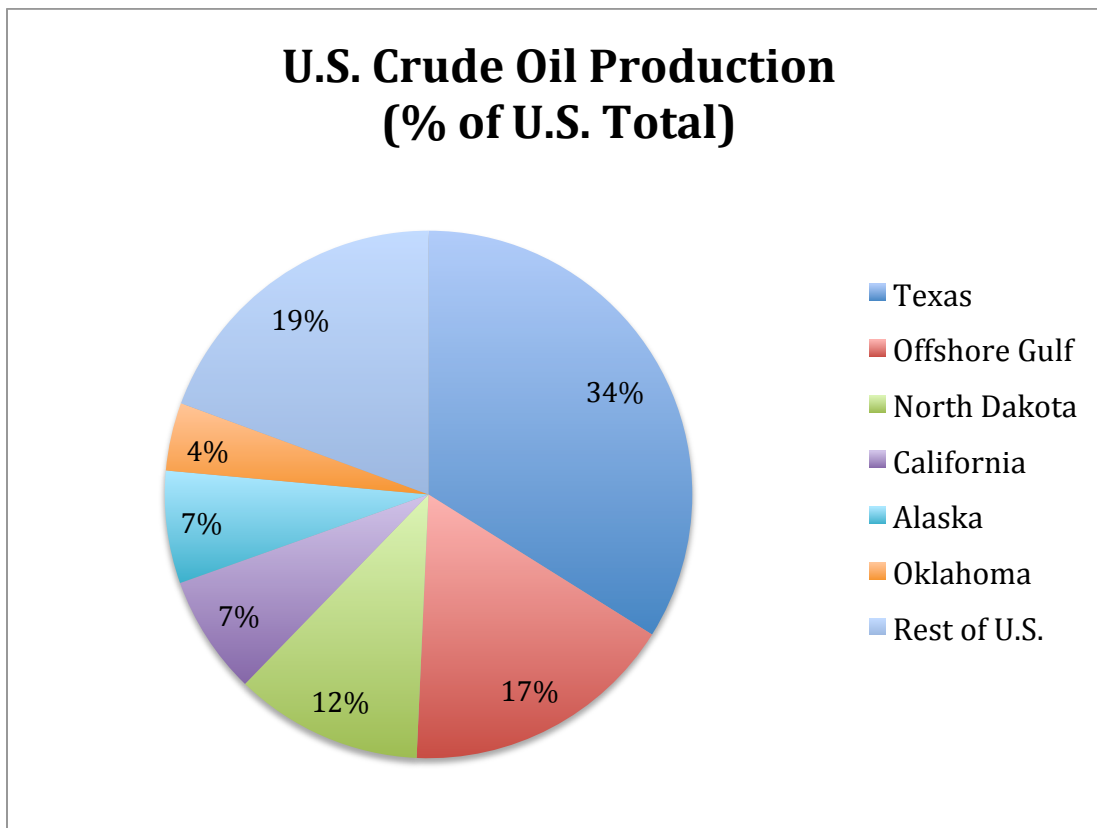
Total population	<ol style="list-style-type: none"> <li>1) California 39.1 million</li> <li>2) Texas 27.5 million</li> <li>3) Florida 20.3 million</li> <li>4) New York 19.8 million</li> <li>5) Illinois 12.9 million</li> </ol>
State real GDP (2009 chained dollars)	<ol style="list-style-type: none"> <li>1) California \$2.1 trillion</li> <li>2) Texas \$1.5 trillion</li> <li>3) New York \$1.3 trillion</li> <li>4) Florida \$769.2 billion</li> <li>5) Illinois \$669.4 billion</li> </ol>
Total energy expenditures	<ol style="list-style-type: none"> <li>1) Texas \$162.1 billion</li> <li>2) California \$136.9 billion</li> <li>3) Florida \$66.2 billion</li> <li>4) New York \$66 billion</li> <li>5) Pennsylvania \$54.1 billion</li> </ol>
Total energy consumption	<ol style="list-style-type: none"> <li>1) Texas 13.3% of U.S. total</li> <li>2) California 7.9% of U.S. total</li> <li>3) Florida 4.2% of U.S. total</li> <li>4) Illinois 4.1% of U.S. total</li> <li>5) Louisiana 3.9% of U.S. total</li> </ol>
Residential energy expenditures	<ol style="list-style-type: none"> <li>1) California \$20.4 billion</li> <li>2) Texas \$18.7 billion</li> <li>3) New York \$18.6 billion</li> <li>4) Florida \$13.4 billion</li> <li>5) Pennsylvania \$12.6 billion</li> </ol>
Residential energy consumption	<ol style="list-style-type: none"> <li>1) Texas 8.0% of U.S. total</li> <li>2) California 7.0% of U.S. total</li> <li>3) Florida 5.5% of U.S. total</li> <li>4) New York 5.1% of U.S. total</li> <li>5) Illinois 4.8% of U.S. total</li> </ol>
Lowest residential per capita energy consumption	<ol style="list-style-type: none"> <li>1) Hawaii 25 million Btu</li> <li>2) California 39 million Btu</li> <li>3) New York 54 million Btu</li> <li>4) Nevada 58 million Btu</li> <li>5) New Mexico 59 million Btu</li> </ol>
Commercial energy expenditures	<ol style="list-style-type: none"> <li>1) California \$20.4 billion</li> <li>2) New York \$16 billion</li> <li>3) Texas \$12.9 billion</li> <li>4) Florida \$9.9 billion</li> <li>5) New Jersey \$6.9 billion</li> </ol>

Commercial energy consumption	<ol style="list-style-type: none"> <li>1) Texas 9% of U.S. total</li> <li>2) California 8.3% of U.S. total</li> <li>3) New York 6.3% of U.S. total</li> <li>4) Florida 5.4% of U.S. total</li> <li>5) Illinois 4.5% of U.S. total</li> </ol>
Industrial energy expenditures	<ol style="list-style-type: none"> <li>1) Texas \$57.5 billion</li> <li>2) Louisiana \$18.5 billion</li> <li>3) California \$14.1 billion</li> <li>4) Pennsylvania \$9.9 billion</li> <li>5) Ohio \$8.5 billion</li> </ol>
Industrial energy consumption	<ol style="list-style-type: none"> <li>1) Texas 21% of U.S. total</li> <li>2) Louisiana 8.2% of U.S. total</li> <li>3) California 5.8% of U.S. total</li> <li>4) Indiana 4.2% of U.S. total</li> <li>5) Pennsylvania 4.2% of U.S. total</li> </ol>
Lowest per capita industrial energy consumption	<ol style="list-style-type: none"> <li>1) Rhode Island 19 million Btu</li> <li>2) New York 19 million Btu</li> <li>3) Maryland 20 million Btu</li> <li>4) Connecticut 23 million Btu</li> <li>5) Florida 24 million Btu</li> </ol>
Transportation energy expenditures	<ol style="list-style-type: none"> <li>1) California \$82.0 billion</li> <li>2) Texas \$73.0 billion</li> <li>3) Florida \$38.7 billion</li> <li>4) New York \$27.9 billion</li> <li>5) Ohio \$25.9 billion</li> </ol>
Transportation energy consumption	<ol style="list-style-type: none"> <li>1) Texas 11.5% of U.S. total</li> <li>2) California 10.9% of U.S. total</li> <li>3) Florida 5.5% of U.S. total</li> <li>4) New York 3.9% of U.S. total</li> <li>5) Illinois 3.6% of U.S. total</li> </ol>
Lowest per capita transportation energy consumption	<ol style="list-style-type: none"> <li>1) New York 53 million Btu</li> <li>2) Rhode Island 55 million Btu</li> <li>3) Connecticut 63 million Btu</li> <li>4) Delaware 67 million Btu</li> <li>5) Massachusetts 68 million Btu</li> </ol>
Lowest per capita energy expenditures	<ol style="list-style-type: none"> <li>1) New York \$3,350</li> <li>2) Florida \$3,375</li> <li>3) Arizona \$3,434</li> <li>4) California \$3,563</li> <li>5) Nevada \$3,646</li> </ol>
Lowest per capita energy consumption	<ol style="list-style-type: none"> <li>1) Rhode Island 184 million Btu</li> <li>2) New York 184 million Btu</li> <li>3) Hawaii 197 million Btu</li> </ol>

	<ul style="list-style-type: none"> <li>4) California 200 million Btu</li> <li>5) Florida 208 million Btu</li> </ul>
Highest per capita energy expenditures	<ul style="list-style-type: none"> <li>1) North Dakota \$10,539</li> <li>2) Alaska \$9,596</li> <li>3) Wyoming \$9,358</li> <li>4) Louisiana \$8,545</li> <li>5) Texas \$6,114</li> </ul>
% of U.S. energy consumption	<ul style="list-style-type: none"> <li>1) Texas 13.3% of U.S. total</li> <li>2) California 7.9% of U.S. total</li> <li>3) Florida 4.2% of U.S. total</li> <li>4) Illinois 4.1% of U.S. total</li> <li>5) Louisiana 3.9% of U.S. total</li> </ul>
Lowest average cost of energy	<ul style="list-style-type: none"> <li>1) Louisiana 15.9 cents/kWh</li> <li>2) Iowa 17.8 cents/kWh</li> <li>3) Indiana 17.8 cents/kWh</li> <li>4) Wyoming 18.4 cents/kWh</li> <li>5) Illinois 18.5 cents/kWh</li> </ul>
Highest average cost of energy	<ul style="list-style-type: none"> <li>1) Hawaii 38.9 cents/kWh</li> <li>2) Vermont 28.7 cents/kWh</li> <li>3) New Hampshire 27.9 cents/kWh</li> <li>4) Connecticut 27.9 cents/kWh</li> <li>5) Rhode Island 26.5 cents/kWh</li> </ul>
Highest renewable energy producing states	<ul style="list-style-type: none"> <li>1) Washington 10.0% of U.S. total</li> <li>2) California 8.3% of U.S. total</li> <li>3) Iowa 7.4% of U.S. total</li> <li>4) Texas 5.2% of U.S. total</li> <li>5) Oregon 5.0% of U.S. total</li> </ul>
Renewable energy production growth from 2003-2013	<ul style="list-style-type: none"> <li>1) Kansas 505.8%</li> <li>2) Colorado 441.6%</li> <li>3) Iowa 403.2%</li> <li>4) North Dakota 373.9%</li> <li>5) Wyoming 338.2%</li> </ul>
Negative renewable energy production growth	<ul style="list-style-type: none"> <li>1) Rhode Island -30.8%</li> <li>2) Louisiana -19.9%</li> <li>3) Connecticut -8.4%</li> <li>4) Alaska -3.9%</li> </ul>
Crude oil production	<ul style="list-style-type: none"> <li>1) Texas 33.9% of U.S. total</li> <li>2) Offshore Gulf 16.8% of U.S. total</li> <li>3) North Dakota 11.5% of U.S. total</li> <li>4) California 7.3% of U.S. total</li> <li>5) Alaska 6.9% of U.S. total</li> </ul>

## Hydraulic Fracturing’s Impact is Increasing throughout the United States

Based on the most recent data for natural gas and crude oil production from the U.S. EIA, a number of states appear to be benefiting significantly from the increase in hydraulic fracturing (“fracking”) relative to traditional oil and natural gas drilling. California does not appear to be one of them. Crude oil production in California decreased every year from 1998 to 2011 before increasing by 1.6% from 2011 to 2012 and by 0.9% from 2012 to 2013. Fracking may play a role in the increase in production, but production nonetheless fell by 7.2% overall from 2008 to 2013—and by a substantial 19.8% from 2003 to 2013. The state’s share of total U.S. crude oil production fell from 12.0% to 7.3% in those 10 years.



In contrast, crude oil production in North Dakota increased precipitously during the same time, along with an increase in fracking in the state’s Bakken shale formation. North Dakota’s share of total U.S. crude oil production increased from 1.4% in 2003 to 11.5% in 2013. Fracking in the Eagle Ford formation helped spur Texas’ crude oil production over the same period. Production increased 130.5% in those 10 years, and nearly all of that growth (127.5%) occurred in the last five years. Texas’ share of total U.S. crude oil production increased from 19.4% in 2003 to 33.9% in 2013. Fracking

appears to have encouraged production growth in nearby Oklahoma as well. From 2003 to 2013, Oklahoma crude oil production increased 75.0%, with 68.7% growth from 2008 to 2013. The state increased its share of total U.S. crude oil production from 3.1% to 4.2%.

Fracking appears to have spread crude oil production across a much larger number of states, as some of the states where crude oil production was formerly very strong have seen their market shares decrease in recent years. Alaska's share of total U.S. crude oil production decreased from 17.2% in 2003 to 6.9% in 2013, as the state's total production decreased by 47.1%. Offshore crude oil production in the Gulf of Mexico decreased as a share of total U.S. production from 27.2% in 2003 to 16.8% in 2013, as total production decreased 18.4%. However, this trend may change in the coming years, as oil producers move to expand deep-water fracking. In California, fracking in the Monterey Shale formation was once considered a new frontier for crude oil production in the state, but current technology is insufficient to capture much of the oil in the formation.<sup>5</sup>

Fracking also appears to have led to substantial increases in natural gas production in several states. Growth in Arkansas, home of the Fayetteville Shale formation, has been extremely high: 572.0% from 2003 to 2013, including 155.3% growth from 2008 to 2013. From 2003 to 2013, Arkansas's share of total U.S. natural gas production increased from 0.8% to 4.4%. In nearby Louisiana, natural gas production increased 78.2% from 2003 to 2013, with 74.7% growth from 2008 to 2013. The state produced 9.4% of all U.S. natural gas in 2013, compared to 6.8% in 2003. Colorado increased its share of total U.S. natural gas production from 5.1% to 6.2% in that time with 58.7% growth in total production.

North Dakota is just beginning to expand its natural gas industry as a complement to its growing oil industry. The state's market share of total U.S. natural gas production stood at just 0.9% in 2013, but its production increased by 323.2% from 2003 levels. Fracking is increasing natural gas production in the Illinois Basin in Illinois and Indiana. Total natural gas production in both states is less than one-tenth of a percent of total U.S. production, but from 2003 to 2013, production increased 1,559.2% in Illinois and 442.2% in Indiana.

U.S. natural gas production continues to soar primarily due to fracking in the Marcellus Shale formation in Pennsylvania and West Virginia. Fracking in Pennsylvania has led to its becoming one of the country's leading natural gas producers. From 2003 to 2013, Pennsylvania's natural gas production increased 1,939.1%, including 1,543.5% growth from 2008 to 2013. In 10 years, the state's share of total U.S. natural gas production increased from 0.8% to 12.7%. West Virginia is also beginning to see a boom in natural gas production. The state's total natural gas production increased by 282.4% from 2003 to 2013, including 193.2% growth from 2008 to 2013. From 2003 to 2013, the state's

---

<sup>5</sup> Sahagun, Louis, "U.S. Officials Cut Estimate of Recoverable Monterey Shale Oil By 96%," *Los Angeles Times*. May 21, 2014.

share of total U.S. natural gas production increased from 0.9% to 2.8%. Growth escalated primarily in the past three years. From 2010 to 2013, production grew by 170.1%.

In some states, oil and gas extraction is coming to represent a significant proportion of the state's economic activity, with much of the growth beginning very recently. In North Dakota, the oil and gas extraction industry accounted for just 1.1% of the state's total GDP in 2008, but by 2013, the industry accounted for 5.0% of total GDP. In Texas, oil and gas extraction increased from 6.6% of total GDP in 2008 to 8.9% in 2013. In Louisiana, oil and gas extraction increased from 4.6% of total GDP in 2008 to 6.0% in 2013. In California, the nation's largest economy, oil and gas extraction increased from 0.6% of total GDP to 0.8% of total GDP.

Some states have thrived due to surging energy prices over the past several years. In North Dakota, for example, from 2008 to 2013 state GDP increased by 44.9% while total nonfarm employment increased by 21.7%. In Texas, state GDP increased by 19.0% and total nonfarm employment increased by 5.7% in that time.

The proportion of a state's total GDP from oil and gas extraction may have increased due to growth in fracking in recent years, but a prolonged decrease in prices or demand could drag revenues from oil and natural gas down significantly, slowing down the state's economic growth. Already, some analysts have begun to question whether plummeting oil prices will slow or reverse Texas' strong economic growth.<sup>6</sup> The state's economy is so heavily tied to oil that a weak oil market may weaken its thriving housing market.<sup>7</sup> These are comparatively minor concerns in California, as oil production plays a much smaller role in the state's economy, but the health of the economies in states like Texas, Louisiana, or North Dakota is important to maintaining economic growth in California and nationwide.

## Conclusion

California, with its very large population and state economy, is one of the largest energy-consuming states in the country, with very high energy expenditures across all categories: residential, commercial, industrial, and transportation. On a per capita basis, though, the state is one of the most efficient energy users in the country. California's total renewable energy production is topped by only Washington, though California's renewable energy production growth has slowed in recent years. Fracking has slowed declining oil production in the state, but it has not had as great an impact on fossil fuel

---

<sup>6</sup> Bedsole, Bart, "Falling Oil Prices Create Anxiety in South Texas." *KRISTV.COM*. Jan. 6, 2015.

<sup>7</sup> Brown, Steve, "Analysts Split Over Whether Oil Plunge Will Hammer Texas' Housing Market." *Dallas Morning News*. Jan. 8, 2015.



production as it has in states like North Dakota or Pennsylvania. However, the California economy has not become as dependent on fossil fuel production as it has in those states. For this reason, the California economy is better prepared to handle falling oil prices than Texas or North Dakota, should the decline in oil price persist for some time now or in the future.