

100 Percent Clean Electricity for California

California—the world’s sixth largest economy—has firmly established itself as a global clean energy leader by setting, achieving, and surpassing clean energy goals that at first seemed unattainable. The next step to maintaining our state’s clean energy momentum and showing the world a pathway to a healthy and sustainable future is to commit to a future powered by 100 percent zero-carbon electricity.

There is increasing support for transitioning California’s electricity supply entirely to zero-carbon resources. For example, Senate Bill 100 (de León) passed the Senate in 2017. This bill would:

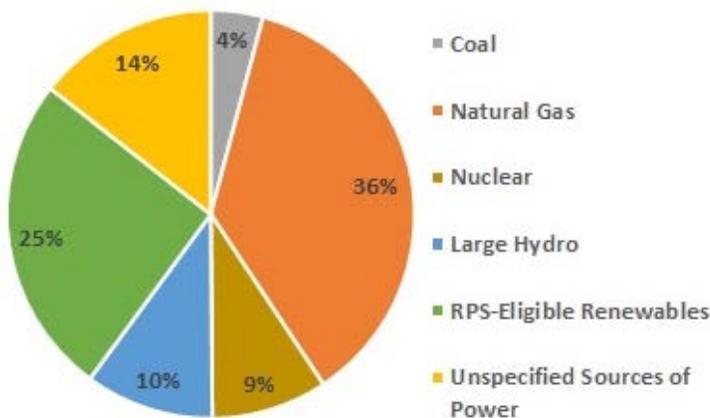
- **Increase RPS to 60 percent by 2030:** accelerate the requirements of the state’s primary renewable energy program—the Renewables Portfolio Standard (RPS)—from 50 percent to 60 percent by 2030.
- **Commit to 100 percent zero-carbon electricity by 2045:** establish a new policy that all electricity produced to meet end-uses come from zero-carbon resources by 2045. Since 2045 is so far in the future, SB 100 leaves open opportunities for new technologies and innovation and does not restrict what qualifies as zero-carbon.

California’s clean energy policies have blazed trails for other states, and sustained leadership on this issue is critical for continued progress. The Legislature should move forward to pass a bill in 2018 that puts the state on a pathway to achieve 100 percent zero-carbon electricity by 2045.

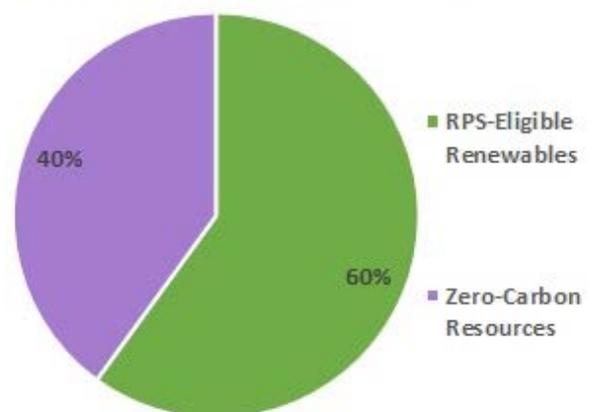
California’s Current Electricity Mix

In 2016, California met 25 percent of its retail electricity needs with RPS-eligible resources. These include solar, wind, geothermal, biomass, biogas, and small hydropower. A bill to establish 100 percent zero-carbon electricity by 2045 could accelerate the state’s current RPS, for example to 60 percent RPS by 2030. The remaining 40 percent could be met with additional RPS-eligible renewables, or non-RPS resources that do not emit GHGs during the process of generating electricity. For example, in 2016 California received about 10 percent of its electricity from in-state and other western large hydropower facilities. Large hydro is not RPS-eligible but would qualify as zero-carbon. In 2016, most nuclear power came from Diablo Canyon, which will be phased out over the next decade. A small amount of nuclear power is imported from a plant in Arizona, and that would qualify as zero-carbon.

2016 California Electricity Mix



2045 California Electricity Mix



How Do We Get to 100 Percent Zero-Carbon Electricity?

Meeting 100 percent of California's electricity needs with zero-carbon resources is a bold goal, but achieving it is within reach. California is on track to exceed its current 50 percent RPS before 2030 and we have the technology to run a flexible and efficient grid with even more renewables.

Key tools and strategies that put us on the pathway to 100 percent zero-carbon electricity include:

- **Better weather forecasting technology** that makes it easier for grid operators to predict precisely how much wind or solar generation they can depend on at any given time.
- **Declining cost of energy storage technologies**¹ that help us use renewables when the wind isn't blowing and the sun isn't shining.
- **Flexibility of large and small electricity users** to increase energy efficiency when renewable electricity is least abundant and shift usage towards times when it is most abundant (e.g., midday).
- **Better coordination of grid operators in Western states** that helps us gain access to more renewables and other flexible, zero-carbon resources.

It's impossible to predict what technological advancements will occur by 2045 that will make it easier and cheaper to achieve 100 percent zero-carbon electricity. Now is the time to kickstart the discussion and the research needed to understand how to reach 100 percent zero-carbon electricity. Every time California sets an ambitious clean energy policy, our state's ability to achieve the policy has far exceeded expectations.

Benefits of a Zero-Carbon Electricity Future

Global climate change is one of the biggest threats to California's economy and the health and well-being of its residents. Reducing GHG emissions and criteria air pollution by transitioning away from fossil fuels is one of the most important things our country and world must do to avoid the worst consequences of climate change. California is a global leader on climate change and innovation for reducing GHG emissions. Continuing to decarbonize our electricity will set a global precedent and chart a path that other states and countries can follow

Today, the cost to build wind and solar plants is cheaper than building new natural gas, coal, nuclear, or almost any other power option.² In addition, relying on larger amounts of zero-carbon resources will reduce California electricity customer's exposure to the price volatility of natural gas.³

Thanks to the RPS, installed renewable generation capacity in the state has nearly tripled since the first RPS was enacted in 2002. Most projects built in the last decade—almost three-quarters of the state total—are in counties with unemployment levels of 6 percent or higher. These new projects have created jobs and jump-started the revitalization of local economies.⁴

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¹ Lazard; Levelized Cost of Energy Storage; December 2016; <http://www.lazard.com/media/438042/lazard-levelized-cost-of-storage-v20.pdf>

² Lazard; Levelized Cost of Energy Analysis; December 2015; <http://www.lazard.com/perspective/levelized-cost-of-energy-analysis-100/>

³ Bollinger; Revisiting the Long-Term Hedge Value of Wind Power in an Era of Low Natural Gas Prices; 2013; <http://emp.lbl.gov/sites/all/files/lbnl-6103e.pdf>

⁴ U.S. Bureau of Labor Statistics (BLS). Unemployment rates by county: June 2015—May 2016 averages; www.bls.gov/lau/maps/twmcort.pdf