

System
Indicators

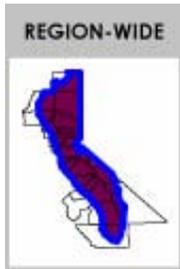
Demographics and Economy



**Renewable and Distributed
Energy Sources (2009)**

September 2011

Renewable and Distributed Energy Sources



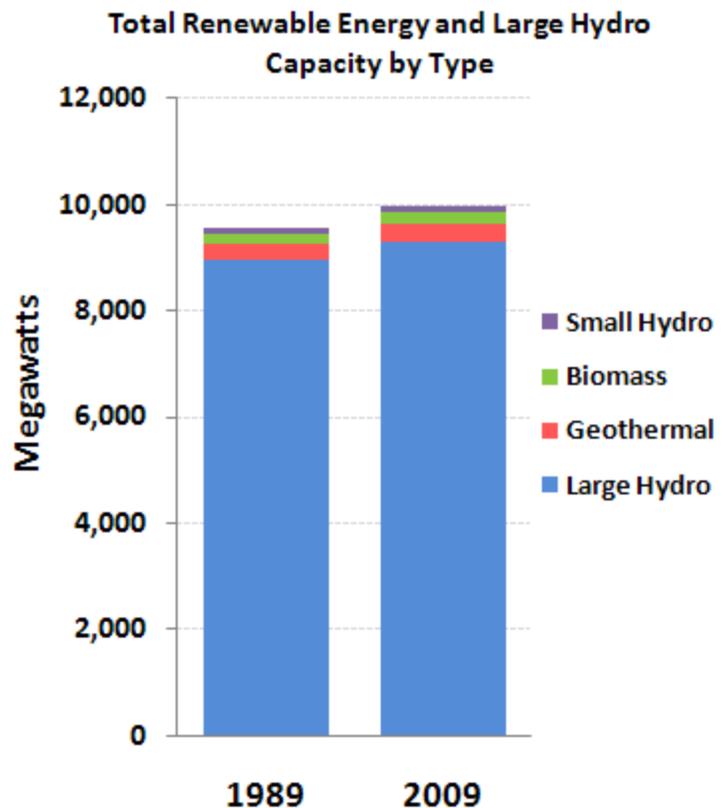
Hydroelectric power is an important economic resource provided by the Sierra Nevada region. Most of the value of this resource flows out to the rest of the state. The value of this resource, and its reliance on water, must be understood and appreciated by all Californians. Additionally, development of renewable energy from other sources is an opportunity to create economic value for the Region.

Renewable sources of energy are viewed as the future of energy production.

Generating energy through ecologically sustainable sources not only protects the environment but creates new economic growth opportunities and lessens dependence on fossil fuels. The State of California has mandated that twenty percent of its energy (excluding large hydropower) come from renewable sources by 2017. Most recently, Governor Brown has proposed the creation of 20,000 Megawatts (MW) of new 'green energy' by 2020. Different parts of the State are assessing their own unique mixes of natural and energy resources.

Ninety-three percent of all the non-fossil energy produced in the SNC Region is by large-scale hydro-electric power plants, which are not classified as 'renewable energy' by the State. Most of this is 'distributed energy', meaning it is sold outside of the Region in which it is generated. The SNC Region is nonetheless a large contributor to the state's carbon-free energy production. Large hydro capacity was 9,300 Megawatts in 2009, accounting for over 70% of California's installed hydro capacity. (Since much of the remainder is represented by facilities located just outside of the SNC Region, but supplied by Sierra water, nearly all of the state's hydro power actually comes from the Sierra.)

Total "renewable energy" capacity from small-scale hydro-electric power plants, geothermal, and biomass was 674 Megawatts.

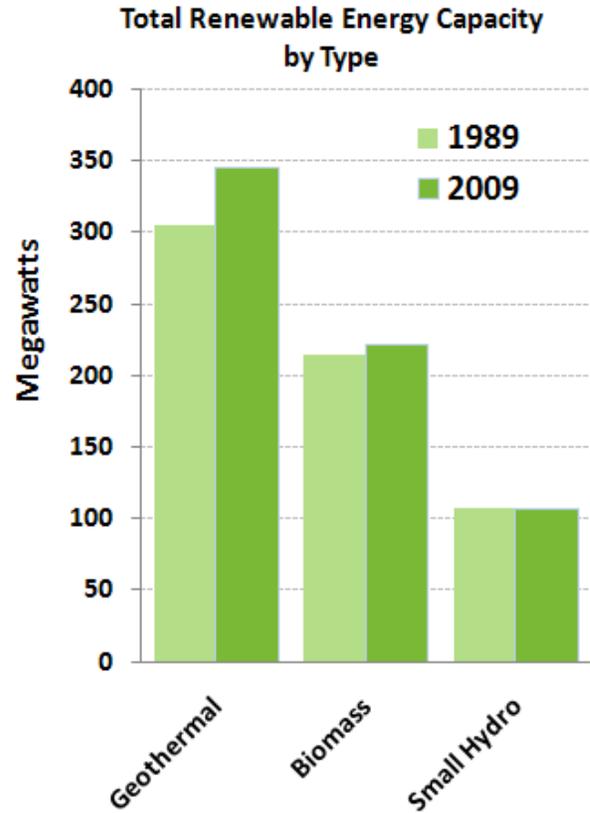


Geographic Definition: Zip Code
Data Source: California Energy Commission

Combined, these 9,974 Megawatts of non-carbon generating sources accounted for 14.3 percent of California's total installed electrical capacity in 2009.

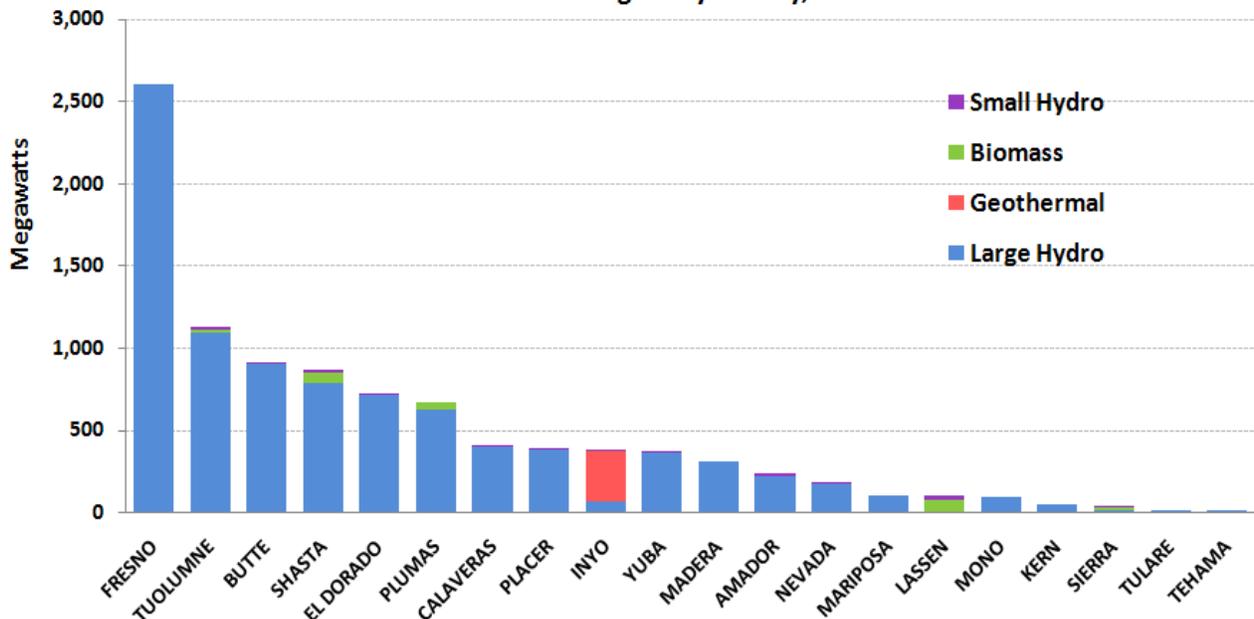
There was miniscule growth in both large hydro and renewable energy in the 20 years from 1989 to 2009; each expanding by only about four percent. Geothermal energy in Inyo County accounted for nearly all the growth in renewable energy, expanding from 305 MWs to 345 MWs.

With a capacity of 2,600 Megawatts of large hydro, Fresno County leads the region in non-fossil distributed energy capacity. For comparison, the typical coal/natural gas power plant has a capacity of 500 MW. The northern Sierra Nevada – Shasta, Lassen, and Plumas Counties – hold most of the biomass capacity of 222 Megawatts. Additionally, there are several biomass plants just outside of the SNC boundary in Placer, Butte, and Shasta Counties that utilize fuel material from the SNC Region. These plants have a capacity of 129 Megawatts that is not reflected in the SNC data.



Geographic Definition: Zip Code
Data Source: California Energy Commission

Renewable Energy and Large Hydro Capacity by Type within the SNC Region by County, 2009



Geographic Definition: Zip Code
Data Source: California Energy Commission

Wind power is emerging as a significant potential new source of renewable energy in the Sierra Nevada, though siting in the Region is likely to bring challenges. Prior to 2010, the only commercial wind power generated within the SNC boundary was an portion of the Tehachapi Pass wind farm that straddles Highway 58 (which is also the SNC boundary in that area), with 805 Megawatts of total facility capacity. The Hatchet Ridge wind project above Burney in Shasta County went online in 2010. Its 46 turbines have a capacity of 102 Megawatts. While located far inside the Region, it represents more distributed energy that is exported to the grid. The Bureau of Land Management has recently accepted a proposal to build a 51MW wind farm project on Fredonyer Peak near Eagle Lake in Lassen County.

Value of Sierra Nevada Energy

It is important to understand that *capacity* (the maximum number of watts that can be generated at an optimum time) of an energy generator is much different from the *amount* (in watt-hours) of electricity that is actually generated over the course of a year. This is particularly important for large hydro and renewable sources, which operate at less than full capacity or not at all for large portions of time. Large hydro is particularly dependent on the amount of precipitation from year to year⁶.

What the generation and sales of electricity means to the Region is unclear. Much deeper research would be required to determine how much of the revenues funnel through the regional economy. What can be estimated is the *value* of the electricity that the Region's water resources create. *Electric Power Monthly* reported the average retail price of electricity in California across all use sectors (residential, commercial, industrial, and transportation) in 2010 at 12.83 cents per kilowatt-hour. This allows for a rough estimate of the retail value of large hydro electricity produced in the SNC Region of \$2.4 billion.⁷

Since renewable energy sources in the Sierra Nevada are relatively tiny by comparison at this time, the value of electricity generated by these renewable sources would be much less, perhaps one to two hundred million dollars.

⁶ According to the California Energy Commission, in 2009 the state's large hydro generation totaled 25.15 Gigawatt-hours of electricity, 12.2 percent of electricity generated in the State, whereas in 2007, large hydro generated 43.6 Gigawatt-hours or 14.5 percent of the state's electricity.

⁷ This estimate relies on the assumption that since Sierra hydro represents about 73.5 percent of the state's hydro capacity, it accounts for 73.5 percent of the electricity generated (i.e. about 18.5 Gigawatt-hours in 2009) at a retail rate of 12.83 cents per kilowatt-hour.