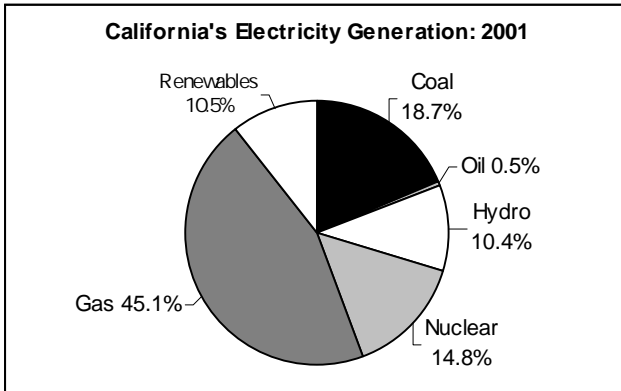




CALIFORNIA

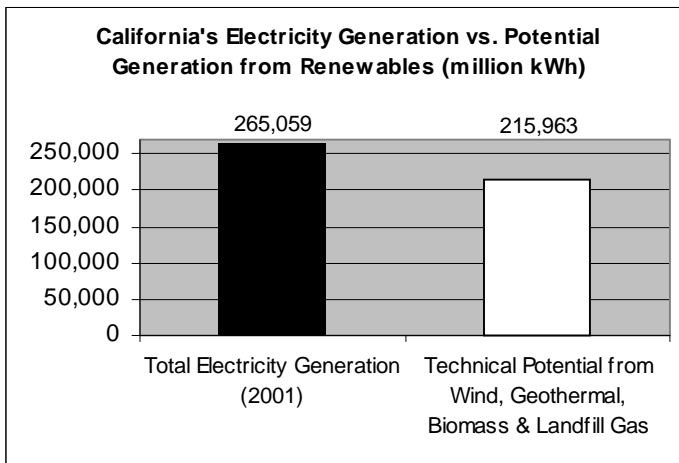


California's Electricity Mixⁱ

California has long been at the forefront of progressive environmental policy. In 2001, California generated 10.5%--a number that continues to grow--of its electricity from renewables sources, such as geothermal power, solar and wind.^j However, the state still depended on fossil fuels and nuclear power for 79% of its electricity needs. Natural gas, which often fluctuates dramatically in price, provided almost half of the state's electricity needs in

2001.

California's Potential to Generate Electricity from Wind, Clean Biomass, Geothermal Energy, and Landfill Gas



	mill. kWh
Electricity Generation (2001)	265,059
Renewable Potential	215,963
Wind	85,892
Geothermal	104,301
Landfill Gas	8,714
Clean Biomass	17,057

California has tremendous technical^k capacity to generate electricity from renewable sources such as wind, clean biomass, geothermal energy and landfill gas. In fact, California has the

best geothermal capacity in the country; it also ranks 1st for its potential to generate electricity from landfill gas. California has the technical potential to meet 81% of its current electricity needs with these four renewable sources alone. California's total

ⁱ California Energy Commission, http://www.energy.ca.gov/electricity/gross_system_power.html. Numbers may have changed slightly since 2001.

^j The California Energy Commission estimates that 12% of the electricity sold to California consumers in 2001 came from renewable sources. See http://www.energy.ca.gov/consumer/power_content_label.html.

^k "Technical" potential refers to what is possible given the state's resources; however, cost and technology may limit the state's ability to fully realize this potential.

generation potential from wind, geothermal, clean biomass and landfill gas is 216 billion kilowatt hours (kWh)—enough to power more than 21 million homes.

California's Potential to Generate Electricity from Solar Energy

California has very good solar resources, and the entire state can effectively use solar technologies. The southern portion of the state has particularly good resources. While California's solar theoretical potential is enormous, solar currently represents a small portion of installed renewable electricity capacity; however, it is expanding quickly and has potential for rapid development in the coming decade. According to the Renewable Energy Atlas of the West, if California installed solar photovoltaic systems on .5% of the state's land area, it could generate 128,000 million kWh, or more than half of the state's total electricity generation in 2000.⁶³

Renewable Energy Boosts the Economy...

A June 2002 analysis found that building 5,900 MW of renewable energy capacity in California would lead to 28,000 year-long construction jobs and 3,000 permanent operations and maintenance jobs. Over thirty years of operation, these new plants would create 120,000 person-years of employment. This is four times as many person-years that would be created by building 5,900 MW of natural gas power plants.⁶⁴

In addition to creating jobs, renewable energy development would boost California's economy, according to an analysis by Union of Concerned Scientists. Through 2020, a national standard requiring increased generation¹ from renewable energy would produce:⁶⁵

- \$3.1 billion in new capital investment;
- \$223 million in new property tax revenue for local economies; and
- \$79 million in lease payments to farmers and rural landowners from wind power.

...While Protecting the Environment

Based on the American Wind Energy Association's statistics quantifying the comparative emissions of wind power (which are zero) and the average U.S. fuel mix, California's technical wind potential, if fully tapped and operating at full-capacity year round, would offset more than 65 million tons of global warming pollution (carbon dioxide), more than 343,000 tons of soot-forming pollution (sulfur dioxide) and more than 210,000 tons of smog-forming pollution (nitrogen oxides) compared to equivalent generation from the average U.S. power plant.⁶⁶

Generating Solutions: Case Studies

California has long been the leader in developing its renewable energy potential. California currently has the most installed wind power in the country, with 1822.3 MW online and 948.94 MW in the planning process. The state has more than 60 wind projects operating in five major resource areas in northern, central and southern California.⁶⁷ In

¹ Union of Concerned Scientists calculated the economic benefits from a national renewable energy standard requiring 10% renewable energy generation by 2020. Environment California supports a national standard of *at least* 20% renewable energy generation by 2020 and a California standard of 20% by 2017. Results are cumulative in 2000\$ and reflect net present value using an 8% real discount rate.

addition, California's geothermal power plants produce about 40% of the world's geothermally-generated electricity.⁶⁸

Powering California with Geothermal Energy

CalEnergy Corporation recently announced plans to build a new geothermal plant in California's Imperial Valley that would be the first such facility built in the state in more than a decade and its largest to date. There are already ten geothermal plants in the region that have a total of 340 MW of capacity.⁶⁹ The new proposal is for a 185-MW plant located six miles northwest of Calipatria. The project is currently undergoing the permitting process, but the Energy Commission should make a decision by the end of 2003.⁷⁰

Imperial County's unemployment rate is historically the highest in the State of California, between 22 and 25%.⁷¹ The 450-500 construction jobs that this project will provide at its peak and the approximately 70 full time positions will be much needed additions to the community's economy.⁷² The current geothermal projects have 295 employees and a payroll of more than \$10 million. The current projects pay \$11 million in property taxes, and the new plant is expected to add \$3 million to that. In addition, the existing plants spend \$100,000 a day in goods and services to support the current project. The existing geothermal power plants in the area are about 80% of Calipatria's tax base.⁷³

Mojave Desert Solar Electric Generating Systems (SEGS)

California's Mojave Desert is home to the world's largest concentrating solar power facility. The Solar Electric Generating Systems (SEGS) plants have a combined capacity of 354 MW and enable Southern California Edison to meet the needs of some 500,000 people.⁷⁴ The plants, built between 1984 and 1991, range in size from 14 MW to 80 MW and are located on three sites.⁷⁵ These nine plants have generated and sold more than 5 billion kilowatt-hours (kWh) of solar electricity to the Southern California Edison utility during the last 14 years.⁷⁶ Southern California Edison currently buys 335 MW of power from seven of these plants.⁷⁷

The solar plants have helped the economy since the first plant was built. Currently, approximately 250 people are directly employed by the SEGS. Each of the two 80-MW plants required about one million job hours to construct. Over their 30 year life, each of the 80-MW plants are expected to contribute \$11.6 million in taxes to the local government, \$65.8 million to the state government, and \$228.9 million to the federal government.⁷⁸

In addition to the economic benefits, the solar systems save the energy equivalent of more than two million barrels of oil every year by harnessing the power of the sun instead of relying on traditional fossil fuel sources.⁷⁹

Imperial Valley Bovine Waste to Energy Plant

Guépard Energy, Inc. (GEI) is developing four biowaste management facilities within the Imperial Valley. GEI expects to complete the plants by the second quarter of 2004. The four plants will have a combined capacity of 25 MW, enough electricity to power 12,000-23,000 homes. The plants will generate the electricity by processing 200 tons of bovine biowaste per day with biodigesters. This results in biogas and 120 tons per day of organic fertilizer.⁸⁰

In addition to being a source of electricity, the plants are a source of economic benefits for the community. The plants are expected to create 150 construction jobs to build the

plants and 30 permanent jobs for ongoing operation and maintenance at the plants. The payroll for the construction jobs will be an estimated \$21,000,000 between 2003 and 2004, and the annual payroll for permanent jobs will be \$1,030,000. By sparking demand for other goods and services, the project is expected to create an ancillary payroll of \$3,500,000. Overall the project will be a \$62,000,000 investment.⁸¹

The plants will have many environmental benefits as well. Each plant will mitigate 25,000 tons of greenhouse gases annually. The processing of the waste will help the feedyards supplying the waste to comply with Clean Water Act requirements. The plants also will deliver steam to the feedyards, enabling the replacement of diesel boilers.⁸²

Powering Los Angeles with Wind: Pine Tree Wind Project

Wind Turbine Prometheus, LLC, a partnership between Zilkha Renewable Energy, LLC and Prometheus Energy Services, is developing a 120-MW facility on approximately 22,000 acres in California's Mojave Desert. The \$162 million Pine Tree Wind Project, powered by 80 GE Wind Energy wind turbines, will be the first wind project for Los Angeles Department of Water and Power (LADWP), the nation's largest municipally owned utility.⁸³ The project is scheduled to begin operation in July 2004.

The Pine Tree Wind Project, generating enough power to meet the annual energy needs of more than 36,000 households, will reduce the Los Angeles Department of Water and Power's dependence on fossil fuels, saving approximately \$14 million a year in gas costs.⁸⁴ The project is expected to create approximately 200 temporary construction jobs and ten permanent jobs for ongoing operation and maintenance throughout the life of the project. In addition, 8 to 12 landowners will receive lease payments for hosting wind turbines on their property.⁸⁵

The clean electricity generated by the Pine Tree Wind Power Project will offset 240,000 tons of global warming pollution (carbon dioxide); 1,200 tons of soot-forming pollution (sulfur dioxide); and 720 tons of smog-forming pollution (nitrogen oxides).⁸⁶

Watsonville Homeowners Benefit from Solar Energy

In 2001, Palo Alto-based homebuilder Clarum Homes built a new housing development, Cherry Blossom, consisting of 31 homes outfitted with photovoltaic solar panels as standard equipment. Each of the homes in the Cherry Blossom community, located in Watsonville, comes equipped with a 1-2 kW solar electric system, comprised of 12-24 BP Solar photovoltaic panels installed on the roofs of the homes. These systems have the capacity to produce 1,500-3,500 kWh of electricity per year.⁸⁷

The panels will provide 25-50% of the electricity requirements of an average California home, saving the homeowners an average of \$30-\$55 a month on their electricity bills.⁸⁸ The systems also will help the homeowners get the best rate possible from PG&E on their bills, because rates go up depending on the number of kilowatt-hours consumed. By lowering the overall use, the homeowner can save by paying the lower rate for electricity use.

All of the homes are now occupied. The program was so successful that Clarum Homes has entered into contract with another solar company, Astropower, to build 277 more homes that include solar electric power.⁸⁹