



## General Overview of Renewables

**Renewables - General** Taken together, the cost of windpower, geothermal energy, bioenergy and solar power has declined by a factor of ten or more over the past 20 years. Including hydropower, renewable energy sources provided about eight percent of total U.S. energy supply in 1999. California got 12 percent of its electricity from renewable sources, excluding hydropower.

**Windpower** Good wind areas, which cover 6 percent of the contiguous U.S. land area, are large enough to supply more than 4.4 billion megawatt-hours - a third more than the total amount of electricity used in the United States in 1999

The cost of producing electricity from wind has dropped 90 percent since the 1980s. Currently producing electricity for 3 to 6 cents per kilowatt-hour, it is competitive with the cost of electricity from a new coal-fired power plant. World capacity was 17,800 megawatts in 2000 and expected to climb to 23,300 installed megawatts in 2001.

**Solar Power** An area 100 miles square in Nevada could produce as enough solar electricity to power the entire United States for a year. Photovoltaic systems produce electricity without pollution. They also pay back within three years the energy used in producing them and the CO<sub>2</sub> generated in doing so. Photovoltaic panels produce the critical margin of electricity efficiently during hot weather, when the electricity grid experiences peak demand and other generating sources may be under stress. Concentrating solar thermal electric plants now produce 350 MW in California and an additional \$90 million in private investment in the industry will yield potential new electric plants in California, Nevada, Mexico and Israel.

**Biomass** Biomass is an abundant resource that can be tapped to produce energy. Grown matter and organic wastes are what is known as "biomass" which can be converted to electricity, heat and liquid and gaseous fuels.

Worldwide, biomass is the fourth largest energy resource after coal, oil and natural gas. Sources can include crops grown specifically for energy, such as fast-growing trees and grasses like hybrid poplars or switchgrass. Other sources include agricultural residues, like corn stover and rice straw, as well as wood waste like sawdust, tree prunings and yard clippings. By 2010, biomass power could provide an additional 3000 megawatts of electric capacity in the U.S., increasing the total contribution of this sustainable energy supply to 10,000 megawatts of capacity.

**Geothermal Power** Geothermal energy supplies about 6 percent of the electricity in California, 10 percent of the power in Northern Nevada, about 25 percent of the electricity for the Island of

*The Stella Group, Ltd. ([www.thestellagroupltd.com](http://www.thestellagroupltd.com)) is a strategic technology optimization and policy firm advancing the utilization of clean, distributed energy applications such as advanced batteries and controls, energy efficiency, fuel cells, geoexchange, heat engines, microhydropower, minigeneration (natural gas), modular biomass, photovoltaics, small wind and solar thermal (air-conditioning, water and industrial process heat, and power generation), and water energy; with blended financing and customer facilitation.*



Hawaii (the Big Island) and significant power in Utah. DOE has estimated that we could increase our generation of geothermal energy almost ten-fold, supplying 10 percent of the energy needs of the West. The United States has an installed geothermal generating capacity of about 2700 megawatts. That's the equivalent of about 58 million barrels of oil, and provides enough electricity for 3.7 million people. The cost of producing this power ranges from 4¢ to 8¢ per kilowatt-hour.

**Nuclear power** From a utility planner's perspective, nuclear power "is a very risky choice," says Christopher Sherry, research director for the Safe Energy Communication Council, a nuclear-power watchdog group. "You're basically taking a big gamble on the future price of electricity and what electricity demand will be when the plant is finished." Sierra, Jerry Taylor, Cato Institute: "...Were it not for large and historically important federal subsidies, there wouldn't be a single nuclear power plant in the United States."

Investors have stayed away from nuclear power because nuclear-fired electricity is about twice as expensive as coal- or gas-fired electricity. The marginal costs of nuclear are indeed lower, but the capital costs are much higher. For instance, electricity costs skyrocketed by 60 percent between 1978 and 1982 largely because of a wave of nuclear power plants that came on line in the late 1970s. And some incurred heavy costs without ever coming on line. The Shoreham debacle on Long Island represented one of the more unfortunate examples." -- Jerry Taylor and Peter VanDoren, Washington Post op-ed, May 18, 2001.

Federal government subsidies for nuclear power totaled \$66 billion from 1948 to 1998, according to the Congressional Research Service.

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