Renewable Energy Development Creates More Jobs than Fossil Fuels
A summary of recent research

As compared to traditional fossil fuels, the renewable energy sector is relatively labor-intensive, requiring a larger number and wider variety of jobs in areas ranging from manufacturing, construction, and installation to ongoing operation and maintenance.

According to an analysis of 13 independent reports and studies of the clean energy industry by UC Berkeley's Renewable and Appropriate Energy Laboratory (RAEL), renewable energy technologies create more jobs per average megawatt (MW) of power generated, and per dollar invested in construction, manufacturing, and installation when compared to coal or natural gas. Over the course of a 10-year period the solar industry creates 5.65 jobs per million dollars in investment, the wind energy industry 5.7 jobs, and the coal industry only 3.96.[1] In the case of coal mining, wind and solar energy generate 40 percent more jobs per dollar invested.[2]

Studies at the state level also confirm the comparative job creation advantages of renewable energy systems. A Union of Concerned Scientists analysis conducted for the state of Wisconsin found that an 800 MW mix of new renewables would create about 22,000 more job-years than would new natural gas and coal plants over a 30-year period.[3] A New York State Energy Office study concluded that wind energy would create 27% more jobs than coal and 66% more than a natural gas plant per kilowatt hour generated.[4] In addition, a study by Economic Research Associates of energy efficiency and renewable energy as an economic development strategy in Colorado found an energy bill savings of $1.2 billion for Colorado ratepayers by 2010 with a net gain of 8,400 jobs. The study also assessed nine other states and reached similar conclusions.[5]

In 2001, the California Energy Commission's Public Interest Energy Research program sponsored a study from the Electric Power Research Institute (EPRI) that included job creation estimates from renewable energy development based on existing and planned projects in California. These include a construction employment rate ranging from 2.57 jobs/MW for wind to 7.14 jobs/MW for solar photovoltaic (PV) systems, and an operating employment rate ranging from 0.12 jobs/MW for PV to 2.28 jobs/MW for landfill digester gas.[6]

From a national perspective, several studies indicate that hundreds of thousands, if not millions of jobs could be created, depending on the aggressiveness of the public policy approach. The

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[1] Daniel Kammen, Kamal Kapadia, and Matthias Fripp, "Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Create?" UC Berkeley: Renewable and Appropriate Energy Laboratory (RAEL), April 2004 (updated January 2006), 12, http://rael.berkeley.edu/files/2004/Kammen-Renewable-Jobs-2004.pdf

[2] Virinder Singh, BBC Research and Consulting, and Jeffrey Fehrs, "The Work That Goes into Renewable Energy," Renewable Energy Policy Project, November 2001, 8.

[3] Michael Brower, Michael Tennis, and Eric Denzler, *Powering the Midwest*, Union of Concerned Scientists, 1993, 107-108.

[4] A.K. Sanghi, *Economic Impacts of Electricity Supply Options*, New York State Energy Office, July 1992.

[5] Skip Laitner and Marshall Goldberg, *Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy*, April 1996, http://solstice.crest.org/renewables/era/index.html

[6] Brad Heavner and Bernadette Del Chiaro, Renewable Energy and Jobs, Environment California Research and Policy Center, 2003, http://www.environmentcalifornia.org/uploads/OW/aa/OWaa2RaedlfHwQOWbxKd5w/Renewable_Energy_and_Jobs.pdf

California-based think tank Redefining Progress estimates that clean energy can produce 652,000 U.S. jobs in 10 years, and 1.4 million by 2025, reducing unemployment rates by 14%.[7] Its job-growth figures depends on a plan that would increase renewable energy generation in the US by 1% per year through to 2025 as well as doubling federal research and development dollars to leverage private investment to boost energy efficiency programs and clean transportation projects. A recent study by the Union of Concerned Scientists[8] also agreed closely with the RAEL study[9] by concluding that if the United States adopted a 20% Renewable Portfolio Standard for its electrical utilities, over 185,000 jobs could be created by the year 2020.

If U.S. policymakers aggressively commit to programs that support the sustained development of renewable energy and energy efficiency programs, the news gets even better. According to research by the American Solar Energy Society (ASES) and Management Information Services, Inc. (MISI), aggressive development of the renewable energy and energy efficiency industries could generate up to $4.5 trillion in revenue and create 40 million new jobs by the year 2030.[10]

U.S. Renewable Energy and Energy Efficiency Industries in 2030[11]

	Total Number of Jobs Created		
	Base Case Scenario	Moderate Scenario	Advanced Scenario
Renewable Energy	1,305,000	3,138,000	7,918,000
Energy Efficiency	14,953,000	17,825,000	32,185,000
Combined Totals	16,258,000	20,963,000	40,103,000

The table above outlines three different scenarios for projected job creation in the renewable energy and energy efficiency sectors. The base case is essentially a "business as usual" scenario, which assumes no change in policy and no major renewable energy or efficiency initiatives over next 23 years. The moderate scenario assumes that various moderate, incremental (above the base case) federal and state initiatives are put in place during next two decades. The advanced scenario "pushes the envelope." It indicates what is possible using current or impending technologies and includes what may be feasible both economically and technologically.

This growing body of evidence indicates that renewable energy technologies and investments in energy efficiency hold tremendous job creation potential. Clean energy development not only helps to mitigate the twin challenges of climate change and fossil fuels dependency, it holds great promise in addressing the pressing need for high-quality jobs with pathways to sustainable careers for Americans who have yet to benefit from the burgeoning green economy.

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[7] J. Andrew Hoerner and James Barrett, *Smarter, Cleaner, Stronger: Secure Jobs, A Clean Environment, and Less Foreign Oil*, Redefining Progress, September 2004, 2-4, http://www.rprogress.org/publications/2004/SmartCleanStrong_National.pdf
[8] Union of Concerned Scientists, *Cashing In on Clean Energy*, 2007, http://www.ucsusa.org/clean_energy/clean_energy_policies/cashing-in.html
[9] Kammen, Kapadia, and Fripp, 2.
[10] Roger Bezdek, *Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century*, American Solar Energy Society (ASES) and Management Information Services, Inc. (MISI), 2007, iv, http://ases.org/ASES-JobsReport-Final.pdf
[11] Ibid, 39.