

**JOB GROWTH FROM INVESTMENT IN RENEWABLE ENERGY:
AN OVERVIEW**

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The following report details commonly accepted conclusions derived by labor and environmental groups on the potential for job growth with investment in the renewable energy sector. The report also analyzes recent projections by scholars and industry experts studying the potential for increased job growth from investment in renewables. Furthermore, the report highlights activities from around the country, and Nevada in particular, detailing potential job growth in key sectors of the renewables industry.

According to the Apollo Alliance, an investment of \$30 billion per year over 10 years could create 3.3 million jobs and boost the nation's GDP by \$1.4 trillion. With regard to Nevada, environmental scholar Daniel Kammen submitted testimony to Congress with a projection that showed green job creation in the state could reach upwards of 80,000 new jobs by 2025.

Across the country, states are seeing the benefits from investing in renewables. Wisconsin for instance, ranks eighth nationwide in potential job gains linked to the expansion of renewable energy. In Pennsylvania, because of the state's push for renewable portfolio standards, an old steel mill has become the home of new wind turbine factory.

NEVADA

The following section analyzes current projections for job growth in Nevada from investment in renewable energy projects. In particular, the section highlights an effort by labor organizations, prior to the passage of the state's renewable portfolio standard, to enact such legislation because of projected job growth. In addition, noted below is also testimony before Congress by Daniel Kammen, a noted environmental scholar, whose analysis projected green job creation in Nevada reaching upwards of 80,000 new jobs by 2025.

HIGHLIGHT:

- ✓ **The AFL-CIO and the Renewable Energy Policy Project estimated between 2003 and 2013, Nevada could see upward of 19,000 manufacturing jobs from the wind, solar, biomass and geothermal industries.**

Nevada Labor Groups Joined an Environmental Organization to Push for Renewable Standards In 2002. The Nevada AFL-CIO joined the Renewable Energy Policy Project (REPP) in pushing for a renewable portfolio standard for the state. In their prepared remarks to the Nevada Public Service Commission, the AFL-CIO argued that Nevada could see a sharp increase in jobs related to the renewable industry. Specifically, the union, with the REPP, estimated between 2003 and 2013, the state could see upward of 19,000 manufacturing jobs from the wind, solar, biomass and geothermal industries. Factoring in operations, maintenance and installation position, the jobs figure increases to more than 27,000 jobs. This figure is the state's peak potential if all manufacturing facilities were created in Nevada. [Renewable Energy Policy Project Link to Nevada AFL-CIO [Testimony](#); Renewable Energy Policy Project: [Nevada RPS](#)]

In 2003, a Study Concluded Investment in Renewable Energy Sources Would Greatly Add to Nevada's Economy. In 2003, the Center for Business and Economic Research at the University of Nevada, Las Vegas, found that renewable resources including, solar, wind, biomass and geothermal, could generate nearly \$21.5 billion in gross state product through the year 2035. The findings were part of a study which were commissioned by the Nevada Renewable Energy and Energy Conservation Task Force. Among the study's major findings:

- Nevada paid \$2.5 billion to out-of-state energy producers in 2002. Currently, 3.9 percent of Nevada's annual consumption of nearly 36,000 GWh is produced from renewable energy resources, which accounts for approximately 850 jobs in the state directly, indirectly or through induced consumption effects.
- Southern Nevada is one of the best sources for solar electric power generation in the world.
- Full utilization of Nevada's wind resources could generate 50,589,000 MWh of electricity.
- The abundance of high-temperature sites in Nevada suggests that geothermal could be a substantial generating resource for the state. More than 60 percent of the overlay sites have temperatures high enough for geothermal power generation. [Electricity Daily, 4/15/03]

Recently, Environmental Scholar Daniel Kammen In Prepared Remarks For Congressional Testimony, Detailed The Potential for a Large Number of Jobs In Nevada Because of the State's RPS Standard.

While the Renewable Energy Policy Project projected their employment estimate to 2013, according to University of California professor Daniel Kammen, the investment in renewable energy could be a much larger boon for Nevada when projected out beyond 2013. Kammen and his team submitted testimony to Congress with a projection that showed green job creation in Nevada reaching upwards of 80,000 new jobs by 2025. That projection was made in large part because of Nevada's 20 percent renewable portfolio standard. Kammen noted in his testimony:

“Across a broad range of scenarios, the renewable energy sector generates more jobs than the fossil fuel-based energy sector per unit of energy delivered (i.e., per average megawatt). In addition, we find that supporting renewables within a comprehensive and coordinated energy policy that also supports energy efficiency and sustainable transportation will yield far greater employment benefits than supporting one or two of these sectors separately. Further, generating local employment – including that in inner-cities, rural communities, and in areas in need of economic stimulus – through the deployment of local and sustainable energy technologies is an important and underutilized way to enhance national security and international stability. Conversely, we find that the employment rate in fossil fuel-related industries has been declining steadily for reasons that have little to do with environmental regulation.” [Submitted testimony by Daniel M. Kammen to the United States Environment and Public Works Committee, [9/25/07](#)]

According to the National Renewable Energy Laboratory, Nevada Could See Significant Job Growth, Particularly in Construction, By Investing in Solar Energy. The National Renewable Energy Laboratory, which conducted a study on the potential for solar energy generation in Nevada found that solar resources for concentrating collectors range between 7,000 and 7,500 watt hours per square meter, which makes southern Nevada one of the best sources for solar generation in the world. NREL’s study analyzed three scenarios in which job growth was calculated. First, should a single 100 megawatt trough facility be constructed, the direct construction impact, including labor, capital, land, and contingencies, could total \$485.6 million. Each year, 817 jobs are estimated to be directly tied to constructing the facility. Indirect and induced job creation totals could add another 1,570 jobs during the construction phase. In short, employment impacts average 140 jobs annually. Second, should 10 plants be constructed over an 11-year period, the report projected the initial employment impact could be upwards of 3,830 jobs in the first year of construction, rising quickly to a peak of over 6,940 jobs by the following year. The first post-construction year could see 1,090 jobs created. Over the operation and maintenance phase, another 1,800 jobs could be created. Finally the third scenario the study analyzed was a case where three 100 megawatt plants are constructed over a two-year build cycle. Within one year, 7,000 jobs may be attributed to the construction of the facilities. The average annual employment impact over the construction phase could be upwards of 4,900 jobs. The average employment impact over the operation and maintenance phase could be 475 jobs. [NREL: The Potential Economic Impact of Constructing and Operating Solar Power Generation Facilities in Nevada, 2/2004]

NATIONWIDE

Below is a summary of the projected outlook for jobs from investment in the renewable sector nationwide. An analysis by the Apollo Alliance a leading coalition of labor and environmental leaders, an investment of \$30 billion per year for 10 years has the potential to create 3.3 million jobs and boost the nation's gross domestic product by \$1.4 trillion. In addition, the same analysis found that 21.5 jobs are created for every \$1 million invested in the energy efficiency industry. These jobs include installation, ongoing operations and maintenance of building systems, as well as technical and building trades to meet the increased demand for energy efficient appliances and building systems.

HIGHLIGHTS:

- ✓ **According to one estimate, an investment of \$30 billion per year over 10 years could create 3.3 million jobs and boost the nation's GDP by \$1.4 trillion.**
- ✓ **Labor leaders argued, the U.S., once the world leader in renewable energy technology, has fallen behind Japan, Germany and Spain. Germany, a country with a land mass the size of Oregon, employs more than 40,000 workers in its wind energy industry; Denmark employs another 20,000.**

According to One Labor-Environmental Partnership, An Investment of \$30 billion Per Year Over 10 Years Could Create 3.3 Million Jobs and Boost the Nation's GDP by \$1.4 trillion. One prominent Labor-Environmental partnership known as the Apollo Alliance, estimates nationwide that dollars invested in clean energy create more jobs than those invested in traditional energy sources, given that renewable energy is simply more labor intensive. An investment of \$30 billion per year for 10 years could create 3.3 million jobs and boost the gross domestic product by \$1.4 trillion. [Christian Science Monitor, 1/25/07; Apollo Alliance: New Energy for America, [January 2004](#)]

- **Coalition of Scientists Found If The Nation Enacted a 20 Percent Renewable Portfolio Standard by 2020, 185,000 new jobs Could be Created to Meet That Standard.** The Union on Concerned Scientists released a report recently which stated that, should the nation enact a 20 percent renewable portfolio standard by 2020, 185,000 new jobs would be created to meet that standard. In addition, \$66.7 billion could be generated in new capital investment, \$25.6 billion could be created in income to farmers, ranchers, and rural landowners, and \$2 billion could be generated in new local tax revenues. According to the report, "A renewable electricity standard would benefit the U.S. economy in other significant ways. For example, dollars invested in clean energy go toward high-quality jobs in manufacturing and construction, as well as jobs in operations, maintenance, finance, sales, shipping, and other industries. Jobs are also created when these workers spend their income on goods and services and when consumer energy bill savings are spent in the local economy." [Union of Concerned Scientists: Cashing in on Clean Energy, [2007](#)]

More Jobs Are Created By Investing in Renewables Than By Comparable Investments in Fossil Fuels. Studies show four times as many jobs per megawatt of installed capacity as natural gas and 40 percent more jobs per dollar invested than coal, renewables support substantial numbers of new jobs in manufacturing and the construction trades. The addition of over 70,000 megawatts of wind power that is expected to come online over the next decade, alone, would generate \$75 billion in new investment. [Apollo Alliance: New Energy for America, [January 2004](#)]

Investing in Energy Efficiency Creates Jobs. Increasing incentives for energy efficiency also creates substantial new construction investment and good jobs retro-fitting buildings. Energy efficiency is far more

labor intensive than generation, creating 21.5 jobs for every \$1 million invested, compared to 11.5 jobs for new natural gas generation. These jobs include installation, ongoing operations and maintenance of building systems, and new manufacturing to meet the increased demand for energy efficient appliances and building systems. Shifting spending from wasted energy costs to investments in skilled labor new technology. [Apollo Alliance: New Energy for America, [January 2004](#)]

Labor Leaders Support Investment in Renewable Energy Because of Its Employment Potential, Including Jobs in Technical and Building Trades. According to United Steelworkers President, Leo Girard, “Investments in environmentally friendly alternative energy programs at the state level, supported by federal initiatives, can create a new surge of quality job growth while significantly reducing our dependence on foreign oil.” In addition, one recent press account reported many union leaders are betting that a green economy will not only address the issue of climate change, it will also provide a wealth of well-paying manufacturing jobs - the kinds of jobs that have largely vanished from the United States in recent decades. A proliferation of wind turbines, solar panels and geothermal turbines means more factories, while ever more stringent efficiency standards imply the need for inspectors and experts in sealing and insulating. “From labor unions’ point of view, these are the kinds of jobs their unions are most prepared for,” said Jeff Rickert, vice president of the Apollo Alliance. In addition, some have argued that making heavy machinery such as wind turbines far from where they would be used, will not be cost-effective. Neither will transmitting energy over long distances. Meaning, jobs will be more evenly distributed as well. [Sierra Club Press Release 11/2/06; Christian Science Monitor, 1/25/07]

Labor Leaders Argued Other Countries Have Made the Investment in Renewable Energy and Have Seen Results. In an opinion piece published in the Salem Statesman Journal, the President of a United Steelworkers Local joined forces with a local environmental activist. Together, Al Dorgan, President of the United Steelworkers of America Local 7150 in Oregon and Megan Ahearn, a field organizer with Environment Oregon, wrote: “The U.S., once the world leader in renewable energy technology, has fallen behind Japan, Germany and Spain. *Germany, a country with a land mass the size of Oregon, employs more than 40,000 workers in its wind energy industry; Denmark employs another 20,000.* Both of these countries have wind resources that are only a fraction of those in our nation's windiest states. *In Germany, the wind energy industry is the second-largest consumer of steel next to the automotive industry.* Communities, counties and states have realized how immense the potential benefits are. Twenty-three states have passed renewable-energy standards, committing to renewable energy targets as high as Oregon’s 25 percent by 2025. Oregon’s renewable energy standard has helped draw two new solar-chip manufacturing facilities to the state and attracted the interest of wind developers who already are approaching Oregon farmers about hosting wind turbines.” [Statesman Journal, 8/1/07 (emphasis added)]

STATE INITIATIVES AROUND THE COUNTRY

Below are examples from states across the country that have seen, or are projected to see, job growth from investment in renewable energy. While not meant to be a conclusive list, the section provides specific examples of companies in the renewable sector hiring workers in states or re-using old factories and mills for future employment. In addition, comments by key business leaders are highlighted.

HIGHLIGHTS:

- ✓ **Two major companies have brought jobs to Pennsylvania because of the state's commitment to renewable energy.**
- ✓ **Wisconsin ranks 8th nationwide in potential job gains linked to the expansion of renewable energy**

Arizona

According to the Arizona Solar Energy Industries Association, An Investment in Solar Power Could Double or Triple the Number of Jobs in The Industry Across the State. Sean Seitz, president of the Arizona Solar Energy Industries Association, said an increase in the use of solar power by utilities could double or triple the 900 Arizona jobs in the solar energy industry in just a few years. The move to renewable energy sources will also reduce the dependence on fossil fuels, like natural gas, which have seen dramatic price increases in recent years. "We're at the mercy of outside forces when it comes to our energy future in Arizona," he said. [Arizona Capitol Times, 11/3/06]

California

One Prominent Silicon Valley Venture Capitalist Stated The Development of Alternative Fuels Is Creating Jobs in California. Vinod Khosla, one of Silicon Valley's leading venture capitalists, argued the development of alternative fuels, even at an early stage, is creating jobs in California. Khosla added that it will *take off when governments do more to limit oil and coal use*. A University of California-Berkeley study found more jobs will be generated by investing in renewable energy than in a comparable investment in fossil-fuel sources that exist today. [Inside Bay Area, 9/27/07 (emphasis added)]

One Community Leader Announced He Was Getting Support for His Program to Train Solar-Panel Installers. Oakland activist Van Jones said more than 50 businesses announced support for Green for All, a project to fund job-training for solar-panel installers and other skilled work. The city of Oakland made a \$250,000 contribution for one program. Employers say they will need a highly trained green-collar workforce, and this could mean good jobs for African Americans and others in cities, said Jones, who co-founded the Ella Baker Center for Human Rights, based in Oakland. [Inside Bay Area, 9/27/07]

Massachusetts

The Renewable Energy Sector is the State's 10th Largest. The renewable energy industry is poised to become the 10th largest job sector in Massachusetts, surpassing the textile industry that was once a staple in the region. While textiles are losing jobs at a rate of about 5 percent a year, the clean energy sector is expected to grow 20 percent annually, adding to the 14,400 jobs already in the state. "It's a growth industry because we have some of the right makings for it to be successful. We have universities generating the technology leading to start-up companies. Secondly, we have a skilled technical workforce. And, third, we have a heritage in the clean energy sector," said Warren Leon, director of the Renewable Energy Trust. According to a report published by the Massachusetts Technology Collaborative, the state has added 116 new renewable energy companies, mostly

small start-ups, since 2001, adding to the now total 556 companies statewide. The clean energy sector is expected to add more than 2,800 in the next year pushing it past the textile industry, which now employs 15,400 people statewide. [Sentinel & Enterprise, 8/20/07]

Pennsylvania

Two Major Companies Have Brought Jobs to Pennsylvania Because of the State's Commitment to Renewable Energy. According to the state's Department of Environmental Protection, Pennsylvania's commitment to renewable energy has already brought jobs to the state. Two companies that are giants in the renewable energy industry, Gamesa and Iberdrola, have recently established their North American headquarters in Pennsylvania. [York Dispatch, 8/13/07]

- **Spanish Wind Energy Giant Gamesa, is Building a Manufacturing Plant on the Site of a Closed Steel Mill.** Spanish wind giant Gamesa Corp. is building a manufacturing plant in Edensburg, Pa., on the site of a closed steel mill. In all, Gamesa will bring 1,000 jobs to Pennsylvania, some 230 of them long-term manufacturing jobs. [Christian Science Monitor, 1/25/07]

Wisconsin

Wisconsin Ranks 8th Nationwide In Potential Job Gains Linked to the Expansion of Renewable Energy. Wisconsin ranks eighth in the nation in terms of potential job gains that could be linked to an expansion of renewable energy, according to a report released last year. The report surveyed sectors of the economy that could be tapped for expansion as development of renewable energy - whether wind, solar, geothermal or biomass - expands. The Wisconsin Apollo Alliance and the Renewable Energy Policy Product report said the state ranks fourth in the nation for potential jobs to be gained in wind energy manufacturing. "Because of its traditional manufacturing base, *Wisconsin is poised to gain 14,061 jobs at existing manufacturing facilities,*" the report says. "Across the state, over 1,300 Wisconsin firms now manufacture products similar to those used in renewable energy systems." [Milwaukee Journal Sentinel, 2/1/06 (emphasis added)]