

## Understanding “Green Jobs”

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The U.S. economy has lost over 7 million jobs in the past two years and has a 9.7 percent unemployment rate.<sup>1</sup> Despite signs of economic recovery, job creation has been slow going and it will probably take many years for the United States to return to previous employment levels. Growing public dissatisfaction about the “jobless recovery” has put the current political focus squarely and intensely on job creation. Green jobs have emerged as one possible avenue for creating new jobs and economic opportunity during a period of high unemployment. The need to transition away from carbon based fuels in order to combat climate change and find alternative sources of energy to provide greater energy security is seen by many as a transformative economic opportunity with the potential to revitalize U.S. economic competitiveness and create new jobs. On the flip side, like many job creation strategies, green jobs are seen by some as a strategy that is being oversold to the American public, a more expensive route for new job creation, and not capable of bringing about the scope or scale of economic transformation or job growth envisioned by green job advocates. Most of the studies conducted thus far have been done by those who advocate for or against green jobs and are therefore biased. As interest in green jobs grows (indeed many countries around the world are employing similar green job strategies), however, so too will the need to study and understand green job trends. The following is a preliminary survey of a sampling of green job studies and key questions surrounding the green jobs debate.

### **What is a Green Job?**

The definition for green jobs varies. The Center for American Progress, a leading progressive policy think tank and advocacy organization, defines green jobs as “living-wage, career-track jobs that contribute to preserving or enhancing environmental quality,”<sup>2</sup> and as “new demand for labor that results from investments in transitioning our economy away from carbon-intensive energy, minimizing degradation of our natural resources, maximizing the efficient use of our

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<sup>1</sup> Department of Labor reports that as of January 2010, unemployment stood at 9.7% down from 10% in December 2009

<sup>2</sup>Center for American Progress. “Green Jobs 101” (Factsheet). December 11, 2008.  
[http://www.americanprogress.org/issues/2008/12/pdf/green\\_jobs101.pdf](http://www.americanprogress.org/issues/2008/12/pdf/green_jobs101.pdf)

natural capital, and protecting humans and the planet from pollution and waste.”<sup>3</sup> Vice President Biden’s Middle Class Task Force (MCTF) states that green jobs (1) “involve some task associated with improving the environment;” (2) “provide a sustainable family wage, health and retirement benefits, and decent working conditions;” and (3) “should be available to diverse workers across the spectrum of race, gender, and ethnicity.”<sup>4</sup> Meanwhile, the Council of Economic Advisors report defines green jobs quite broadly as jobs in any of the following areas: energy efficiency; renewable [energy] generation; grid modernization; advanced vehicles and fuel technologies; traditional transit and high-speed rail; carbon capture and sequestration; green innovation and job training; clean energy equipment manufacturing; and an “other” category for jobs which do not fit in any of the above.<sup>5</sup> Until a standard and more specific definition is developed for what is to be considered a green job, estimates and predictions for the potential for green job creation will differ greatly.

### Why do green job estimates vary so widely?

Determining the number of green jobs generated in the U.S. economy is difficult for several reasons. The first is the definitional issue raised above: the broader the definition the greater the number of potential jobs. The second reason is that many of the studies try to quantify the number of green jobs created as a result of a particular act. For example, several studies estimate the number of green jobs created by the U.S. stimulus spending, congressional climate legislation, or a particular renewable energy standard or goal. Third, estimating the number of green jobs becomes more complex when considering the direct, indirect, and induced employment effects of clean energy investments.<sup>6</sup> Should green job estimates include jobs

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<sup>3</sup> Hendricks, Light and Goldstein. “Seven Questions About Green Jobs.” Center for American Progress, April 22, 2009. [http://www.americanprogress.org/issues/2009/04/green\\_jobs\\_questions.html/#q7](http://www.americanprogress.org/issues/2009/04/green_jobs_questions.html/#q7)

<sup>4</sup> Middle Class Task Force, “Green Jobs: A Pathway to a Strong Middle Class.” March 13, 2009, pg. 5. [http://www.whitehouse.gov/assets/documents/mctf\\_one\\_staff\\_report\\_final.pdf](http://www.whitehouse.gov/assets/documents/mctf_one_staff_report_final.pdf)

<sup>5</sup> Council of Economic Advisors, “The Economic Impact of the American Recovery and Reinvestment Act of 2009.” pg. 32-35. <http://www.whitehouse.gov/sites/default/files/microsites/100113-economic-impact-arra-second-quarterly-report.pdf>

<sup>6</sup> Pollin, Heintz, and Garrett-Peltier “The Economic Benefits of Investing in Clean Energy: How the economic stimulus program and new legislation can boost U.S. economic growth and employment.” June 2009, pg. 27. [http://www.americanprogress.org/issues/2009/06/pdf/peri\\_report.pdf](http://www.americanprogress.org/issues/2009/06/pdf/peri_report.pdf)

The authors define these terms in less detail. In order for job creation to be classified as a direct effect of investment, the job must be immediately created or necessitated by the investment made. For example, an investment in weatherization has a direct employment effect, because the construction company receiving the investment must hire a new worker to replace inefficient windows, among other tasks. An indirect employment effect is somewhat more removed from the initial investment, but would likely not have been created otherwise. These jobs usually exist in intermediate industries, which aren’t immediately responsible for improving the environment. For example, an investment in wind energy necessitates the production of additional wind turbines, which in turn increases demand for intermediate products such as bolts and sheet metal. It is in those intermediate

created or preserved because of spending directed toward environmental goods and services? If so, the estimated number of green jobs grows considerably. Finally, making sense of all the estimates requires a thorough investigation of the assumptions behind the numbers. The reports produced by the Council of Economic Advisors and the Vice President's Office notate its predictions of future job creation in job-years. A job-year is "the equivalent of one worker employed for one year."<sup>7</sup> The use of the term job-year in the report reflects the short-run focus of the study,<sup>8</sup> and draws attention back to the administration's focus on relatively short-term jobs such as retrofitting and weatherization.<sup>9</sup> Of the studies reviewed, green job estimates range from 719,600<sup>10</sup> job-years to 2.5 million<sup>11</sup> jobs depending on these factors.

### **Is investing in green jobs preferable to new jobs in other sectors of the economy?**

Advocates of green job creation argue that green jobs, and the clean energy investments which create them, are more beneficial than similar job creation and investments in other industries, particularly the fossil fuel industry,<sup>12</sup> for several reasons. First, the reports argue that the high labor intensity of the clean energy industry make it a more appealing industry for creating employment. In other words, advocates argue that investment in the green economy results in more jobs because the sector is more dependent upon labor than upon capital<sup>13</sup> and more of the invested money is spent upon labor than on land, office space, machinery, etc. This argument is dependent upon the segment of the clean energy economy that is being considered, as jobs such as construction and insulation should have significantly higher labor intensities than a sector such as wind power. Second, advocates claim green investment has the potential to create a significant number of well-paying jobs. One report suggests that green investment can produce approximately three times as many jobs at a higher wage than an identical investment in the oil industry.<sup>14</sup> Finally, the reports state that the domestic content of such investments are high

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industries facing increased demand that indirect effects are felt. Finally, induced employment effects are created when the holders of new jobs created by the direct and indirect effects of investment spend their newly earned wages, expanding the market for consumer goods. Induced effects are usually seen in retail, manufacturing, and service industries. For example, when the window installers from the direct effects example buy new cars with their new paychecks, there is potential for new jobs to be created in the auto industry.

<sup>7</sup> Council of Economic Advisors, pg. 39.

<sup>8</sup> Council of Economic Advisors, pg. 38.

<sup>9</sup> Brief explanations of the methodologies used are provided for each of the major reports in the matrix at the end of this document.

<sup>10</sup> Council of Economic Advisors, pg. 38.

<sup>11</sup> Pollin, Heintz and Garrett-Peltier, pg. 34.

<sup>12</sup> The fossil fuel industry is seen as a natural point of comparison due to the competition among sectors for energy investments.

<sup>13</sup> Pollin, Heintz, and Garrett-Peltier, pg. 31.

<sup>14</sup> The higher wage used in these studies is \$16 per hour. Pollin, Garrett-Peltier, Heintz, and Scharber, "Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy." September 2008, pg. 11.

relative to other industries, resulting in a high domestic impact.<sup>15</sup> Because the green economy is comprised of many activities which cannot take place or be imported from abroad, such as retrofitting and weatherization, installation and upkeep of electric grids and wind turbines, etc.,<sup>16</sup> the U.S. economy is far more likely to benefit substantially from investment in this sector than from investment in industries with lower domestic content and greater import dependencies.<sup>17</sup>

Jobs which have been created from the immediate investments have been concentrated in construction and simple manufacturing positions, which are not the high paying jobs that these reports suggest will dominate the clean energy economy. According to Robert Pollin of the Political Economy Research Institute, 30 percent of the jobs created by the nearly \$80 billion in green spending allocated through the American Recovery and Reinvestment Act will go to construction.<sup>18</sup> The jobs which stand to be created from clean energy investments span the full range of jobs which are currently in existence.

Many within other sectors of the economy, the oil and gas industry for example, refute many of the green job advocates' claims and site the importance their industry plays not only as a creator of jobs but a creator of green jobs through the promotion of carbon mitigation technologies. The American Petroleum Institute claims to have created 1.2 million green jobs between 2000 and 2008 in the oil and gas sector.<sup>19</sup> Critics of green job creation through public spending have focused on several primary issues, which include the potential protectionist nature of such spending, rising energy costs as the result of adopting more expensive alternative energy technologies,<sup>20</sup> green jobs as expensive 'government-subsidized jobs'<sup>21</sup>, the merits of jobs outside the green sector (fossil fuel industry primarily) and the sustainability of green job creation following the end of stimulus spending in 2012.

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[http://www.americanprogress.org/issues/2008/09/pdf/green\\_recovery.pdf](http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf) The authors also recognize that this argument has generated significant criticism, although the exact source of such critiques is not identified.

<sup>15</sup> Pollin, Heintz, and Garrett-Peltier, pg. 31.

<sup>16</sup> Pollin, Heintz, and Garrett-Peltier (pg. 36) identify retrofits, mass transit, and freight rail as being the industry's with the highest domestic content (97 percent) in the clean energy economy.

<sup>17</sup> A number of organizations, including the Heritage Foundation, have anecdotally challenged this argument as being protectionist, however such critiques do not appear to have been substantiated statistically.

<sup>18</sup> NPR, "What Kind of Green Jobs Will the Stimulus Spawn," February 10, 2009.

<sup>19</sup> <http://www.api.org/Newsroom/job-summit-missed.cfm>

<sup>20</sup> Hendricks, Light and Goldstein.

<sup>21</sup> Hendricks, Light and Goldstein. Also see Kreutzer, David, "Subsidized Green Jobs Destroy Jobs Elsewhere." The Foundry by The Heritage Foundation, September 3, 2009. <http://blog.heritage.org/2009/09/03/subsidized-green-jobs-destroy-jobs-elsewhere/>

**How are green jobs created and what kind of green jobs is the administration targeting?**

The conventional wisdom predominant in most of the literature states that green jobs are created through a combination of policies that promote energy efficiency and renewable energy markets, investments in clean energy projects and products and research, and tax and regulatory environments that encourage green job creation. There is little empirical evidence provided in or conclusion to be drawn from reports released by the Council for Economic Advisors and the Vice President's Office as to exactly what kinds of jobs are being created through the stimulus and other policy measures. In rhetoric the administration is highlighting the benefits of the higher end jobs in green technology manufacturing, which can provide a worker with a salary of \$16-20 an hour. Manufacturing jobs are created through a boost in domestic production of wind turbines and solar panels, and this can be helped with policies that provide manufacturers with incentives to produce in the United States. Other policies and spending programs, specifically the weatherization and infrastructure programs that the recovery act focuses heavily on, tend to produce a different class of jobs. Construction and installation jobs tend to provide workers with a salary closer to \$10 an hour. While these jobs perform a necessary role in the economy and in keeping the country running, they cannot alone create employment or economic recovery of the magnitude which is needed today.

**What kinds of green jobs data are available?**

The green jobs literature considered in the preparation of this report can generally be sorted into one of five categories- theoretical reports, advocacy reports, policy and evaluation reports, government reports, and green jobs critiques (see table below for categorized illustrative examples). "Theoretical" literature outlined the spectrum of possibilities for the green economy in terms of benefits and job creation, while others simply explored the theoretical reasons for investment in a green economy. Advocacy reports are generally intended to drum up support for investments in a particular industry or sector based upon their ability to contribute to economic well-being through promoting job creation. The reports which have been published by government agencies have sought either to explain or justify government policy toward clean energy investment and green jobs, or to quantify the effects that existing policies have had upon job creation or investment. Independent policy or evaluation reports have generally attempted to look at the impact of green investments upon job creation and/or economic recovery through analysis of previous, existing or potential programs and policies, and offer the most rigorous (for the most part) modeling and projection oriented work. Finally, several reports which have called into question some of the assumptions and arguments underlying the push for green jobs, but for

the most part critiques of green jobs literature have largely been limited to blogs and anecdotal evidence from organizations such as the Heritage Foundation.<sup>22</sup>

Organization/ Agency/ Author	Report Title	Assertion	Date of Publication
<b>Government Reports</b>			
Council of Economic Advisors	<a href="#">The Economic Impact of the American Recovery and Reinvestment Act of 2009</a>	Quantitative assessment of ARRA expenditure and resulting job expansion; finds that 719,600 job years could be created by 2012	January 2010
Office of the Vice President	<a href="#">Progress Report: The Transformation to a Clean Energy Economy</a>	Document intended to outline the accomplishments to date of the ARRA investments and to identify expectations of future progress	December 2009
Middle Class Task Force	<a href="#">Green Jobs: A Pathway to a Strong Middle Class</a>	Largely qualitative assessment of the impact that green jobs creation could have on the US middle class	March 2009
Middle Class Task Force	<a href="#">Recovery Through Retrofit</a>	Analysis of the economic impacts of legislation mobilizing capital for building retrofitting and weatherization	October 2009
United States Conference of Mayors/ Global Insight	<a href="#">U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy</a>	Analysis of potential drivers for green job growth, including renewable power generation, energy efficiency, renewable transportation fuels	October 2008
<b>Policy and Evaluation Reports</b>			
PERI	<a href="#">Job Opportunities for the Green Economy: A State-by-State Picture of Occupations that Gain From Green Investment</a>	Examines the potential areas of green job creation (retrofitting, mass transit, energy-efficient automobiles, wind power, solar power, and cellulosic biomass fuels) on a state-by-state basis	June 2008
PERI/ CAP	<a href="#">Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy</a>	Finds that \$100B investment in green infrastructure and energy (not ARRA spending) would create 935,200 direct, 586,000 indirect, and 496,000 induced jobs by 2016	September 2008
PERI/ CAP	<a href="#">The Economic Benefits of Investing in Clean Energy: How the economic stimulus program and new legislation can boost U.S. economic growth and employment</a>	Finds that \$150B investment from ARRA and ACESA legislation would create 2.5M jobs (1.7M net), sustainable with continued \$150B annual investment	June 2009
PERI/ NRDC/ Green for All	<a href="#">Green Prosperity: How Clean-Energy Policies Can Fight Poverty and Raise Living Standards in the</a>	Finds that \$150B investment from ARRA and ACESA legislation would create 1.7M net jobs, looks at the socio-economic groups which would benefit from such job	June 2009

<sup>22</sup> Many of the advocacy reports also rely on anecdotal evidence but there seems to be a bigger push within the pro-green jobs community to dedicate resources to model and quantify green job opportunities within the economy.



	<a href="#">United States</a>	creation	
Pew Charitable Trusts	<a href="#">The Clean Energy Economy: Repowering Jobs, Businesses and Investments Across America</a>	An analysis of green jobs creation and performance through 2007, which found that green jobs outperformed traditional job growth in 38 states	June 2009
Economic Policy Institute	<a href="#">Green Investments and the Labor Market: How many jobs could be generated and what type?</a>	Found that annual investments of \$100B over ten years would yield \$160B in additional output, 1.1M net jobs, increase in relative wages of workers without four-year college degrees for each year of investment	April 2009
<u>Theoretical Reports (still generally advocacy but attempts to lay a theoretical foundation)</u>			
United Nations Environment Programme/ WorldWatch Institute	<a href="#">Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World</a>	Quantitative assessment of existing green jobs market with predictions of future green jobs potential on a global scale	September 2008
Van Jones	<a href="#">The Green Collar Economy</a>	Advocates a transition to a green economy through social, environmental, and fiscal programming to move the nation to a more sustainable state	2008
<u>Targeted Advocacy Reports</u>			
American Solar Energy Society	<a href="#">Estimating the Jobs Impact of Tackling Climate Change</a>	Finds that 4.5 million jobs (net) could be created by 2030 with aggressive action to limit climate change	October 2009
U.S. Green Building Council/ Booz Allen Hamilton	<a href="#">Green Jobs Study</a>	Looks at the impact upon jobs creation that would result from green construction (as much as \$140B by 2013)	November 2009
RES Alliance for Jobs/ Navigant Consulting, Inc.	<a href="#">Jobs Impact of a National Renewable Electricity Standard</a>	Finds that the creation of a 25% national RES by 2025 would result in 274,000 additional jobs	February 2010
<u>Critical Reports</u>			
Beacon Hill Institute	<a href="#">“Green Collar” Job Creation: A Critical Analysis</a>	Critique of three prominent reports, finds that green jobs policies will harm economic growth	June 2009
Institute for Energy Research	<a href="#">Green Jobs: Fact or Fiction?</a>	Analysis of the underlying economic assumptions of existing reports	January 2009