



## Renewable Energy and Energy Efficiency Jobs Created by the American Recovery and Reinvestment Act of 2009

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According to a report by Jared Bernstein and Christina Romer, the American Recovery and Reinvestment Act of 2009 has the potential to create almost 3.7 million jobs. Of these, 541,000 will result from investments in energy and infrastructure.<sup>1</sup> By contrast, the Political Economy Research Institute estimates that, for every \$1 million in new spending on building retrofits, public transit, smart grid projects, and renewable energy, 16.7 direct jobs are created.<sup>2</sup> With an estimated \$110 billion in funding for clean energy included in the final version of the Recovery Act, the result would be over 1.8 million jobs created.

Based on our research, which breaks out by type each green investment included in the Recovery Act, **we estimate that the total investment of \$110 billion will create almost 2 million direct jobs** in energy efficiency, renewable energy, smart grid projects, public transit and transportation infrastructure construction, advanced battery and alternative-fuel vehicle manufacturing.

While the Recovery Act invests some \$4.9 billion in job training, only a portion of that (\$1.15 billion) is specifically directed toward training in the energy efficiency, renewable energy, and advanced manufacturing sectors. **This amount will only allow approximately 276,000 workers to access green jobs training opportunities** and gain the skills needed to participate in the growing clean energy economy. Such an amount falls far short of the expected demand created by Recovery Act clean energy investments.

The Apollo Alliance recommends directing the maximum amount of training funds provided by the Act toward green job training, and that these opportunities be directly linked to jobs created by clean energy investments. The Apollo Alliance further recommends that priority be given to programs developed by multi-stakeholder training partnerships, with preference for those developed by labor-management partnerships. Finally, the Apollo Alliance recommends that a portion of training funds be directed toward 'pathways out of poverty' programs that provide opportunities to youth, disadvantaged populations, and those with barriers to employment.

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<sup>1</sup> Romer, C. and Bernstein, J. The Job Impact of the American Recovery and Reinvestment Plan (January, 2009). [http://www.politico.com/static/PPM116\\_obamadoc.html](http://www.politico.com/static/PPM116_obamadoc.html)

<sup>2</sup> Pollin, R. Testimony Before the House Committee on Education and Labor (October 24, 2008).

The following analysis details our assumptions:

## I. Energy Efficiency

It is estimated that every \$1 million spent on energy efficiency retrofits generates about 10 person years of employment in direct installation of efficiency measures and another 3-4 person years in the production of relevant materials.<sup>3</sup> In addition, every one direct construction job supports 1.9 indirect jobs in other sectors.<sup>4</sup>

The American Recovery and Reinvestment Act invests \$34 billion in improving energy efficiency in public buildings and subsidized housing, including:

- \$3.2 billion for the Energy Efficiency and Conservation Block Grant program
- \$3.1 billion for the State Energy Program
- \$4.5 billion for renovations and repairs to federal buildings with a focus on increasing energy efficiency.
- \$4 billion to HUD for repair and modernization of low-income housing, including energy efficiency upgrades
- \$2.25 billion for a new program to upgrade HUD sponsored low-income housing to increase energy efficiency, including new insulation, windows, and furnaces.
- \$2.25 billion to the HOME Program to help local communities build and rehabilitate low-income housing using green technologies.
- \$3.2 billion for Qualified Energy Conservation Bonds, to be used for green community programs that use loans or other such repayment mechanisms to support energy efficiency programs
- \$510 million for Native American Housing Block Grants to perform energy efficiency improvements
- \$4 million to create a federal Office of High-Performance Green Buildings
- \$4.23 billion for energy efficiency improvements in Department of Defense facilities
- \$1.45 billion for military hospital construction and energy efficiency improvements
- \$300 million to provide consumers with rebates for buying energy efficient Energy Star products to replace old appliances

A total investment of \$29 billion in energy efficiency would create **290,000 jobs construction jobs**, as well as an additional **116,000 jobs in materials manufacturing**.

The Recovery Act also provides \$5 billion to the Weatherization Assistance Program. According to the Department of Energy, weatherization creates 52 direct jobs for every \$1 million in WAP funding, as well as additional jobs for subcontractors and material suppliers.<sup>5</sup> This \$5 billion investment will create an additional **260,000 direct jobs in**

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<sup>3</sup> Rogers, Joel. *Seizing the Opportunity (for Climate, Jobs, and Equity) in Building energy Efficiency* (COWS, December 2007).

<sup>4</sup> Bivens, J. *Updated Employment Multipliers for the U.S. Economy* (EPI, 2003).

<sup>5</sup> DOE WAP data quoted in CAP Green Recovery Plan

**the construction sector**, performing auditing and installation of efficiency improvements.

## II. Renewable Energy

The Recovery Act makes some important investments in expanding deployment of renewable energy technologies. This includes:

- \$6 billion in loan guarantees for renewable energy power generation and transmission projects, and biofuel projects, to leverage \$60 billion in loans
- \$300 million to the Department of Defense for testing and deployment of energy efficient and renewable energy technologies
- \$1.6 billion in Clean Renewable Energy Bonds (CREBs) to finance RE generation facilities

It is estimated that, for every \$1 billion invested in wind, solar, geothermal, or biomass technologies, an average of 6,000 jobs are created.<sup>6</sup> Additionally, the Center for American Progress estimates that, in general, approximately five full-time component manufacturing jobs are created for every \$1 million of investment in renewable energy systems.<sup>7</sup> A total federal investment of almost \$7.9 billion in renewable energy, which will leverage an additional \$60 billion in loans for renewable energy projects, would create **371,400 direct jobs in systems installation** and another **309,500 jobs in component manufacturing**.

## III. Smart Grid

The American Recovery and Reinvestment Act invests \$10.9 billion in smart-grid related activities, including work to modernize the electric grid. For every \$1 million invested in smart grid installation, 5.2 direct utility jobs are created.<sup>8</sup> Therefore, a \$10.9 billion investment in smart grid demonstration projects would create or retain a total of **56,680 direct jobs** for utility workers.

## IV. Carbon Capture and Sequestration

The American Recovery and Reinvestment Act provides a total of \$3.4 billion for carbon capture demonstration projects.

As an example, we can look at the FutureGen Carbon Capture and Sequestration demonstration project. It is estimated that the FutureGen project will cost approximately \$1.5 billion and create a total of more than 3,000 jobs, including 1,300 immediate direct

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<sup>6</sup> Apollo Alliance, 2009

<sup>7</sup> Sterzinger, George. *Component Manufacturing: Michigan's Future in the Renewable Energy Industry*. REPP, 2006; *Redefining the Prospects for Sustainable Prosperity, Employment Expansion, and Environmental Quality in the U.S.: An Assessment of the Economic Impact of the Initiatives Comprising the Apollo Project*. The Perryman Group, 2003.

<sup>8</sup> Data from *Green Recovery Program* analysis, Political Economy Research Institute, University of Massachusetts - Amherst

jobs in construction, 510 jobs in operations, and 1,225 indirect jobs in manufacturing, transportation, and other sectors.<sup>9</sup> Once the technology is commercialized it will provide thousands more workers with construction and manufacturing jobs as they retrofit power plants across America.

A \$3.4 billion investment in Carbon Capture and Sequestration, therefore, would create approximately **6,800 direct jobs**, including 2,960 construction jobs, 1,110 jobs in operations, and 2,810 jobs in manufacturing.

## V. Public Transit

The American Recovery and Reinvestment Act provides \$17.7 billion for ready-to-go public transit investments. These investments include:

- \$8.4 billion for transit capital investments
- \$9.3 billion for rail projects, including Amtrak and high-speed intercity rail

The Surface Transportation Policy Project estimates that, for every \$1 billion in federal dollars spent on new public transportation projects, nearly 51,300 jobs are created, around 24 percent of which are direct jobs.<sup>10</sup> A \$17.7 billion investment in ready-to-go transit projects would create or retain more than **218,000 direct jobs**.

## VI. Transportation Infrastructure

It is essential that stimulus infrastructure funds be used to support maintenance and repair of existing highways, bridges, and tunnels rather than being used for new construction. The Recovery Act makes number of significant investments in transportation infrastructure:

- \$27.5 billion for highway projects, including highway and bridge repair and resurfacing projects
- \$1.5 billion to the Department of Transportation for competitive grants to state and local governments for transportation improvements
- \$142 million to the US Coast Guard for bridge repair projects
- \$100 million in assistance to small shipyards

The Federal Highway Administration estimates that every \$1 billion in federal dollars spent on maintaining and repairing existing bridges and roads supports a total of 34,779 jobs, including 11,921 direct construction jobs and 22,858 indirect jobs.<sup>11</sup> Additionally, the Surface Transportation Policy Project estimates that, for every \$1 billion spent on federally-aided highway resurfacing projects, some 10,421 person-years of construction

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<sup>9</sup> Altman, I. The Economic Impacts of Clean Coal for Illinois (Southern Illinois University, 2007).

<http://www.futuregenforillinois.com/media/SIU-FutureGen%20FINAL%20Report.pdf>

<sup>10</sup> Surface Transportation Policy Project. *Setting the Record Straight: Transit, Fixing roads Offers Greatest Job Gains* (January 2004). [http://www.transact.org/library/decoder/jobs\\_decoder.pdf](http://www.transact.org/library/decoder/jobs_decoder.pdf)

<sup>11</sup> Federal Highway Administration. *Employment Impacts of Highway Infrastructure Investment* (2007).

jobs are generated.<sup>12</sup> With a total of \$29.24 billion in fix-it-first transportation infrastructure investments, the Recovery Act will create over **348,000 direct jobs** for highway construction workers and laborers.

## VII. Advanced Battery Manufacturing

The American Recovery and Reinvestment Act invest \$2 billion in grant funding for the manufacturing of advanced batteries systems and components.

A \$2 billion investment in advanced battery manufacturing will create or retain an estimated **8,470 direct manufacturing jobs**, as well as an additional 24,560 indirect jobs among suppliers and associated industries<sup>13</sup>.

## VII. Alternative-fuel Vehicles

Finally, the Recovery Act provides over \$1.3 billion to federal agencies, cities, and public transit authorities to purchase fuel-efficient and alternative-fuel vehicles.

- \$300 million to help states and cities purchase alternative-fuel transit vehicles
- \$300 million to replace older fleet vehicles owned by the federal government with alternative fuel automobiles
- \$400 million for grants to state and local governments for projects to develop infrastructure that supports widespread use of Plug-in Hybrid Electric Vehicles
- \$300 million to EPA for Diesel Emission Reduction programs

A study by Cambridge Systematics estimates that a \$10 billion transit capital investment results in approximately 47,000 direct jobs in durables manufacturing, as well as over 208,000 indirect jobs.<sup>14</sup> The Electric Drive Transportation Association estimates that, for every \$1 million of investment in electric transportation infrastructure, between 5 and 7 jobs are created.<sup>15</sup> Additionally, a \$600 million investment in programs to deploy electric drive vehicles and infrastructure could create between 3,000 and 4,000 direct jobs.<sup>16</sup> A \$1.3 billion investment in new clean-energy automobiles and transit vehicles, therefore, could create or retain up to **8,210 direct jobs** in vehicle manufacturing.

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<sup>12</sup> Good Jobs First

<sup>13</sup> Based on an analysis by Mike Andrew, Johnson Controls Power Solutions (December 2008)

<sup>14</sup> Cambridge Systematics. *Public Transportation and the Nation's Economy* (APTA, October 1999).

<sup>15</sup> Murray, C. *Electric Drive Transportation Job Creation: Background Memo* (Office of Senator Evan Bayh, 2008).