GREEN JOBS AND THE POTENTIAL TO DIVERSIFY THE ENVIRONMENTAL WORKFORCE

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At the apogee of the 2008 election cycle not a day passed without mention of green jobs or green collar workers. In fact, one of the most enduring slogans of the campaign was "Jobs, baby, jobs." What was intriguing about this slogan was that it was a call for green jobs, but the term green collar is not new. As early as 1976, Professor Patrick Heffernan made reference to the coming "green collar revolution" in a congressional report.[1] Despite the ubiquity of the term, there still is not consensus on what the term means or what constitutes a green job. The Department of Labor is trying to remedy this—it has placed a preliminary list of occupations that will be considered green jobs in the *Federal Register* and will begin collecting data on these.[2]

For the purposes of this discussion, I will use the term green jobs to encompass the range of jobs that are environmental in nature and that serve the purpose of environmental protection and sustainability. However, it is important to make further distinctions between different types of green jobs. Thus far, most studies of the environmental workforce have been concerned with the white collar sector of the green labor force. These are professional jobs typically requiring a bachelor's or graduate degree. However, some of the green jobs being promoted by politicians, think tanks, and grassroots activists alike are jobs social scientists traditionally described as blue collar jobs. These are skilled, semi-skilled, and unskilled jobs in manufacturing, installation, maintenance, the provision of services, and the like. The difference between these and traditional blue collar jobs is that the green collar jobs are being generated by companies using green technologies focused on sustainability, use of renewable resources, and have as their goal a reduction in the harmful effects of climate change. As Lucy Blake, CEO of the Apollo Alliance describes it, "A green-collar job is in essence a blue-collar job that has been upgraded to address the environmental challenges of our country."[3]

Green jobs are intriguing because they have the potential to diversify the environmental workforce in both race and class terms. For half a century, scholars and activists have noted the lack of diversity in environmental institutions and have called for greater diversity.[4] Studies of institutional diversity have previously

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[1] *Jobs and Prices in the West Coast Region: Hearing before the J. Economic Comm. on Employment*, 94th Cong., 2nd Sess. (1976) (statement of Prof. Patrick Heffernan).

[2] Bureau of Labor Statistics Comment Request, 75 Fed. Reg. 12,571 (Mar. 16, 2010).

[3] Steven Greenhouse, *Millions of Jobs of a Different Collar*, N.Y. TIMES, Mar. 26, 2008, http://www.nytimes.com/2008/03/26/business/businessspecial2/26collar.html.

[4] For an extensive review of the literature regarding diversity in environmental institutions and the environmental movement in general, see Dorceta E. Taylor, *Diversity*

indicated that the environmental workforce lacked race and class diversity.[5] Moreover, these studies have also indicated that the leadership of these institutions showed a persistent lack of gender diversity.[6] For example, a 1988 Conservation Fund study of 265 leaders (president, chair, chief executive officer, etc.) of environmental organizations nationwide found that 79 percent of them were male and 3 percent were under thirty years old.[7] Ninety-nine percent of the leaders had at least a bachelors degree and one-fifth had a doctorate or other professional degree.[8] Fourteen percent earned $60,000 or more annually ($110,963 in 2008 dollars).[9] The Conservation Fund also studied 180 environmental volunteers nationwide in 1988. The study found that 71 percent had a professional or managerial job while only 3 percent worked as skilled laborers.[10]

The twentieth anniversary of Earth Day brought heightened scrutiny to the environmental movement and the issue of diversity garnered much attention in 1990 and the years immediately following that milestone. In fact, in 1990, an informal poll from four of the largest environmental organizations found that only 14 (1.9 percent) of the 745 workers of the Audubon Society, Friends of the Earth, Natural Resources Defense Council, and Sierra Club were minorities.[11] Two years later a study of activists in the state of Washington found that environmental activists tended to be more educated and had higher incomes than labor activists.[12] The environmental activists had an average annual income of $67,300 while forest industry workers averaged $29,300 and construction workers earned an average of $29,000.[13] Ninety-two percent of the environmental activists had a college degree and 48 percent had advanced degrees while it was much less common to find college degrees among timber and construction workers.[14] Sixty-two percent of the environmental activists had professional occupations.[15] In comparison the mean

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and the Environment: Myth-Making and the Status of Minorities in the Field, 15 RES. SOC. PROBS. & PUB. POL'Y 89, 89–148 (2008).

[5] *Id.*; Dorceta E. Taylor, *Employment Preferences and Salary Expectations of Students in Science and Engineering*, BIOSCIENCE, Feb. 2007, at 175–85; ENVTL. CAREERS ORG., BEYOND THE GREEN: REDEFINING AND DIVERSIFYING THE ENVIRONMENTAL MOVEMENT 63–101 (1992); DONALD SNOW, INSIDE THE CONSERVATION MOVEMENT: MEETING THE LEADERSHIP CHALLENGE 47–51, 111–14 (1992).

[6] Taylor, *supra* note 5, at 89–148.

[7] SNOW, *supra* note 5, at 47–51, 111–14.

[8] *Id.*

[9] *Id.*

[10] *Id.*

[11] *Lifestyle: Earth Issues Lure a New Breed of Young Worker*, N.Y. TIMES, July 20, 1990, http://www.nytimes.com/1990/07/29/style/lifestyle-earth-issues-lure-a-new-breed-of-young-worker.html?scp=1&sq=earth+issues+lure+a+new+breed+of+Young+worker&st=nyt.

[12] FRED ROSE, COALITIONS ACROSS THE CLASS DIVIDE: LESSONS FROM THE LABOR, PEACE, AND ENVIRONMENTAL MOVEMENTS 15 (2000).

[13] *Id.* at 228.

[14] *Id.*

[15] *Id.*

income for the general population was $23,227 and 21.4 percent of the population had four or more years of college in the U.S. in 1990.[16] A subsequent study showed that of sixty-three mainstream environmental organizations found that 32 percent of the organizations had no minorities on their staff, 19 percent had no volunteers who were people of color, 22 percent had no board members who were people of color, and 16 percent had no minorities in their membership.[17]

Scholars have also examined the demographic characteristics of natural resource agencies to determine the extent of minority participation in the workforce.[18] In 1993, Clark E. Adams and Marisela Moreno evaluated the racial composition of the staff of state natural resources agencies and found that minorities constituted 8.4 percent of the 12,245 workers employed in such departments in sixteen southeastern states and the U.S. Virgin Islands.[19] More specifically Adams and Moreno found that blacks comprised 5.2 percent of the workforce, Hispanics 2.5 percent, Native Americans 0.3 percent, and Asians 0.4 percent.[20]

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[16] U.S. CENSUS BUREAU, MEAN EARNINGS OF WORKERS 18 YEARS OLD AND OVER BY EDUCATIONAL ATTAINMENT, RACE, HISPANIC ORIGIN, AND SEX: 1975 TO 1999, tbl.A-3, (2000). For related studies, see also U.S. CENSUS BUREAU, RACE AND HISPANIC ORIGIN OF PEOPLE BY MEDIAN INCOME AND SEX: 1947 TO 1998, tbl.P-2, (2000), *and* U.S. CENSUS BUREAU, CHARACTERISTICS OF AMERICAN INDIANS BY TRIBE AND LANGUAGE, Census of Population, CP-3-7, (1990), http://www.census.gov/population/www/socdemo/race/cp-3-7.html. The Environmental Careers Organization also released a study in 1992, ENVTL. CAREERS ORG., BEYOND THE GREEN: REDEFINING AND DIVERSIFYING THE ENVIRONMENTAL MOVEMENT 63, 101 (1992).

[17] *Id*. For detailed analysis of why environmental institutions lack diversity or whether minorities want to work in environmental institutions, see Taylor, *supra* note 4, at 89–148; Taylor, *supra* note 5, at 175–85.

[18] Clark E. Adams & Marisela Moreno, *A Comparative Study of Natural Resource Professionals in Minority and Majority Groups in the Southeastern United States*, 26 WILDLIFE SOCIETY BULLETIN 971, 971–81 (Winter 1998), *available at* http://www.jstor.org/pss/3783578.

[19] *Id*.

[20] *Id*. *see infra* Table 1.

Table 1. Percent of White and Ethnic Minority Employees in Southeastern Natural Resources Agencies in 1993

State	Number of Employees	Number and Percent of Each Group of Employes									
		Whites		Blacks		Hispanics		Asians		Native American	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Arkansas	423	402	95.04	17	4.02	0	0.00	2	0.47	2	0.47
Alabama	851	781	91.77	70	8.23	0	0.00	0	0.00	0	0.00
Florida	780	728	93.33	22	2.82	13	1.67	9	1.15	8	1.03
Georgia	944	922	97.67	22	2.33	0	0.00	0	0.00	0	0.00
Kentucky	341	339	99.41	2	0.59	0	0.00	0	0.00	0	0.00
Louisiana	675	653	96.74	16	2.37	5	0.74	1	0.15	0	0.00
Maryland	1,517	1,332	87.80	161	10.61	6	0.40	17	1.12	1	0.07
Mississippi	679	592	87.19	84	12.37	3	0.44	0	0.00	0	0.00
Missouri	1,796	1,764	98.22	25	1.39	2	0.11	3	0.17	2	0.11
North Carolina	472	445	94.28	20	4.24	2	0.42	1	0.21	4	0.85
Oklahoma	255	227	89.02	14	5.49	7	2.75	4	1.57	3	1.18
South Carolina	545	485	88.99	59	10.83	0	0.00	0	0.00	1	0.18
Tennessee	526	517	98.29	8	1.52	0	0.00	1	0.19	0	0.00
Texas	1,723	1,321	76.67	111	6.44	267	15.50	6	0.35	18	1.04
U.S. Virgin Islands	17	12	70.59	4	23.53	1	5.88	0	0.00	0	0.00
Virginia	322	319	99.07	0	0.00	3	0.93	0	0.00	0	0.00
West Virginia	379	373	98.42	4	1.06	1	0.26	0	0.00	1	0.26
Total	12,245	11,212	91.56	639	5.22	310	2.53	44	0.36	40	0.33

Source: Compiled from Adams, Clark E. and Marisela Moreno. 1998. A Comparative Study of Natural Resource Professionals in Minority and Majority Groups in the Southeastern United States. *Wildlife Society Bulletin* 26(4): 971-

The results of recent institutional diversity studies indicate that the percentages of minorities on the staff of environmental organizations are still low. A 2002 report that examined diversity in sixty-one organizations in the Natural Resources Council of America found that 11.5 percent of the 6,347 staff were minority.[21] How does this compare with the general population? In 2000, minorities comprised about 30 percent of the U.S. population.[22] Blacks constituted 12.3 percent of the population, Hispanics 12.5 percent, Asians 3.6 percent, and Native Americans 0.9 percent of the population.[23]

My own study of institutional diversity found that minorities comprised 15.8 percent of 20,289 staff members from 243 organizations.[24] Minorities were found to comprise 14.3 percent of the staff of mainstream environmental organizations, 14.8 percent of government environmental agencies, and 49.1 percent of environmental justice organizations.[25] Overall, blacks comprised 4.9 percent of the

[21] ROBERT G. STANTON, NATURAL RES. COUNCIL OF AM., ENVIRONMENTAL STEWARDSHIP FOR THE 21ST CENTURY: OPPORTUNITIES AND ACTIONS FOR IMPROVING CULTURAL DIVERSITY IN CONSERVATION ORGANIZATIONS AND PROGRAMS PHASE 1 (2002).

[22] U.S. CENSUS BUREAU, UNITED STATES: 2000 SUMMARY POPULATION AND HOUSING CHARACTERISTICS 5 (2002), http://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf.

[23] *Id.*

[24] Taylor, *supra* note 4, at 89–148.

[25] *Id.*

staff of the organizations, Hispanics 4.3 percent, Native Americans 4.7 percent, and Asians 2 percent.[26]

Demographic profiles of federal agencies also provide information on the level of diversity in federal environmental agencies. My analysis of this data found that there were 187,000 workers in five environmental agencies (Department of Agriculture, Department of Energy, Department of the Interior, Environmental Protection Agency, and Nuclear Regulatory Commission) plus one environmental unit of the Department of Commerce (National Oceanic and Atmospheric Administration) in 2006.[27] As Table 3 shows, males constituted 59.1 percent and females 40.1 percent of this labor force. Overall minorities constituted 23.7 percent of the workforce. More detailed analysis indicated that blacks comprised 9.6 percent, Hispanics 5.4 percent, Asians 3.1 percent, and Native Americans 5.8 percent of this workforce. I also analyzed the racial composition of the land and resource management units of the aforementioned agencies and found that they had a higher percentage of males and whites in their workforce than the federal environmental agencies in general. When only the land and resource management units were considered, males constituted 63.6 percent of the units' staffs while minorities constituted only 15.6 percent.[28]

[26] *Id.*; *see also* Table 3.

[27] P'SHIP FOR PUB. SERV. & AM. UNIV. INST. FOR THE STUDY OF PUB. POLICY IMPLEMENTATION, BEST PLACES TO WORK IN THE FEDERAL GOVERNMENT: 2007 RANKINGS (2006), http://ourpublicservice.org/OPS/publications/viewcontentdetails.php?id=91.

[28] *Id*. The ethnic make-up of that 15.6 percent is blacks 5.6 percent, Hispanics 5.2 percent, Asians 2.1 percent, and Native Americans 2.7 percent.

Table 2. Percentage of minority staff in three types of environmental organizations

Types of environmental institutions	Total Number of Organizations	Percentage of minorities on staff in environmental institutions													
		Total number of staff	White		Total minorities		Black		Hispanic		Native American		Asian		
			Number	Percent	Total number of minorities	Percent minority	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
All organizations combined	243	20,289	17,080	84.2	3,209	15.8	990	4.9	874	4.3	947	4.7	398	2.0	
Mainstream environmental orgs.	166	7,226	6,192	85.7	1,034	14.3	353	4.9	339	4.7	60	0.8	282	3.9	
Government environmental agencies	38	12,350	10,525	85.2	1,825	14.8	448	3.6	407	3.3	865	7.0	105	0.9	
Environmental justice organizations	39	713	363	50.9	350	49.1	189	26.5	128	18.0	22	3.1	11	1.5	

Table 3. Demographic Characteristics of the Workforce of Federal Environmental Agencies

Federal Environmental Agencies	Work-force Size in 2006	Gender				Race									
		Male		Female		White		Black		Hispanic		Asian		Native American	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Department of Agriculture (USDA)	85,236	48670	57.1	36566	42.9	66825	78.4	8950	10.5	5285	6.2	2301	2.7	1960	2.3
Department Commerce -- National Oceanic and Atmospheric Admin.	11,950	8162	68.3	3788	31.7	10026	83.9	1040	8.7	311	2.6	502	4.2	84	0.7
Department of Energy	14,333	8987	62.7	5346	37.3	11065	77.2	1577	11.0	846	5.9	631	4.4	215	1.5
Department of Interior	56,745	34898	61.5	21847	38.5	41481	73.1	2951	5.2	2667	4.7	1135	2	8512	15.0
Environmental Protection Agency	16,430	8215	50.0	8215	50.0	11534	70.2	3023	18.4	822	5.0	920	5.6	131	0.8
Nuclear Regulatory Commission	2,682	1733	64.6	949	35.4	2009	74.9	349	13.0	115	4.3	198	7.4	11	0.4
Total	187,376	110,664	59.06	76,712	40.94	142,939	76.28	17,889	9.55	10,045	5.36	5,687	3.04	10,913	5.82
Land and Resource Management Units															
Bureau of Land Management (Interior)	9,470	6051	63.9	3419	36.1	8097	85.5	303	3.2	625	6.6	133	1.4	313	3.3
Bureau of Reclamation (Interior)	5,381	3519	65.4	1862	34.6	4439	82.5	178	3.3	436	8.1	156	2.9	172	3.2
Farm Service Agency (USDA)	5,075	2223	43.8	2852	56.2	4207	82.9	553	10.9	183	3.6	61	1.2	71	1.4
Forest Service (USDA)	29,317	18264	62.3	11053	37.7	24861	84.8	967	3.3	1964	6.7	469	1.6	1085	3.7
National Oceanic and Atmospheric Administration (Dept. of Commerce)	11,950	8162	68.3	3788	31.7	10026	83.9	1040	8.7	311	2.6	502	4.2	84	0.7
National Park Service (Interior)	15,515	9914	63.9	5601	36.1	12769	82.3	1226	7.9	714	4.6	341	2.2	450	2.9
Natural Resource Conservation Service (USDA)	11,478	8000	69.7	3478	30.3	9687	84.4	872	7.6	471	4.1	161	1.4	287	2.5
Reclamation and Enforcement (Interior)	517	293	56.7	224	43.3	416	80.5	70	13.5	17	3.2	10	2.0	5	0.9
U.S. Fish and Wildlife Service (Interior)	7,960	4927	61.9	3033	38.1	6798	85.4	358	4.5	390	4.9	159	2.0	255	3.2
U.S. Geological Survey (Interior)	7,273	4735	65.1	2538	34.9	6415	88.2	291	4.0	276	3.8	218	3.0	73	1.0
Total	103,936	66,089	63.6	37,847	36.4	87,715	84.4	5,858	5.6	5,386	5.2	2,210	2.1	2,793	2.7

Source: Compiled from Partnership for Public Service. 2007. *Best Places to Work in the Federal Government*. Washington, D.C.: American University, Institute for the Study of Public Policy Implementation, School of Public Affairs.

At first glance, the federal environmental agencies seem to have a much higher percentage of minority workers (23.7 percent) than found in other studies. However, when only the staffs of land and resource management units were analyzed the percentages of minorities were similar to levels found in other studies—including my own. The data on the land and resource management agencies indicated that in 2006, 15.6 percent of the 103,936 workers in those units were minorities.[29] Of these units the U.S. Geological Survey was the least diverse.[30]

How does the data presented above on staffing in environmental nongovernmental organizations and government agencies compare to the science and engineering (S&E) workforce (of which the environmental workforce is a subset)? Though the level of racial diversity has increased in environmental organizations, it is still below the level of diversity found in the S&E fields and in the population at large.[31] Minorities constitute almost a fourth of the S&E workforce nationwide.[32] That is, blacks comprise 6.9 percent, Hispanics 3.2 percent, and Asians 14 percent of the S&E workforce.[33]

Thus far this Article has focused on the environmental workforce as reflected in institutions that use the environment as the core principle around which they are organized. That is, they are environmental nonprofits, and government environmental agencies. The remainder of this Article will examine the potential for green collar jobs to be a democratizing force in incorporating minorities and low-income people into the environmental workforce. The discussion of green jobs also puts the attention on different types of institutions. Instead of environmental nonprofits, universities, and government agencies, most of the green jobs being promoted will be generated by commercial enterprises. The place of work will also be more varied—the factory, in the community, and in the field, to name a few.

I. GREEN JOBS: CURRENTS LEVELS AND PROJECTED GROWTH

The environmental workforce is growing rapidly—going from about 700,000 jobs in 1970 to approximately 5.3 million in 2005.[34] Estimates of the number of jobs currently being generated in the green sector of the economy vary. As such, the American Solar Energy Society (ASES) estimated that renewable energy and energy efficiency industries generated about 8.5 million jobs and nearly $1 trillion

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[29] *Id*.

[30] *Id.* The USGS has a staff which is 88.2 percent white.

[31] Taylor, *supra* note 4, at 89–148.

[32] NATIONAL SCIENCE BOARD. NATIONAL SCIENCE FOUNDATION, NSB 06-01, SCIENCE AND ENGINEERING INDICATORS 2006 2–4, 3–19 (2006).

[33] *Id*.

[34] Roger H. Bezdek et al., *Environmental Protection, the Economy, and Jobs: National and Regional Analyses*, 86 J. ENVTL. MGMT. 63–79 (2008); CENTER FOR AMERICAN PROGRESS, GREEN JOBS BY THE NUMBERS (2007), http://www.americanprogress.org/issues/2007/11/green_jobs.html/.

in revenues in the U.S. in 2006.[35] ASES also estimates that about 40 million green jobs could be created by 2030.[36] The green industry could generate about $4.5 trillion in revenue by 2030.[37] The Bureau of Labor Statistics estimate that the number of construction jobs will increase by about 10 percent over the next eight years.[38] Other industries are expected to experience roughly the same rate of growth. Studies show that investment in renewable energy generates twice as many jobs as traditional fossil-fuel based technologies and practices.[39]

Recently states and cities have begun reporting the number of green jobs they generate. California is said to have generated 1.5 million jobs stemming from energy-efficiency policies from 1977–2007.[40] Ohio generated 6,600 renewable energy jobs and 500,000 energy efficiency jobs in 2006.[41] States and cities are also making projections about the number of green jobs they hope to generate in the future. Ohio is projected to generate 2.27 million jobs by 2030.[42] The state of Washington hopes to generate 25,000 new green jobs by 2020.[43] Indiana hopes to create 34,000 clean energy jobs: 25,180 to manufacture wind turbines and 7,485 to manufacture solar panels.[44] Michigan estimates it can create 30,000 new jobs manufacturing wind turbines.[45] Washington, D.C. expects to generate about 1,400 new construction jobs over the next six years.[46] There are also estimates of the number of jobs generated in the different renewable energy and energy efficiency

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[35] Renewable energy technologies are defined as hydroelectricity, biomass, geothermal, wind, photovoltaics, and solar thermal. Renewable energy industries alone generated about $40 billion in revenues and about 450,000 green jobs in 2006. The energy efficiency sector is harder to define. It includes parts of large industries that include vehicles, lighting, buildings, and appliances. More than eight million new jobs were created in the energy efficiency sector in 2006. ROGER H. BEZDEK, AM. SOLAR ENERGY SOC'Y, RENEWABLE ENERGY AND EFFICIENCY: ECONOMIC DRIVERS FOR THE 21ST CENTURY 4–5 (2007), *available at* http://www.greenforall.org/resources/renewable-energy-and-energy-efficiency-economic.

[36] *Id*.

[37] *Id*. at vii, 4–7.

[38] David Lipscomb, *D.C. Schools Offer 'Green-Collar' Classes*, WASH. TIMES, Aug. 21, 2008, http://www.washingtontimes.com/news/2008/aug/21/green-collar-classes-unveiled/?page=1.

[39] CENTER FOR AMERICAN PROGRESS, *supra* note 34.

[40] BEZDEK, *supra* note 35, at 8–9.

[41] *Id*. at 4–5.

[42] *Id*. at 8–9.

[43] Rachel La Corte, *State to Come Up with Emissions Goals*, SEATTLE TIMES, Mar. 6, 2008, http://seattletimes.nwsource.com/html/politics/2004263882_climate06m0.html.

[44] Jennifer Wagner, *Long Thompson, Oxley Announce Green Jobs Initiative*, HOOSIER POLITICAL REPORT, July 30, 2008, http://www.hoosierpoliticalreport.com/2008/07/release-long-thompson-oxley-an.html.

[45] Nico Rubello, *Turbines in the Future of Manufacturers*, TRAVERSE CITY RECORD-EAGLE, Oct. 20, 2008, http://record-eagle.com/grandtraverse/x75062092/Turbines-in-the-future-of-manufacturers.

[46] Lipscomb, *supra* note 38.

sectors in 2006.[47] As Table 4 shows, the bulk of these jobs can be expected to be created in the renewable energy sector. The vast majority of these renewable energy jobs will be created in the private industry.

These numbers help to explain the interest in green jobs. Interest in green jobs also stems from the fact that for a long time the environment was seen as antithetical to labor.[48] However, as issues such as climate change and sustainability have dominated the news in recent years, environmental protection has emerged as a medium through which immense job growth is being envisioned. Job growth was seen as a pressing issue as the national unemployment rate stood at 9.7 percent in February 2010.[49] Job loss is palpable—for instance, the U.S. has lost 7.2 million manufacturing jobs over the past decade.[50] These factors have converged to create tremendous urgency around the development of green jobs.

[47] ROBERT POLLIN ET AL., POLITICAL ECONOMY RESEARCH INSTITUTE, GREEN RECOVERY: A PROGRAM TO CREATE GOOD JOBS AND START BUILDING A LOW-CARBON ECONOMY (2008), *available at* http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/peri_report.pdf; *see also* Table 4.

[48] ANDREW HURLEY, ENVIRONMENTAL INEQUALITIES: CLASS, RACE, AND INDUSTRIAL POLLUTION IN GARY, INDIANA, 1945–1980 (1995); JAMES NOEL SMITH, ENVIRONMENTAL QUALITY AND SOCIAL JUSTICE IN URBAN AMERICA: AN EXPLORATION OF CONFLICT AND CONCORD AMONG THOSE WHO SEEK ENVIRONMENTAL QUALITY AND THOSE WHO SEEK SOCIAL JUSTICE 96–97 (1974).

[49] News Release, Bureau of Labor Statistics, The Employment Situation (Mar. 5, 2010), *available at* http://www.bls.gov/news.release/archives/empsit_03052010.pdf.

[50] THE APOLLO ALLIANCE, THE NEW APOLLO PROGRAM: CLEAN ENERGY, GOOD JOBS (2008), http://apolloalliance.org/downloads/fullreportfinal.pdf.

Table 4. Jobs Created in the Renewable Energy and Energy Efficiency Sectors

Renewable energy sector	Number of jobs	Energy efficiency sector	Number of jobs
Private industry		**Private industry**	
Wind	36,800	Insulation	60,000
Photovoltaics	15,700	Energy service companies (ESCO)	44,000
Solar thermal	1,900	Recycling	3,013,000
Hydroelectric power	19,000	Vehicle manufacturing	380,000
Geothermal	21,000	Household appliances and lighting	198,000
Biomass		Windows and doors	117,000
Ethanol	154,000	Computers, copiers, fax machines	718,000
Biodiesel	6,300	Television, video and audio equipment	421,000
Biomass power	152,000	Heating, ventilating and air-conditioning (HVAC)	104,000
Fuel cells	11,100	Industrial and related machinery	175,000
Hydrogen	9,200	Miscellaneous durable manufacturing	894,000
		Nondurable manufacturing	1,219,000
		Utilities	32,000
		Construction	522,000
Total private industry	427,000	Total private industry	7,892,000
Government		**Government**	
Federal government	1,850	Federal government energy efficiency spending	35,000
Department of Energy laboratories	8,300	State government energy efficiency spending	64,000
State and local governments	5,750	Local government energy efficiency spending	48,000
Total government	15,870	Total government	147,000
Organizations and groups		**Organizations and groups**	
Trade and professional associations and nonprofits	3,450	Trade and professional associations and nonprofits	7,000
Total for all sectors	**446,320**	**Total for all sectors**	**8,046,000**

Compiled from: Bezdek, Roger. 2007. *Renewable Energy and Efficiency: Economic Drivers for the 21st Century*. Report produced for the American Solar Energy Society. Boulder: American Solar Energy Society. P. 24, 30.

Experts predict that the environmental sector will be among the fastest growing segment of the labor force in coming decades. Long wary of mainstream environmentalism, community groups working in low-income communities were among the first to see the potential of environmental protection to generate an unprecedented number of "green collar" jobs. In practical terms, the college-trained environmental specialists that populate the environmental nonprofits and governmental environmental agencies are unlikely to be the people who are going to be constructing wind towers, installing solar panels on roofs, retrofitting homes, decommissioning and cleaning leaking underground storage tanks, or fixing leaking sewers and drains. Hence, the emergent green, post-carbon economy that environmental policymakers predict is imminent, and the lifestyles they urge us to adapt will literally need an army of workers trained and ready to build, deploy, and use the new technologies and techniques that sustainable living requires.

The green collar jobs being touted by politicians and activists around the country are environmental jobs that the working class, unemployed, and poor can have access to. These are jobs that large numbers of minorities can obtain. Consequently, investment in green collar jobs has the potential to diversify the environmental labor force. Additionally, green collar jobs can provide living wages, benefits, opportunities for occupational advancement, meaningful work experiences, transportable and desirable skills, a high level of job satisfaction, and an entrée into a wide array of conservation activities. Green collar jobs are attractive to organizations and groups seeking to revitalize poor communities and reduce the levels of poverty in them because some of the jobs present few barriers for entry into the workforce. A case in point, the Ella Baker Center in Oakland, California is able to incorporate formerly incarcerated youths and adults in its green collar jobs program. Another characteristic of these jobs is that green collar jobs can also provide on-the-job training—a feature that will help those with limited work experience or education to learn on the job. Furthermore, green collar jobs can be locally created. As a result, such jobs provide opportunities to the very poor in the communities where they live and thereby become drivers of the local economy. Lastly, these are typically not jobs that can be shipped overseas.

The growth in the green workforce is not limited to the U.S. A recently-released report found that the global market for environmental products and services will double from its current level of $1.3 trillion per annum to $2.74 trillion per year by 2020.[51] Roughly half of that market demand comes from energy efficiency. In the last few years, roughly 2.3 million people have found jobs in the renewable energy sector.[52] This sector alone is projected to generate about 20 million jobs by 2030.[53] The shift to energy efficient buildings will generate millions of jobs; there are already 111 million people working in construction

[51] WORLDWATCH INSTITUTE, GREEN JOBS: TOWARDS DECENT WORK IN A SUSTAINABLE, LOW-CARBON WORLD 6–7 (2008), http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---webdev/documents/publication/wcms_098487.pdf.

[52] *Id.*

[53] *Id.*

worldwide.[54] For example, Brazil's ethanol industry has already created 500,000 jobs and China's solar thermal industry currently employs about 600,000 people.[55]

II. DRIVERS OF GREEN JOBS CREATION

A. Adaptation to Climate Change

The focus on climate change, efficiency, and sustainability has resulted in the creation of green jobs. Furthermore, publicity generated from *An Inconvenient Truth* and other dire warnings and predictions of melting polar icecaps, disappearing glaciers, and severe disruptions to global food systems have created greater urgency to live more sustainably.[56] In an effort to make the necessary adaptations to climate change, the U.S. and other countries around the world have developed policies that will result in the creation of millions of new jobs to make the transition to more sustainable living.

It is somewhat ironic that the climate change discourse has stimulated the discourse on creating green-collar jobs. Climate change advocates have been criticized for their reluctance to engage in dialogue with low-income and minority communities and activists. This is evident in the demographic characteristics of the staff of climate change organizations and in the participants who attend major climate change conferences and gatherings. The disconnect between climate change advocates and minority environmental groups is so obvious that a parallel movement for climate justice has sprung up. Environmental justice organizations now regularly organize conferences and gatherings on climate justice. The split between the two goes beyond the inclusion or exclusion of minorities from major climate change events. It is an ideological split as well. Climate justice advocates focus on both changing climate and the need to adapt as well as the inequities in risks and burdens that arise from climate change. Given the environmental justice groups' interest in creating jobs, green-collar jobs are common ground on which the two factions can meet.

B. Manufacturing and Construction

The shift to manufacturing renewable energy technologies domestically, such as wind turbines, has created jobs in the U.S. One estimate reports that wind turbine production has replaced about a fourth of the jobs lost in the downsizing of the auto industry.[57] But the U.S. has to gain a greater share of the manufacturing

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[54] *Id*.

[55] Alistair Doyle, *"Green jobs" to Outweigh Losses from Climate Change*, REUTERS, (Dec. 7, 2007, 9:29 AM), http://uk.reuters.com/article/idUKL0612674420071207.

[56] AN INCONVENIENT TRUTH (Paramount Pictures 2005); LESTER BROWN, EARTH POLICY INSTITUTE, PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION (2008).

[57] BEZDEK, *supra* note 35, at 10; JOHN PODESTA ET AL., CENTER FOR AMERICAN PROGRESS, CAPTURING THE ENERGY OPPORTUNITY: CREATING A LOW-CARBON ECONOMY 2 (2007), http://www.americanprogress.org/issues/2007/11/pdf/energy_chapter.pdf.

base for green technologies. For instance, Japan and Germany are the leading producers of solar panels while Brazil is the world leader in ethanol production.[58] Germany, with about a fourth of the population and gross domestic product of the U.S., generates more green jobs than the U.S. In fact, Germany currently generates 214,000 renewable energy jobs annually compared to the roughly 194,000 being produced in the U.S.[59] Though the U.S. has emerged as the world's leader in bringing new wind energy generating facilities on line since 2005, 70 percent of the wind turbines produced globally today are made in the European Union. Consequently, between 2007 and 2030—when the U.S. hopes to generate roughly 20 percent of its energy from wind—the Department of Energy predicts that an average of 250,000 workers will be employed in the wind industry annually.[60] The wind power manufacturing sector is growing rapidly. In the first ten months of 2008, seventeen new wind turbine manufacturing plants were opened and another nineteen were announced. When fully operational, these facilities will generate 9,000 jobs.[61]

Green construction is also stimulating job creation. City and state governments have passed legislation stating that all new government buildings should be LEED (Leadership in Energy and Environmental Design) certified. The District of Columbia has passed a mandate, which states that all public buildings built after 2007 must conform to LEED standards, additionally all new private buildings larger than 50,000 square feet must meet such standards by 2012.[62] Indiana has put forth a similar mandate but without a target date for compliance.[63]

C. Politicians, Government and Tax Credits

Politicians and governments at all levels have also been key stakeholders in green job creation. For instance, they have created mandates and proposed tax credits to stimulate job creation.[64] In 2004, the state of California decided to invest

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[58] BEZDEK, *supra* note 35, at 10; PODESTA ET AL., *supra* note 57, at 2.

[59] *Id.*

[60] *Id.*; U.S. DEP'T OF ENERGY, 20 PERCENT WIND ENERGY BY 2030: INCREASING WIND ENERGY'S CONTRIBUTION TO U.S. ELECTRICITY SUPPLY 6, 203–04 (2008), http://www1.eere.energy.gov/windandhydro/pdfs/41869.pdf; AMERICAN WIND ENERGY ASS'N, 2008: ANOTHER RECORD YEAR FOR NEW INSTALLATIONS (2008), http://www.geneva.il.us/departments/publicworks/electric/Market_Update_Factsheet.pdf; RYAN WISER & MARK BOLINGER, U.S. DEP'T OF ENERGY, ANNUAL REPORT ON U.S. WIND POWER INSTALLATION, COST, AND PERFORMANCE TREND: 2007 (2008), http://eetd.lbl.gov/ea/ems/reports/lbnl-275e.pdf.

[61] PODESTA ET AL., *supra* note 57, at 2; U.S. DEP'T OF ENERGY, *supra* note 60, at 6, 203–04; RYAN WISER & MARK BOLINGER, *supra* note 60.

[62] Press Release, Reuters, Washington, D.C. Economic Partnership Solicits Bids for Report on Green Collar Job Demand in District (Jan. 22, 2008), *available at* http://www.reuters.com/article/idUS270329+22-Jan-2008+PRN20080122 [hereinafter, Reuters, Washington D.C. Green Jobs].

[63] Wagner, *supra* note 43.

[64] Reuters, Washington D.C. Green Jobs, *supra* note 62.

portions of its two large pension funds into an initiative dubbed the Green Wave, with the goal of investing in green firms, creating jobs, and cleaning up the environment.[65] The state invested $1.5 billion in cutting-edge technologies and environmentally-responsible businesses.[66] That venture in environmental investment and entrepreneurship might be paying dividends now as California is a leader in producing green jobs.

The United States Congress has gotten involved as well. The House of Representatives passed the Green Jobs Act of 2007, which earmarked $125 million for job training for workers in the area of renewable energy.[67] The national and state-level job training programs are being administered by the Department of Labor. The Senate passed the Green Jobs Initiative in 2007.[68] In addition, the Renewable Energy and Energy Conservation Act of 2007 was passed by the House in August of 2007, but failed to pass the Senate in July of 2008.[69] Among other things, the bill required that utilities generate 15 percent of electricity from renewable sources by 2020, and provides up to $300,000 in funding for small and medium-sized businesses to improve their environmental performance.[70] Under the American Recovery and Reinvestment Act of 2009, nearly $500 million was invested in green jobs related training. In November of the same year, $55 million was released to begin green jobs information gathering and training programs.[71] In January 2010, the Department of Labor announced that $100 million would be authorized for energy training partnership grants[72] and another $190 million would be released that same month to expand green jobs training.[73]

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[65] News Release, California State Treasurer, State Treasurer Phil Angelides Launches 'Green Wave' Environmental Investment Initiative to Bolster Financial Returns, Create Jobs and Clean Up the Environment (Feb. 3, 2004), *available at* http://www.treasurer.ca.gov/greenwave/020304_enviro.pdf. The two pension funds are the California Public Employees' Retirement System and the California State Teachers' Retirement System.

[66] *Id*.

[67] Green Jobs Act of 2007, Pub. L. 110-140, 121 Stat. 1748 (codified at 29 U.S.C. § 2916) (2008) (H.R. 2847 sponsored by Rep. Hilda Solis & Rep. John Tierney).

[68] *Id*. (sponsored by Sen. Bernie Sanders & Sen. Hillary Clinton).

[69] Renewable Energy and Energy Tax Act of 2007, H.R. 3221, 110th Cong. (2007) (Sponsored by Rep. Nancy Pelosi).

[70] *Id*.

[71] Press Release, U.S. Department of Labor, US Department of Labor Announces Nearly $55 million in Green Jobs Training Grants Through Recovery Act (Nov. 18, 2009), *available at* http://www.recovery.gov/News/press/Pages/20091118_DOL_GreenJobsTraining.aspx.

[72] Press Release, U.S. Department of Labor, US Department of Labor Announces $100 million in Green Jobs Training Grants Through Recovery Act (Jan. 6, 2010), *available at* http://www.recovery.gov/News/press/Pages/20100106_DOL_GreenJobGrants.aspx.

[73] Press Release, U.S. Department of Labor, US Department of Labor Announces Nearly $190 Million in State Energy Sector Partnership and Training Grants for Green Jobs (Jan. 20, 2010), *available at* http://www.recovery.gov/News/press/Pages/20100120_DOL_190million_training_grants_green_jobs.aspx.

Mayors of American cities are also keenly interested in green jobs and view them as a mechanism for jump starting ailing local economies. However, the blue-collar green jobs that politicians are salivating over remain elusive. For instance, the U.S. Conference of Mayors released a report, which found that more than half of the green jobs currently in existence are of the white-collar variety, i.e., in engineering, research, legal, and consulting.[74] However, jobs in the renewable sector comprised the second largest group, followed by jobs in government administration, manufacturing, agriculture and forestry.[75] Equipment dealers and wholesalers were the seventh ranked category.[76] In addition, more than 85 percent of the green jobs were located in metropolitan areas while the remainder were located in non-metro areas. Ten large metropolitan areas—New York, Washington, D.C., Houston, Los Angeles, Boston, Chicago, Philadelphia, San Francisco, San Diego, and Pittsburgh—account for 23 percent of the existing green jobs.[77]

D. Think Tanks and Policy Groups

Influential green jobs proposals and initiatives are being developed by think tanks and policy groups as well. For example, the Center for American Progress (CAP) proposes that the country should undertake a $100 billion green economic recovery program with job creation and investment in infrastructure as the centerpiece of the plan.[78] CAP urges investment in energy-efficient retrofitting of buildings, mass transit and smart rail, smart grid electrical transmission systems, as well as wind, solar, and advanced biofuels. It argues that such a program would yield two million new jobs in two years. It would also reduce unemployment levels by about 1.3 percent nationally over that time period.[79]

The Apollo Alliance also has a bold vision for green collar jobs. Environmentalists, labor unions, corporations, and community organizers forming the alliance have launched the New Apollo Program, which seeks to invest $50 billion annually or $500 billion over the next decade, to generate more than five million green jobs in that time period. Predicting that three-quarters of the buildings in the U.S. will be new or undergo extensive renovations by 2035, the Apollo Alliance plans to focus heavily on green collar construction jobs. It projects that for every $10 billion invested in energy efficient upgrades 100,000 on-site jobs will be generated, and thousands more will be derived from the multiplier effects of those construction activities rippling through the economy. The program will also focus on developing a green manufacturing sector to facilitate the use of renewable energy technologies and products like wind towers, turbines, and solar

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[74] GLOBAL INSIGHT, U.S. METRO ECONOMIES: GREEN JOBS IN U.S. METRO AREAS 5 (2008), *available at* http://www.usmayors.org/pressreleases/uploads/greenjobsreport.pdf.

[75] *Id*.

[76] *Id*.

[77] *Id*.

[78] POLLIN ET AL., *supra* note 47.

[79] *Id*.; *see* Table 5 for the projected infrastructure investment and projected job growth in various states.

panels. Unlike the community-based training programs underway at environmental justice organizations that focus solely on low-income participants, the Apollo Alliance's program will target low-income participants for training programs, unions for apprenticeship programs, and create 100,000 scholarships for college students to pursue math and science degrees.[80]

Another policy group that has played an influential role in this discourse is the Worldwatch Institute. The institute has produced reports on green jobs, and has conducted an analysis of the feasibility of replacing coal with renewable energy.[81] In a recent article, the Worldwatch Institute argued that the coal, oil, and natural gas industries are losing jobs while the green jobs sector is expanding rapidly.[82]

E. Renewable Portfolio Standards

Thus far twenty-eight states have established mandatory renewable portfolio standards, (RPS) while another six have set renewable goals.[83] The RPS call for electric utilities to generate a percentage of their electricity from renewable energy sources. Increasing a state's use of renewable energy creates jobs that arise from manufacturing, construction, and maintenance.[84] The time table for achieving goals and the target amounts vary widely from one state to another. RPS goals range from increasing the use of renewable sources to 4 percent by 2009 in Massachusetts, to producing 25 percent of electricity from renewable sources by 2025 in Illinois, Minnesota, and Oregon.[85]

F. Venture Capital

Investment in environmental companies has become a hot commodity. In 2006 alone venture capitalists invested $2.4 billion in energy technologies.[86] Investments in green technology are expected to reach $14 billion—and maybe as high as $19 billion—by 2010.[87] This is expected to create between 400,000–

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[80] THE APOLLO ALLIANCE, *supra* note 50.

[81] *Coal Industry Hands Out Pink Slips While Green Collar Jobs Take Off*, WORLDWATCH INSTITUTE, http://www.worldwatch.org/node/5824 (last visited Dec. 5, 2010).

[82] Michael Renner, *Worldwatch Institute, Jobs in Renewable Energy Expanding*, WORLDWATCH INSTITUTE (July 8, 2008), http://www.worldwatch.org/node/5821.

[83] *See* Table 6.

[84] *Renewable & Alternative Energy Portfolio Standards*, PEW CENTER ON GLOBAL CLIMATE CHANGE, http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm (last updated Dec. 17, 2010).

[85] *States With Renewable Portfolio Standards*, U. S. DEP'T OF ENERGY, http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm#chart (last updated Dec. 17, 2010).

[86] PODESTA ET AL., *supra* note 57, at 3; CENTER FOR AMERICAN PROGRESS, *supra* note 34.

[87] *Id.*

500,000 new jobs.[88] In 2006, revenues from solar, wind, biofuels, and photovoltaic companies totaled $55.4 billion; a year earlier revenues from these companies totaled $40 billion.[89] Venture capitalists have been significant drivers in the development of biofuels. From the beginning of 2007 through the first quarter of 2008, venture capital companies invested $650 million in biofuels.[90] After information technology and biotechnology, clean technologies are the third largest sector of investment for venture capital in the U.S.[91]

[88] *Id.*

[89] *Id.*

[90] BRIAN CUTTER, U.S. DEPARTMENT OF ENERGY, U.S. ETHANOL INDUSTRY: THE NEXT INFLECTION POINT 19 (2008), *available at* http://www1.eere.energy.gov/biomass/pdfs/2007ethanolreview.pdf.

[91] WORLDWATCH INSTITUTE, *supra* note 51, at 6–7.

Table 5. Projected jobs and dollar investment in various states

State	Number of jobs projected	Dollar amount of investment	Percent reduction in unemployment
National	2,000,000	100 billion	1.3
Alaska	4,959	275 million	1.3
Arizona	37,234	1.9 billion	1.2
Arkansas	19,532	814 million	1.4
California	235,198	12.7 billion	1.3
Colorado	32,849	1.7 billion	1.2
Florida	123,756	5.7 billion	1.3
Illinois	83,710	4.4 billion	1.2
Indiana	43,353	2.0 billion	1.3
Iowa	21,057	968 million	1.2
Kansas	19,142	881 million	1.1
Maine	9,132	396 million	1.2
Maryland	36,939	1.9 billion	1.2
Massachusetts	42,530	2.4 billion	1.2
Michigan	61,394	3.1 billion	1.2
Minnesota	37,429	1.8 billion	1.3
Missouri	43,047	1.8 billion	1.4
Montana	6,335	279 million	1.2
Nebraska	12,766	581 million	1.2
Nevada	15,021	865 million	1.1
New Hampshire	9,245	432 million	1.3
New Jersey	57,228	3.2 billion	1.3
New Mexico	13,717	600 million	1.4
New York	131,991	7.1 billion	1.3
North Carolina	62,015	2.9 billion	1.4
North Dakota	4,380	204 million	1.1
Ohio	80,360	3.7 billion	1.3
Oregon	27,307	1.2 billion	1.4
Pennsylvania	86,385	4 billion	1.3
South Carolina	28,064	1.3 billion	1.3
Tennessee	44,942	1.9 billion	1.5
Virginia	56,459	2.7 billion	1.4
Washington	42,690	2.2 billion	1.3
West Virginia	12,149	516 million	1.5
Wisconsin	37,165	1.8 billion	1.2

Compiled from: Pollin, Robert, Garrett-Peltier, Heidi, Heintz, James, and Scharber, Helen. 2008. Green Economic Recovery Program: Impact on California. Report jointly issued by the Center for American Progress and the Political Economy Research Institute at the University of Massachusetts-Amherst. September. State-by-state data retrieved on November 3, 2008 from http://www.peri.umass.edu/green_ recovery/.

Table 6. Adoption of Renewable Portfolio Standards in States

State	Has RPS	Amount	Target Year	State	Has RPS	Amount	Target Year
Alabama	No			Montana	Yes	15%	2015
Alaska	No			Nebraska	No		
Arizona	Yes	15%	2025	New Hampshire	Yes	23.8%	2025
Arkansas	No			New Jersey	Yes	22.5%	2021
California	Yes	33%	2030	New Mexico	Yes	20%	2020
Colorado	Yes	20%	2020	Nevada	Yes	20%	2015
Connecticut	Yes	23%	2020	New York	Yes	24%	2013
District of Columbia	Yes	20%	2020	North Carolina	Yes	12.5%	2021
Delaware	Yes	20%	2019	North Dakota	Voluntary	10%	2015
Florida	No			Oklahoma	No		
Georgia	No			Oregon	Yes	25%	2025
Hawaii	Yes	20%	2020	Pennsylvania	Yes	8%	2020
Idaho	No			Rhode Island	Yes	16%	2019
Indiana	No			South Carolina	No		
Iowa	Yes	105 MW		South Dakota	Voluntary	10%	2015
Illinois	Yes	25%	2025	Tennessee	No		
Kansas	No			Texas	Yes	5,880 MW	2015
Kentucky	No			Utah	Voluntary	20%	2025
Louisiana	No			Vermont	Voluntary	10%	2013
Massachusetts	Yes	15%	2020	Virginia	Voluntary	12%	2022
Maryland	Yes	20%	2022	Washington	Yes	15%	2020
Maine	Yes	40%	2017	West Virginia	No		
Michigan	Yes	10%	2015	Wisconsin	Yes	10%	2015
Minnesota	Yes	25%	2025	Wyoming	No		
Mississippi	No			Wyoming	No		
Missouri	Yes	15%	2021				

Compiled from: U.S. Department of Energy. 2009. Energy Efficiency and Renewable Energy. Washington, D.C.: U.S. Department of Energy.

G. Extractive Industries Converting to Renewable Energy

Jobs are being generated or retooled as extractive industries and firms are diversifying their companies in an effort to respond to rising demands for green business practices, new technologies, new markets, and new government mandates. The establishment of the RPS is a case in point because it encourages utilities to execute plans to generate part of their electricity from renewable energy. Similarly, industries such as coal and oil have begun to invest in energy efficient and renewable energy technologies, and pursue practices intended to reduce their impact on the earth. Consequently, Texas, a major oil-producing state, leads the country in the installation of wind turbines. In fact oil companies are jockeying for position to become the leaders in alternative energy production. Shortly after oil tycoon T. Boone Pickens announced plans to build the world's largest wind farm—a $10 billion development large enough to power a small city—BP, which had acquired a wind energy company in 2006, announced it would be developing

the world's largest wind farm in South Dakota.[92] BP's 5,050 megawatt Titan Wind Project would dwarf Pickens' Mesa Power Project with its 4,000 megawatt capacity.[93] Other oil companies such as Shell and Chevron have also diversified their investment portfolios to include wind and solar energy.[94]

The agricultural industry is getting into the act as well. For example, John Deere has begun to invest in wind energy.[95] Farmers love this, as they can get up to $500 per month for each wind machine installed on their farms.[96] However, the recession has dampened the enthusiasm for some of these investments in alternative energy. For instance, T. Boone Pickens has dramatically scaled back the plans for his wind farm—he is now planning a roughly 400 megawatt project.[97]

Extractive industries are also being forced to consider renewable energy and more efficient solutions because they are hemorrhaging jobs at a time when the green jobs market is expanding. The Worldwatch Institute reports that coal, oil, and natural gas industries are losing jobs.[98] For example, employment in the coal industry has fallen by half in the last two decades.[99] The steady contraction of jobs in fossil-fuel based industries has forced those industries to look at creating jobs in the renewable energy and energy efficiency sectors.

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[92] Clifford Krauss, *Move Over, Oil, There's Money in Texas Wind*, N.Y. TIMES, Feb. 23, 2008, http://www.nytimes.com/2008/02/23/business/23wind.html.

[93] Press Release, BP Alternative Energy, BP Alternative Energy Buys U.S. Wind Company (Aug. 15, 2006), *available at* http://www.bp.com/genericarticle.do?categoryId=9024973&contentId=7046884; *Clipper, BP Plan World Largest Wind Farm*, SUSTAINABLE BUSINESS.COM, http://www.sustainablebusiness.com/index.cfm/go/news.display/id/16517 (last visited Dec. 17, 2010).

[94] *Investment Portfolio*, CHEVRON, http://www.chevron.com/ctv/ctvi/investmentportfolio/#b4. (last visited Dec. 17, 2010); *Shell Wind Energy Operations*, SHELL, http://www.shell.us/home/content/usa/innovation/wind/projects/ (last visited Dec. 17, 2010).

[95] *Wind Energy Comes to Missouri*, U.S. DEPARTMENT OF ENERGY, http://www.windpoweringamerica.gov/filter_detail.asp?itemid=1168 (last updated Feb. 6, 2006).

[96] Krauss, *supra* note 92.

[97] John Leitzing, *Reporters Notebook: Pickens and the Great White North*, MARKETWATCH (Mar. 5, 2010, 12:13 AM), http://www.marketwatch.com/story/t-boone-pickens-cuts-capacity-of-wind-project-2010-03-05; Andy Stone, *What the Pickens Fiasco Means to Green*, FORBES (July 8, 2009, 12:09 PM), http://www.forbes.com/2009/07/08/boone-pickens-wind-power-business-energy-pickens.html.

[98] WORLDWATCH INSTITUTE, *supra* note 81; Renner, *supra* note 82.

[99] *Id.*

III. GREEN JOBS TRAINING PROGRAMS

A. State-Run Programs in Community Colleges and High Schools

States and cities are eagerly developing job training programs such as Michigan's Green Jobs Initiative: *No Worker Left Behind* (MGJI). MGJI was put in place in 2008 to help workers who lost their jobs to receive up to two years of job training and counseling to help them obtain green jobs. In its first year of operation, about 31,000 people enrolled in the program.[100] About 11,000 of them have completed their training already.[101] Thus far, thirty-eight of the state's eighty-three counties have MGJI-sanctioned training programs. In Michigan, where unemployment rose to 8.5 percent in June of 2008, demand is outstripping the ability of the program to serve all those who want to enroll.[102] In the summer of 2008 there were 9,100 people on the waiting list for MGJI training.[103] Indiana has also developed a Green Jobs Initiative. It offers a $500 tax credit for any new green job created in the state.[104] Chicago has also created a green jobs program—the Chicagoland Green Collar Jobs Initiative.[105] These training programs are conducted primarily in community colleges, but some are housed in four-year colleges.

The District of Columbia is taking the lead on training high school students for green jobs. The first green jobs program opened at Cardozo Senior High School's Academy of Construction and Design, where students are trained in construction.[106] More than 100 students are expected to participate in the program.[107] Connecticut has launched a similar program.[108] The state will invest $125,000 to develop green collar training programs in its eighteen technical high schools. The schools serve 10,000 full-time and 5,500 part-time students.[109]

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[100] Tim Martin, *'Green' Jobs Expand Michigan Worker Training*, NO WORKER LEFT BEHIND (July 24, 2008, 11:04 PM), http://www.michigan.gov/documents/nwlb/AP_Green_Jobs_250418_7.pdf.

[101] *Id*. The data is sketchy on the employment of these trainees.

[102] *Id*.

[103] *Id*.

[104] Wagner, *supra* note 43.

[105] BUILDING A GREEN COLLAR WORKFORCE IN CHICAGOLAND, CHICAGOLAND GREEN COLLAR JOBS INITIATIVE (Oct. 2009), *available at* http://greencollarchicago.org/uploads/GreenCollarWorkforce.pdf.

[106] *Connecticut Governor Promotes Green Collar Job Training*, ENVIRONMENTAL NEWS SERVICE (Mar. 11, 2008), http://www.ens-newswire.com/ens/mar2008/2008-03-11-095.html.

[107] Lipscomb, *supra* note 38.

[108] ENVIRONMENTAL NEWS SERVICE, *supra* note 106.

[109] *Id*.

B. Green Jobs, Environmental Justice Organizations, and Other Nongovernmental Organizations

Environmental justice organizations have long wrestled with the challenge of creating jobs in order to create sustainable communities. Recognizing that many companies that pollute and degrade the environment have long held out the promise of jobs to get the support needed to site their facilities, environmental justice groups realized early on that they needed mechanisms to counter such incentives. As a result, by the early 1990s some turned to job training programs that prepared their constituents and other community residents for jobs in fields such as brownfields remediation and Hazardous Waste Operations and Emergency Response Standard (HAZWOPER).[110] Not surprisingly, environmental justice organizations have been pushing for green jobs for some time now.

Environmental justice organizations are also spearheading green collar job training programs. In 1990, the Southwest Organizing Project in Albuquerque began working on job creation and training programs.[111] Since the 1990s, People for Community Recovery, an environmental justice organization located in the public housing project of Altgeld Gardens on Chicago's Southside, has been offering job training to residents.[112] The Indigenous Environmental Network has also been working on clean energy issues and jobs.[113] The Environmental Justice Resource Center at Clark Atlanta University has run a Worker Education and Apprenticeship Job Training Program for several years.[114] The Deep South Center for Environmental Justice at Dillard University also conducts job training programs through its Education and Training Institute.[115] Newer environmental justice green jobs initiatives include the Ella Baker Center for Human Rights, which has a target of raising $1 billion to train 250,000 people in this field.[116] Sustainable South Bronx runs a Bronx Environmental Stewardship Training

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[110] *Brownfields Success Stories*, ENVIRONMENTAL PROTECTION AGENCY, http://www.epa.gov/brownfields/success/ss_ej.htm (last updated Sept. 8, 2010).

[111] *SWOP History*, SOUTHWEST ORGANIZING PROJECT, http://www.swop.net/timeline (last visited Nov. 29, 2010).

[112] *PCR's Evironmental Programs*, PEOPLE FOR COMMUNITY RECOVERY, http://www.peopleforcommunityrecovery.org/ (last visited Nov. 29, 2010).

[113] *See* INDIGENOUS ENVIRONMENTAL NETWORK, http://www.ienearth.org (last visited Nov. 22, 2010).

[114] *Worker Education and Apprenticeship Job Training Programs*, ENVIRONMENTAL JUSTICE RESOURCE CENTER, http://www.ejrc.cau.edu/traininstitute.htm (last visited Nov. 29, 2010).

[115] *Who We Are*, DEEP SOUTH CENTER FOR ENVIRONMENTAL JUSTICE, http://www.dscej.org/index.php?option=com_content&view=article&id=46&Itemid=151 (last visited Nov. 29, 2010).

[116] *Green for All: Ella Baker Center Launches a Bold National Initiative*, ELLA BAKER CENTER FOR HUMAN RIGHTS (Sept. 27, 2007), http://www.ellabakercenter.org/page.php?pageid=26&contentid=327.

Program[117] while Detroiters Working for Environmental Justice has launched a Green Jobs Training Program.[118] Scores of other environmental justice organizations around the country offer similar programs.

IV. GREEN JOBS: ARE THEY THERE YET?

In the excitement about green jobs one should not be too quick to frame them as a panacea or a magic pill to cure all that ails the economy. One of the biggest areas of concern in the green jobs movement is the lack of reliable information to enable employers, potential employees, and community organizations facilitating the employer-employee match to streamline their activities. In other words, though policymakers are enacting legislation, state and city governments are developing and monitoring training programs, employers are predicting and advertising green jobs, and community organizations have begun training programs, these activities are not well coordinated. As a result, no one knows how the big picture fits together completely, or is able to communicate that vision to the affected stakeholders.

Therefore, it was no surprise that at a June 2008 Ford Foundation meeting of community organizations interested in green job creation one of the most pressing questions was—where are the green jobs?[119] This is interesting because three months earlier at the Aspen Forum on the Environment the 500 plus environmental leaders, corporate energy producers, and financial institutions who gathered to discuss climate change focused on ideas for environmental protection (proposed by the likes of Amory Lovins and Lester Brown) that would require an expansion of the environmental workforce and the training of a new cadre of green collar workers.[120] However, while the policy elites at the Aspen Forum were sure that green collar jobs would be the wave of the future, they did not address the questions a community organizer raised at the Ford Foundation gathering in June—where are the jobs? How many are there? Can poor people get these jobs?

I am currently conducting research to help answer questions such as these. Some preliminary findings appear *infra*. I studied 7,124 green jobs that were being advertised nationwide from July 2008 to February 2009. These jobs were identified through electronic eco or green jobs databases, federal jobs boards, industry jobs boards, and company websites. General electronic jobs boards such as Monster.com were also used. The websites of professional and trade associations

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[117] *Bronx Environmental Stewardship Training Academy*, SUSTAINABLE SOUTH BRONX, http://www.ssbx.org/index.php?link=33 (last visited Nov. 29, 2010).

[118] *Green Jobs Training Program*, DETROITERS WORKING FOR ENVIRONMENTAL JUSTICE, http://www.dwej.org/Green_Jobs.htm (last visited Nov. 29, 2010).

[119] The Ford Foundation convened a green jobs conference of community organizations and academics that was held at the Massachusetts Institute of Technology in June 2008.

[120] *Watch Video Clips from the 2008 Aspen Environment Forum*, ASPEN INSTITUTE, http://www.aspenenvironment.org/past-forum-highlights/2008-forum-highlights/video-from-2008 (last visited Nov. 22, 2010).

were also searched for job listings. The research showed that while typical environmental employment databanks list thousands of jobs to help college-educated workers with a bachelor's or graduate degree build "green careers," such databanks contain virtually no working-class green jobs. My study found that 51.2 percent of the jobs being advertised required a bachelor's degree while 9.5 percent required a graduate degree. Many of the environmental justice organizations and community training programs focus on training very low-income clients with less than a college education. As shown in Table 7, only 0.6 percent of the jobs in my study required only a GED (General Educational Development or high school equivalency) and 10 percent called for a high school education. This data suggests that we could face a situation where—at the outset—we are training more people for the entry-level green positions than are currently on the market. However, this is likely to change as industry brings new green jobs on line.

Table 7. Educational Qualifications for Green Jobs

Minimum Requirements	Number	Percent
No qualifications specified	1,736	24.4
Certificate	7	0.1
GED	45	0.6
High school diploma	710	10.0
Associates degree	306	4.3
Bachelor's degree	3,642	51.2
Master's degree	583	8.2
MBA	15	0.2
Law	13	0.2
Doctorate	67	0.9
Total	7,124	100

My findings are corroborated by findings from other studies. A report prepared for the U.S. Conference of Mayors found that the most common green jobs currently being generated are engineering, legal, research, and consulting jobs.[121] The American Solar Energy Society report also found that the vast majority of the jobs currently being created in renewable energy and energy efficient industries were what they referred to as standard jobs, for example, jobs for accountants, engineers, computer analysts, clerks, factory workers, truck drivers, mechanics, etc.[122]

The types of green jobs being advertised also demonstrate the extent to which blue-collar green jobs are still in limited supply. Construction jobs account for 1.4 percent, drivers 1.7 percent, technicians 1.3 percent, and jobs in hazardous waste

[121] GLOBAL INSIGHT, *supra* note 74, at 5.
[122] BEZDEK, *supra* note 35, at 3.

management accounted for 1.1 percent of the total. The most common jobs being advertised were for managers (7.2 percent), directors (5.8 percent), and engineers (4.2 percent).[123]

Table 8. Top 42 Green Jobs Being Advertised

Types of Jobs	Number	Percent	Types of Jobs	Number	Percent
Manager	508	7.2	Construction	100	1.4
Director	413	5.8	Environmental health	97	1.4
Engineer	296	4.2	Technician	96	1.3
Sales	293	4.1	Agriculture	92	1.3
Coordinator	286	4.0	Conservationist	85	1.2
Landscaping	195	2.7	Communcations	85	1.2
Nuclear	165	2.3	Hazardous waste management	81	1.1
Pest management	160	2.3	Solar	75	1.1
Biologist	151	2.1	Business development	70	1.0
Environmental scientist	146	2.0	Electrician	64	0.9
Operations management	137	1.9	Environmental consulting	63	0.9
Energy analyst	135	1.9	Planning	63	0.9
Environmental engineer	128	1.8	Agronomist	63	0.9
Wind energy	128	1.8	Web designer	62	0.9
Accounting	126	1.8	Forestry	58	0.9
Driver	123	1.7	Fundraising	58	0.9
Finance	122	1.7	Policy analyst	54	0.8
Administration	121	1.7	Environmental analyst	53	0.7
Arborist	118	1.6	Nuclear engineer	53	0.7
Horticulture	110	1.5	Compliance	53	0.7
Marketing	101	1.4	Climate change	53	0.7

My analysis of the states in which green jobs were being advertised found that the vast majority were being advertised in California (15.8 percent). California was followed by Michigan (7.4 percent), Texas (5.1 percent), and New York (5.0 percent). The states where the fewest green jobs were being advertised were West Virginia, Rhode Island, Mississippi, Arkansas, and North Dakota.[124]

The report done for the U.S. Conference of Mayors also found that most of the green jobs are being generated in cities. Cities such as New York, Washington, D.C., and Los Angeles lead the way.[125] My study made a similar finding that the green jobs phenomenon is largely an urban phenomenon. The cities in my study where the largest number of green jobs were being advertised were Washington, D.C., Seattle, Houston, Chicago, and New York. Though most of the green jobs were being advertised in large cities, some green jobs were being advertised in small municipalities also.[126]

[123] *See* Table 8.
[124] *See* Table 9 *infra*.
[125] GLOBAL INSIGHT, *supra* note 74, at 5.
[126] *See* Table 10.

Table 9. Green Jobs Advertised in Each State

State	Number	Percent	State	Number	Percent
California	1128	15.8	Oklahoma	54	0.8
Michigan	526	7.4	New Hampshire	44	0.6
Texas	362	5.1	Nevada	41	0.6
New York	359	5.0	South Carolina	40	0.6
Massachusetts	329	4.6	Utah	37	0.5
Washington	315	4.4	Kansas	32	0.4
Florida	275	3.9	Maine	31	0.4
Virginia	261	3.7	Tennessee	29	0.4
District of Columbia	244	3.4	New Mexico	25	0.4
Illinois	238	3.3	Louisiana	24	0.3
Maryland	233	3.3	Nebraska	23	0.3
Ohio	233	3.3	Montana	22	0.3
Colorado	226	3.2	Idaho	21	0.3
Pennsylvania	223	3.1	Hawaii, Pacific Islands	19	0.3
Oregon	161	2.3	Alaska	18	0.3
Connecticut	132	1.9	Delaware	15	0.2
New Jersey	120	1.7	Alabama	12	0.2
North Carolina	114	1.6	South Dakota	12	0.2
Arizona	112	1.6	Wyoming	11	0.2
Georgia	105	1.5	Kentucky	8	0.1
Wisconsin	86	1.2	West Virginia	6	0.1
Minnesota	79	1.1	Rhode Island	5	0.1
Missouri	77	1.1	Mississippi	3	0.0
Indiana	72	1.0	Arkansas	2	0.0
Vermont	60	0.8	North Dakota	1	0.0
Iowa	57	0.8			

Table 10. Cities in which the Largest Number of Green Jobs are Located

City	Number of Jobs	City	Number of Jobs
Washington, D.C.	244	Warrington	56
Seattle	164	Reston	54
Houston	143	Englewood	52
Chicago	137	Los Angeles	51
New York	126	Atlanta	49
Portland	122	San Diego	46
San Francisco	119	Olympia	45
Richmond	71	Medina	45
San Jose	69	Sacramento	43
Boston	68	Irvine	42
Forest City	67	Santa Clara	42
Ann Arbor	67	Raleigh	40
Akron	64		

Of the jobs that listed qualifications only 7.3 percent listed a year or less experience as the minimum required. Just over 12 percent of the jobs required two years of experience and a similar percentage required a minimum of three years of experience. The most frequently sought after level of experience was five years; 16.8 percent of the jobs sought at least this level of experience. The mean number of years of experience sought was 4.4 years.[127]

Table 11. Minimum Experience Desired for Green Jobs

Number of Years	Number	Percent
None specified	2,396	33.6
None required	55	0.8
1 year	517	7.3
2 years	878	12.3
3 years	869	12.2
4 years	227	3.2
5 years	1197	16.8
6 years	119	1.7
7 years	174	2.4
8 years	158	2.2
9 years	10	0.1
10 years	422	5.9
11 or more years	102	1.4
Total	7,124	100

[127] *See* Table 11.

Another potential bottleneck could arise from the narrow focus on training for renewable energy and energy efficiency jobs. To date, state and city green jobs initiatives focus on this sector. The green jobs training bill also earmarks money for training in this sector; so much of the government programs focus attention here. However, not only is it challenging to find green jobs for potential job seekers, concentrating on a few areas of the green economy could create a problem of over supply of workers in one or two areas while other areas in which green jobs could be created remain under-developed.

V. DIVERSITY AND THE ENVIRONMENTAL WORKFORCE: WHERE DO WE GO FROM HERE?

Diversity has been on the rise in environmental institutions, and current trends in green-collar job creation promise to expand the environmental workforce and increase diversity further. Skeptics have questioned the ability of green-collar job initiatives to create large numbers of jobs. As the above discussion indicates, there are legitimate concerns regarding the number of new green jobs currently being created, and the ability of the green sector to absorb the number of people desiring entry-level, unskilled, and semi-skilled green-collar jobs. This might be particularly true of people who have not been in the workforce, who do not have a college degree, or who lack prior work experience. There is a possible shortfall in the types of jobs low-income people and minorities who are not highly educated might seek.

Environmental justice and other community organizations running green jobs training programs have gotten around the problem of potential green-collar job shortage by starting small and by establishing partnerships with companies who hire their trainees when the training is completed. The training programs currently train a small number of people at a time and usually have jobs lined up for them.[128] However, state-sanctioned training programs such as Michigan's do not operate in quite the same way. Trainees choose between a variety of college-level training programs. Programs may or may not assist in helping to secure jobs upon completion. Jobless Michigan residents can also register in a green jobs databank—they can submit a resume and search for employers seeking new employees.[129] Thus the job training and job seeking activities are not tightly coupled. Under this model, it is difficult to decipher how effectively people who have gone through green jobs training programs obtain and keep green jobs.

The Internet currently plays a big role in green jobs initiatives—but this creates a conundrum. While the Digital Divide does not influence the rates of access of college-educated minorities and whites, there is still a class and racial

[128] *See supra* III.B.

[129] *Job Seeker Resources*, NO WORKER LEFT BEHIND, http://www.michigan.gov/nwlb/0,1607,7-242-48247---,00.html (last visited Dec. 3, 2010).

divide amongst the poor.[130] This is important since all the green job training programs rely to some extent on advertising the programs, recruiting participants, searching for jobs, submitting resumes, finding training programs, and seeking funding on the Internet. Given the high possibility that people seeking green-collar jobs may not have access to the Internet, may lack the knowledge of how to use a computer, or may be unable to use the web as a networking or job search medium, heavy reliance on the Internet could hinder a person's ability to find out about training and jobs. Recognizing that inequities in access are likely to affect people's ability to get green-collar jobs, training programs should develop alternative ways of disseminating information about jobs and training options.

Though the green-collar jobs are not being filtered through the informal networks of professional associations and other elite networks, heavy reliance on the Internet for dissemination and application could create insurmountable barriers for some. So while the Internet is a formidable force that could open up white-collar jobs to minorities seeking professional positions, the same technology could hinder access to the poor because of lack of familiarity with the technology and lack of access.

Nonetheless, the green workforce seems to be headed for an unprecedented era of expansion. It is likely that increased racial and class diversity will accompany this expansion. Unless things change dramatically, much of the increase in diversity will not occur in mainstream environmental organizations (the least diverse environmental nonprofits). This is the case because mainstream environmental organizations, for the most part, have been on the sidelines while the green-collar jobs discourse has been going on. Though groups such as the Natural Resource Defense Council, Sierra Club, National Wildlife Federation, and Greenpeace are a part of the Apollo Alliance, most mainstream environmental groups are not involved in green-collar jobs training programs in any significant way.

As we look to the future, it is incumbent on those interested in diversity to keep an eye on the state of diversity in environmental organizations. They should also pay attention to how green-collar workers are incorporated into the workforce and larger environmental movement. Observers should pay attention not only to the large environmental organizations but to the medium-sized and small ones that are less diverse and have escaped scrutiny and pressure to diversify.

Ready or not, the paradigm shift is upon us. The discourse around climate change and sustainability has created unprecedented opportunities to reorganize not only the way we live, the resources and technologies we use and rely on, and how industry does business, but also the way the environmental workforce is

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[130] Don A. Dillman & Dennis K. Bowker, *The Web Questionnaire Challenge to Survey Methodologists, in* DIMENSIONS OF INTERNET SCIENCE (Ulf-Dietrich Reips & M. Bosnjak ed., 2001); LISA J. SERVON, BRIDGING THE DIGITAL DIVIDE: TECHNOLOGY, COMMUNITY, AND PUBLIC POLICY (2002); U.S. DEP'T OF COMMERCE, A NATION ONLINE: ENTERING THE BROADBAND AGE (Sept. 2004), *available at* http://www.ntia.doc.gov/reports/anol/nationonlinebroadband04.htm.

structured. This is a workforce that has remained predominantly white for the better part of the twentieth century and into the twenty-first. Environmentalists have shown that they are adept at persuading themselves and others to make major changes to protect the environment. The hope is that they are willing and able to adapt to the changes a dramatically different workforce is likely to demand.