Quality Employment for Women in the Green Economy

Industry, Occupation, and State-by-State Job Estimates

Institute for Women's Policy Research

ABOUT THIS REPORT

This report provides the first-ever estimates of women's employment in the green economy, state-by-state, by industry, and by occupation. The analysis draws on the U.S. Census Bureau's American Community Survey; the Brookings-Battelle Clean Economy database; and the U.S. Department of Labor, Bureau of Labor Statistics Green Goods and Services survey. The report examines women's share of employment in the occupations predicted to see the highest growth in the green economy and includes two alternative state-by-state estimates for growth in green jobs. Focusing on investments in green buildings and retrofits, the report includes a state-by-state analysis of employment in key construction occupations by age, race, ethnicity, and gender. This report was funded by a grant from the Rockefeller Foundation's Sustainable Employment in a Green US Economy (SEGUE) Program. It is the first of a series of publications investigating strategies for improving women's access to quality employment in the green economy; future reports will address good practices in workforce development for women in the green economy.

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Quality Employment for Women in the Green Economy:

INDUSTRY, OCCUPATION, AND STATE-BY-STATE ESTIMATES

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Executive Summary

Investments in the green economy have many potential benefits such as reduced pollution, enhanced energy security, and increased competitiveness and export earnings for the U.S. economy. Such investments, particularly in energy conservation, also have the potential to create jobs with family-sustaining wages that do not require college degrees. Given women's greater propensity to earn less than family-sustaining wages, this characteristic of green jobs is, arguably, particularly relevant to women. This report provides the first detailed estimates of women's employment in the green economy, state-by-state, by industry, and by occupation. It finds that women working in the green economy have higher earnings than other women and that the gender wage gap in green jobs is lower than in the economy overall. Women are, however, much less likely than men to work in green jobs and are particularly underrepresented in the occupations that are predicted to grow most strongly in the green sector. The report suggests that state and national workforce development policies need to explicitly address women's underrepresentation in green growth occupations to ensure that investment in the green economy equally benefits women's and men's economic prospects.

Methodology

The report prepares state-by-state, occupation, and industry estimates of women's shares of green jobs and future growth in the number of green jobs held by women based on two data sources: the Brookings-Battelle Clean Economy database and the U.S. Department of Labor, Bureau of Labor Statistics Green Goods and Services survey. Green growth occupations are identified from a review of state reports on the green economy. The U.S. Census Bureau's American Community Survey 2008–2010 is the source for the gender analysis of green jobs. The estimates and projections offered are based on the assumption that firms producing green jobs and services are essentially like firms producing non-green jobs and services in the same industry classification group. It is possible that this assumption is false and that green industries or occupations differ significantly, whether in the gender composition of the workforce or in other dimensions such as earnings. To date, however, data are lacking to make such an assessment.

Findings

- Women hold three out of ten green jobs (29.5 percent), significantly less than their share of all jobs (48 percent). Women in all major race and ethnic groups are underrepresented in green jobs compared to their share of the overall workforce

- There are large variations between states in the gap between women's share of green jobs and women's share of all jobs. Washington, DC, has the smallest gap at 4 percentage points; Maine has the largest at 24 percentage points.

- Thirty three percent of women in the green economy work in public administration, compared to 5 percent of all women in the total economy; public administration also accounts for a disproportionately large share of men's green economy jobs, but the difference is not quite as marked (25 compared to 6 percent).

- Women's lower representation in the green economy is partly due to differences in the industry distribution of green compared to all jobs. Industry sectors such as healthcare, education, leisure service, and finance, which employ a larger share of women than men in the economy overall, are underrepresented in the green economy. Industry sectors that employ a larger share of men than women in the economy overall, such as manufacturing, construction, transportation and warehousing, and the utilities, are overrepresented in the green economy. Gender differences are further enlarged, however, because women's underrepresentation in these sectors is worse in the green economy than in the economy overall.

- Women are proportionately more likely in the green than the overall economy to work in office and administrative occupations (31 percent of women in the green economy compared to 22 percent in the overall economy), business and finance occupations (12 compared to 5 percent), production occupations (11 compared to 4 percent), protective service occupations (9 compared to 1 percent), and transportation occupations (8 compared to 2 percent).

- As has been established in several studies, green occupations are more likely to be performed by workers with less than a bachelor's degree than jobs in the economy overall. More than three-quarters of green economy workers, compared to two-thirds of workers in the economy overall, have less than a bachelor's degree. Men are more likely than women in green occupations not to have a bachelor's degree, but the differences are minor.

- Women's estimated median earnings for full-time, year-round work are higher in the green economy than in the overall economy ($38,486 compared to $35,574), and the gender wage gap is lower (18 compared to 22 percent, for 2008–2010). This broad pattern, of higher earnings and a lower wage gap, holds nationally and in the majority of states. In 33 states women's median annual earnings for full-time, year-round work are estimated to be at least $1,000 higher in green than in all jobs. In 43 states the gender wage gap between women and men in the green economy is smaller than in the overall economy (though eliminated in none).

- The report offers two alternative state-by-state estimates of growth of green jobs for women. Scenario I is based on state-level estimates of growth in demand for different occupations and suggests that between 2008–10 and 2018 green employment will grow by 200,000 additional jobs, of which only 14 percent would go to women. Insofar as the green economy might grow faster than other parts of the economy, this scenario is likely to underestimate overall growth, but it allows an assessment of different job trajectories for men and women.

- Green job growth Scenario II is based on a linear projection of the historical growth rate of different green industry segments, holding the gender distribution of jobs constant. It suggests that green employment will grow by close to one million during the same period, with 283,400 jobs going to women. Given the dependence of the green economy on regulatory policy and fiscal incentives, it is difficult to predict with any certainty which of these scenarios is more likely.

- The majority of states have prepared sector reports on employment in the green economy. The most commonly identified occupations likely to see growing demand in response to green growth are heating and air conditioning technicians, carpenters, and electricians; women are fewer than 5 percent of current workers in these occupations. This gender imbalance in high-growth occupations is not addressed in these state-level reports.

- The underrepresentation of women in green jobs is part of a broader problem of women's underrepresentation in science, technological, engineering and math (STEM) occupations. Yet the 'green' aspect of these jobs provides a new opportunity to encourage more women to pursue such careers and to address women's glaring absence from key occupations and fields of work.

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Introduction

Investments in energy efficiency, pollution control, recycling, and clean and renewable energy sources improve the environment, increase energy security, and, potentially, increase competitiveness and exports. Such investments, particularly in energy conservation, also have the potential to create jobs with family-sustaining wages that do not require college degrees and provide career pathways for low-income individuals. A recent report by the U.S. Department of Labor's Women's Bureau (2011) summarized the potential attraction of the green economy for women: green jobs provide potentially higher earnings than many 'traditionally' female jobs requiring similar qualification levels; opportunities exist at many skill and educational levels, including opportunities to move up from low-skilled, entry-level positions to highly skilled, higher-paying jobs; knowing that green jobs contribute to a healthier environment can bring job satisfaction; and the green economy offers a higher number of comparably well-paid lower- and middle-skilled jobs than the rest of the economy. Given women's disproportionate representation of workers in jobs and occupations paying less than family-sustaining wages, this characteristic of the green jobs sector is, arguably, of particular relevance to women. Yet little research to date has assessed how well the potential of the green sector to provide strong job opportunities for women is currently being realized and what policy and programmatic shifts might help that potential to be realized in the future. _

This report draws on existing national and state-level studies to provide estimates of men's and women's employment in the green economy and assesses how likely women will be to benefit from increased investment in energy conservation and building retrofits. The report begins with an overview of data sources on green economy employment and a discussion of the Institute for Women's Policy Research (IWPR)'s methodology for estimating women's share of green jobs. It then provides a state-by-state estimate of the gender distribution of green jobs, as well as estimates of the distribution of green jobs by gender and race/ethnicity, industry, occupation, educational attainment, and earnings. After this general review of the characteristics of women's and men's jobs in the green economy, the report turns to those occupations that are most likely to grow in response to proactive investment strategies in the energy efficiency of buildings and that offer the greatest opportunity for family-sustaining wages without requiring extensive college-level education. While this report estimates that women are three in ten workers in the green economy overall, they are fewer than five percent of workers in high-quality, high-growth occupations. The report notes that concerted efforts are required to address women's severe underrepresentation in these high-growth green occupations so that both men and women may benefit from the job-creating potential of investments in energy efficiency and conservation.

Methodology: Estimating the Gender Distribution of Green Jobs

Data Sources

To date, two comprehensive national assessments of employment in green goods and services have been conducted: the Brookings-Battelle study (BBS; Muro, Rothwell, and Saha 2011) and the Green Goods and Services (BLS-GGS) survey of employers conducted by the U.S. Department of Labor, Bureau of Labor Statistics (2012a). These studies do not provide a gender estimate of green jobs but form the basis for IWPR's estimates of women's share of green jobs, women's median earnings and educational characteristics in green jobs, and their share of projected job growth.

Both studies employ similar definitions of green activities: jobs with an 'environmental benefit' (Muro et al. 2011) in "businesses that produce goods and provide services that benefit the environment or conserve natural resources" (U.S. Department of Labor 2012a); but, as the detailed identification of potentially green industry segments was conducted independently by each, they differ slightly in the detailed definition of 'green.' Both studies count only direct jobs: jobs in a factory producing wind turbines are counted, but jobs in a factory that produces conventional screws to be used in the production of the turbines are not. In establishments that produce solely green goods and services, both studies count all workers as working in the green sector, whether they are directly involved, for example, in producing environmentally friendly cleaning products, or whether they are indirectly involved as administrative assistants, janitors, or delivery truck drivers. Yet many establishments are not 'exclusively' green; a college might teach classes on environmental engineering as part of a broad set of courses, or a factory might provide components for hybrid cars, as well as for conventional cars. In these circumstances the Brookings-Battelle study includes only the workers who contribute to the production of green goods or services (Rothwell, Grueber, Horowitz, and Muro 2011). The BBS identified potentially 'green' establishments based on industry codes (using detailed SIC codes) and public lists of green companies. Information on the industry, location, and employment of these companies and their establishments was collected by BBS using Dun & Bradstreet and the National Establishments Time Series (NETS)—the latter for historical data.

The BLS-GGS survey was administered through the Quarterly Census of Employment and Wages to a sample of establishments in 333 industry segments that the BLS had identified as most likely "to produce green goods or provide green services" (U.S. Department of Labor 2012a). BLS-GGS employment es-

timates are based on the share of employment or revenues reported by the establishment applied to the number of workers on payroll during the reference week. The BLS asks firms to provide the revenue derived from green goods and services, and apportions a corresponding share of its total employment to green goods and services, and thus includes both the workers directly engaged in providing 'green' tasks as well as administrative or support workers. Public sector employers and not-for-profits are asked to provide direct job estimates. Workers who are involved in intra-firm green activities and processes, for example, in the establishment's recycling activities, without directly contributing to the green 'output' of the establishment are not counted.[1]

Both the BBS and BLS-GGS studies produce similar estimates for the number of jobs held in 2010 of less than 3 percent of total employment: BBS estimates a total of 2.7 million workers, including 575,000 public sector workers, and the BLS estimates 3.2 million workers in total, including 860,000 public sector workers (Muro et al. 2011; United States Department of Labor 2012a).

The BBS and BLS-GGS studies provide estimates of green employment by industry and by broad occupational groupings for 2010. Such occupational information was not directly collected from employers. When estimating the occupational distribution of green jobs, Brookings-Battelle makes the assumption that a firm producing 'green' goods and services essentially has the same type of jobs (in terms of occupations, educational profile, earnings) as a firm in the same industry segment that produces non-green goods and services. The BBS database provides estimates of the green economy by state and educational attainment, and by state and broad occupation.

Apart from these national studies, the majority of states have conducted studies of employment in the green economy. Several of these studies are based on surveys of employers and other original data collection, while others use general input-output estimations based on national statistics. Appendix Table A1 provides an overview of the methodologies and job estimates in the state reports. Of the 45 state-level reports that are available, only two, the report for Minnesota and a study on green jobs in Rhode Island conducted by independent researchers, include an estimate of women's share of green jobs..

Methodology for Estimating the Gender Distribution of Green Jobs

This report draws on the U.S. Census Bureau's American Community Survey (ACS) to estimate the shares of women and men working in green occupations for private and public employers producing green goods and services; the ACS is also a source for the earnings and educational profiles of the men and women

1 The BLS separately conducted a survey of "Green Technologies and Practices" to capture employment in such activities (U.S. Department of Labor 2012b). Based on its survey the BLS estimates that 854,000 workers (0.7 percent of total U.S. employment) in 2011 spent at least half of their time on processes and techniques that reduce the environmental impact of production processes or improve energy efficiency. The two BLS surveys used different methodologies and survey definitions and cannot be directly compared; estimates may involve the same workers and are not 'additive.'

estimated to hold green jobs. To get a sufficiently large sample for such detailed analysis, the IWPR study uses the three-year combined ACS files for 2008–2010.

Microdata files for the 2008–2010 ACS (Ruggles et al. 2010) include a sample weight that indicates how many people in the U.S. population are represented by a given sample observation in the survey sample. This population weight is used to estimate the size and distribution of the national workforce by gender, education, occupation, and other characteristics for respondents who report employment currently or in the previous twelve months.

To estimate the number of jobs in the green, or clean, economy by gender and other variables of interest, the sample weights are adjusted in a series of steps to the size of the "clean economy" from Brookings-Battelle (Muro et al. 2011) and the GGS sector from the U.S. Department of Labor, Bureau of Labor Statistics (2012a), reflecting both the BBS state-level education and occupation estimates and the BLS-GGS estimates of state-level industrial distributions. First, the sample weights are adjusted to the state-specific[2] educational attainment distribution of the green economy workforce from the Brookings-Battelle Clean Economy database. Educational attainment is coded in seven categories: Less than high school completion, High school graduation or GED certification, Some college, Associate's degree, Bachelor's degree, Master's degree, and Doctoral or professional degree. Second, the weights are adjusted to the state-specific occupational distribution of the green economy workforce from the Brookings-Battelle Clean Economy database. 'Occupation' is measured using the 22 BLS major occupational categories for the civilian labor force. Third, the weights are adjusted to the state-specific distribution of the workforce by industry sectors using data from the BLS-GGS (U.S. Department of Labor 2012a). Industry is coded into 15 categories including public administration.[3] Fourth, a final adjustment is made using a ranking method to ensure that the weight for the number of green jobs represented by each sample observation in the ACS reproduces the size of the green goods and services workforce by state and industry sector. That is, the new weight estimates the number of green jobs represented by an observation in the ACS, in the same way the sample weight estimates the total employed population. The resulting weight is used in microdata analyses to estimate the size of the green economy by the social and demographic characteristics of the workforce that are of interest, and the original sample weight is used to estimate the size and characteristics of the total workforce.

2 Available for fifty states and the District of Columbia.

3 'Public administration' includes establishments primarily engaged in enacting and administering laws. Government-owned establishments engaged in nongovernmental activities are classified in the same industry as privately owned establishments engaged in similar activities.

Growth projections of the size and distributions of worker characteristics in the green economy in 2018–2020 were calculated in two ways. The first is based on state-specific growth of detailed occupations (SOC codes) for 2008–2018 re-coded to the 2002 Census occupational classification (Projections Central 2011). For each state,[4] the ratio of the projected size of the occupation group in 2018 divided by the base size of the occupation group in 2008 is multiplied by the sample weight for the green economy workforce in 2008–2010, to estimate the number of jobs in 2018 represented by each observation in the 2008–2010 ACS. The growth rate in each state for the detailed occupation in the green sector is assumed equal to the overall occupation's growth, but the change in number of women and men in green jobs can vary due to different rates of occupational growth that can vary by the gender composition of the occupation. In as far as this estimation is based on general occupational projections, which incorporate assumptions about green job growth but only as one element among many factors influencing the changing demand for occupations, these estimates are likely to underestimate actual green job growth.

The second growth projection is based on applying the state-specific green economy growth rates for 2003–2010 from the BBS (Table A11 in Muro et al. 2011). These are reported as annual average changes in the number of jobs and are applied to the estimates of the green economy workforce generated using the 2008–2010 ACS. There is, of course, no guarantee that job growth in the green economy will continue at the same historic rate, but at least this scenario does provide some indication of the impact of green-specific growth rates. In this scenario, the rate of projected growth in green jobs is the same for women and men, but the faster rate of growth measured for the green economy from 2003–2010 is projected forward for eight years to 2018.

Before turning to the results of the analysis, it should be emphasized again that the estimates and projections offered are based on the assumption that firms producing green jobs and services are essentially like firms producing non-green jobs and services in the same industry classification group. It is possible that this assumption is false, and that green industries or occupations differ significantly, whether in the gender composition of the workforce or in other dimensions such as earnings. To date, however, the data to make such an assessment are lacking.

4 There were no 2008–2018 occupational projections available for South Dakota. Occupations in South Dakota were assumed to grow at the national average.

Findings: The Gender and Race/Ethnic Distribution of Green Jobs

Using the methodology described above, this study finds that fewer than three of ten green jobs are held by women, whereas women are nearly half of the total labor force. The study estimates that 924,163 women worked in green jobs in 2008–2010, 1.3 percent of all women workers and 30 percent of workers in green jobs (Appendix Table A2). Working in green jobs is also not common for men; but for every woman in a green job, there are more than two men in green jobs.

Women of all the largest race and ethnic groups are underrepresented in the green economy compared to their share of the total workforce. Black women are estimated to hold 135,400 green jobs, 4.3 percent of all green jobs, less than their 5.9 percent share of all jobs; Hispanic women are estimated to hold 125,000 green jobs, 4 percent of green jobs compared to 6.3 percent of all jobs; Asian American women are estimated to hold 44,660 green jobs, 1.4 percent of all green jobs compared to 2.5 percent of all jobs; and white women 598,000 green jobs, 19 percent of the green workforce compared to 32 percent of the total workforce(Table 1).

Table 1. Green Jobs by Gender and Race/Ethnicity*: Employed Workers Aged 18 Years and Older in the Civilian Workforce, 2008-2010

	Women Green Jobs	Men Green Jobs	Total Green Jobs	Women's share of green jobs (3,129,110)	Women's share of all jobs (140,746,458)
White	598,494	1,510,170	2,108,664	19.1%	31.9%
Black	135,435	220,275	355,710	4.3%	5.9%
Asian American	44,660	83,633	128,293	1.4%	2.5%
Hispanic	124,519	346,979	471,498	4.0%	6.3%
Other	21,056	43,889	64,945	0.7%	1.0%
Total	924,163	2,204,947	3,129,110	29.5%	47.6%

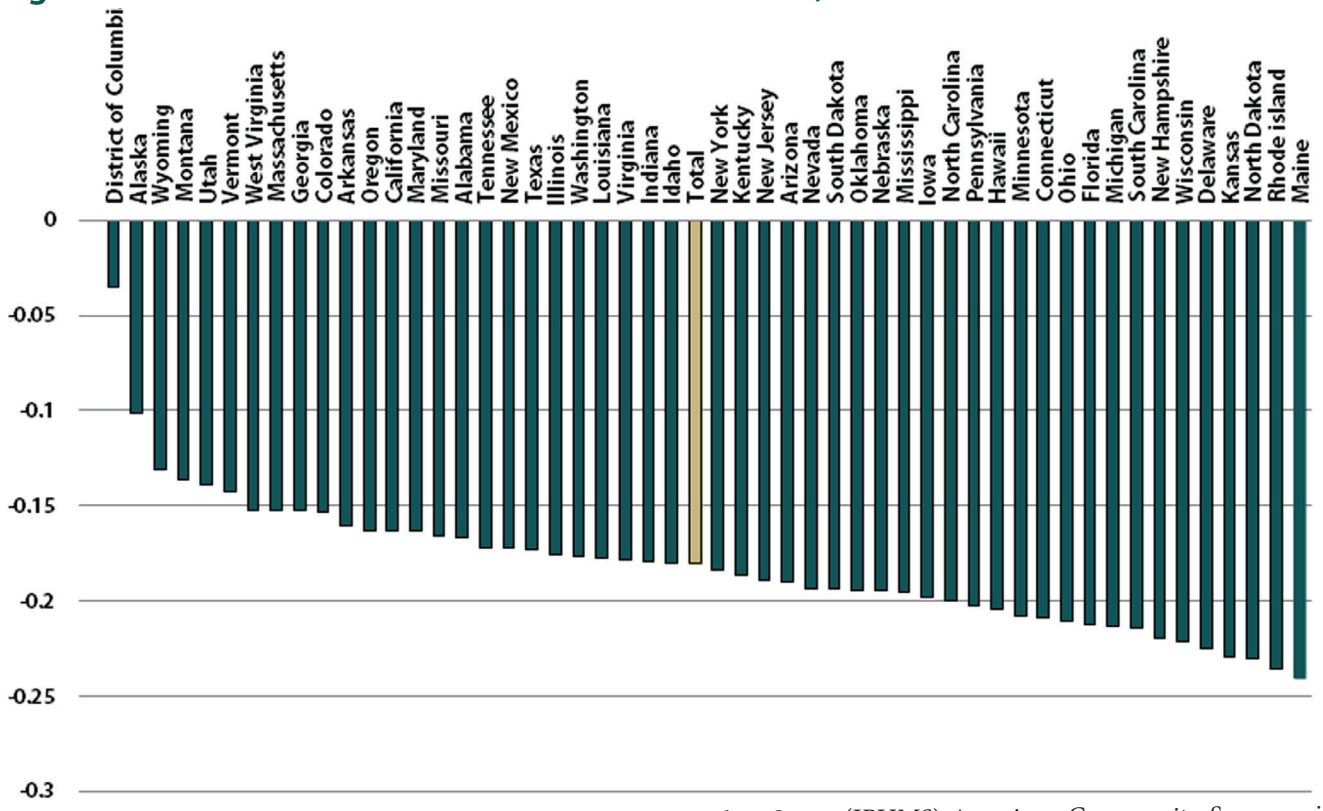
Note: * 'White' is defined as 'white alone, non-Hispanic'; 'Black' is 'black alone, non-Hispanic'; 'Hispanic' includes people of all races; "Other' includes persons of two or more races and anyone not elsewhere specified.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

The Gender Distribution of Green Jobs Across States

Women are less likely than men to work in green jobs in all 50 states and in Washington, DC, but there is significant variation in the degree of their underrepresentation between states (Appendix Table A2).[5] Women's share of green jobs varies from almost half of all green jobs in Washington, DC (46 percent, only 3 percent below women's share of all jobs in DC) to less than a quarter of green jobs in North Dakota (Appendix Table A2). Figure 1 shows the gap between women's share of total employment and women's share of green jobs for each state; this gap is largest in Maine at 24 percentage points.

Figure 1. The Green Gender Gap in Employment State-by-State: Women's Share of Total Employment Minus Women's Share of Green Employment; Employed Workers Aged 18 Years and Older in the Civilian Labor Force, 2008–2010



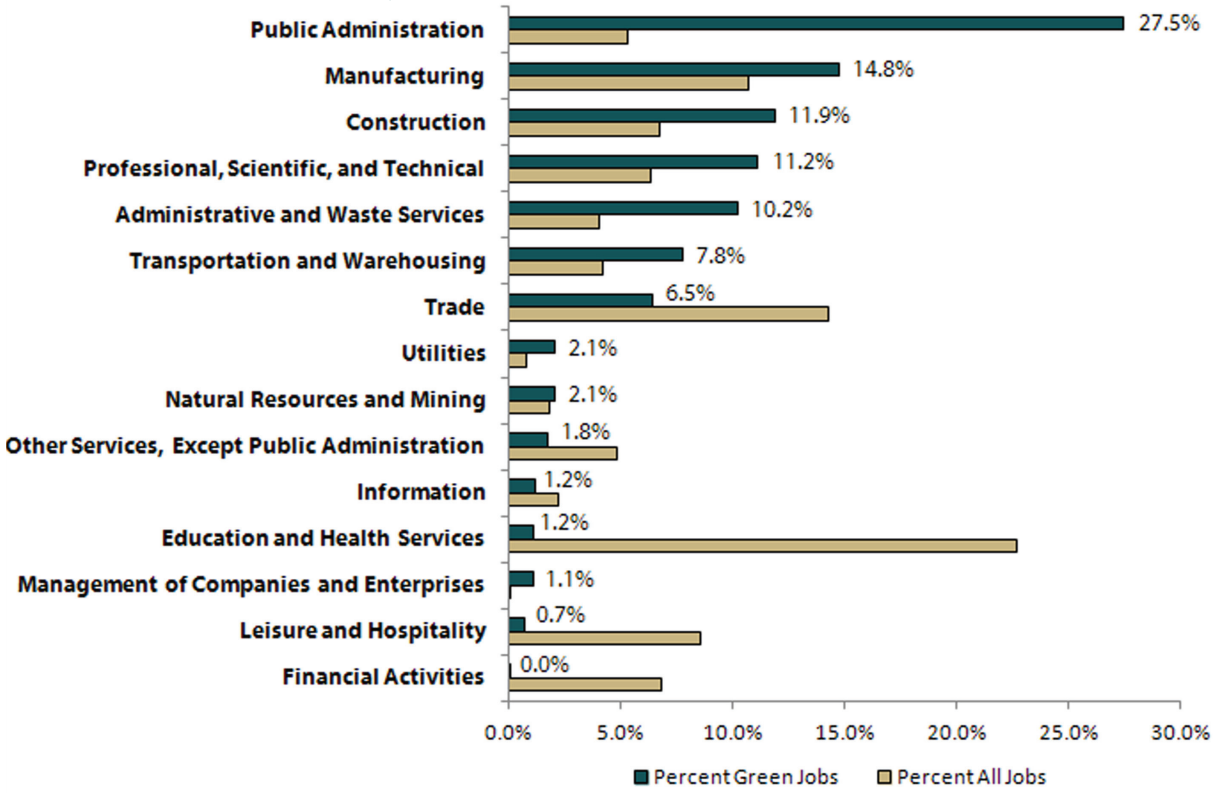
Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

5 State-level green employment is measured in terms of where a person works rather than where he or she is a resident.

The Gender Distribution of Green Jobs Across Industries

State-level differences in women's share of green jobs are likely to largely reflect each state's unique industry composition of green jobs compared to the overall economy. Industry sector (a category that counts all workers working in a firm across occupations, whether they work as technicians, secretaries, accountants, or janitors) matters in two ways: first, it allows comparing the distribution of green jobs across all industry sectors to the distribution of all jobs across all industries (Figure 2); second, it allows for the estimation of the gender distribution of employment in the green economy compared to the gender distribution in the overall economy (Table 2).

Figure 2. Distribution of Jobs Across Major Industries in the Green Economy and the Overall Economy, 2008–2010



Notes: Percentages are shown only for distribution across green jobs. 'Public administration' includes establishments primarily engaged in enacting and administering laws. Government-owned establishments engaged in nongovernmental activities are classified in the same industry as privately owned establishments engaged in similar activities.
Sources: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

As can be seen from Figure 2, green jobs are over five times as likely to be in public administration and almost twice as likely to involve 'professional, scientific and technical services' than is the case for all jobs in the overall economy. Table 2 shows that in these two industry sectors the differences between the green and the overall economy are more pronounced for women than men. In

the economy overall, 4.9 percent of women are employed in public administration, but 32.6 percent of women are in public administration in the green economy, compared to 5.8 and 25.4 percent of men, respectively (Table 2). Women are more likely than men to work in industries that are underrepresented in the green economy, such as education and health, leisure and hospitality, and financial activities. Men are more likely than women to work in industries that are overrepresented in the green economy, such as construction, transportation and warehousing, and the utilities. This partly explains women's lower share of green jobs compared to their share of all jobs. Thus, a jurisdiction with a high share of jobs in public administration and professional, scientific, and technical services, such as Washington, DC, is likely to have a higher level of green employment for women than a state like Maine.[6]

Table 2. Distribution of Jobs Across Major Industries in the Green Economy and in the Overall Economy: Employed Female and Male Workers Aged 18 Years and Older in the Civilian Workforce, 2008–2010

	Women		Men	
Major Industry	Green jobs	All jobs	Green jobs	All Jobs
Public Administration*	32.6%	4.9%	25.4%	5.8%
Manufacturing	13.6%	6.7%	15.2%	14.5%
Construction	3.0%	1.3%	15.6%	11.7%
Professional, Scientific, and Technical Services	15.0%	6.0%	9.5%	6.8%
Administrative and Waste Services	11.2%	3.4%	9.8%	4.8%
Transportation and Warehousing	4.8%	2.2%	9.1%	6.0%
Wholesale and Retail Trade	7.7%	13.7%	6.0%	14.8%
Utilities	1.2%	0.4%	2.5%	1.3%
Natural Resources and Mining	1.3%	0.7%	2.4%	2.9%
Other Services, Except Public Administration	2.1%	5.5%	1.7%	4.4%
Information	1.5%	2.1%	1.1%	2.5%
Education and Health Services	2.7%	35.7%	0.5%	10.9%
Management of Companies and Enterprises	2.2%	0.1%	0.7%	0.1%
Leisure and Hospitality	1.0%	9.3%	0.6%	7.9%
Financial Activities	**	8.0%	**	5.8%
All	100%	100%	100%	100%

Notes: Percentages are shown only for distribution across green jobs. 'Public administration' includes establishments primarily engaged in enacting and administering laws. Government-owned establishments engaged in nongovernmental activities are classified in the same industry as privately owned establishments engaged in similar activities. Sources: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

6 Over half of all workers in Washington, DC, were employed in government and professional, scientific and technical services (54.4 percent) in September 2011, compared to a quarter of workers in Maine (26.5; IWPR calculation based on U.S. Department of Labor, Bureau of Labor Statistics [2012c]).

Yet, the gender differences are further enlarged because in almost all industries women's share of jobs is lower in green activities in an industry sector than it is of all jobs in that sector (Appendix Table A3). This includes industries such as construction, transportation and warehousing, mining, and the utilities; women are proportionately underrepresented in these jobs in the overall economy, and their underrepresentation is even more pronounced in the green economy in these industries. For example, women's share of all jobs in utilities is 22 percent, but their share of green jobs in utilities is only 17 percent; in transportation and warehousing, their overall share of employment is 25 percent, but of green jobs in transportation and warehousing it is only 18 percent.[7]

The Gender Distribution of Green Jobs Across Occupations

The distribution of employment across specific occupations also differs between the green economy and the overall economy and in key occupations. Occupations in transportation and material moving, protective services, production, construction and extraction, and architecture and engineering are proportionately much more common in the green than in the overall economy (Figure 3). With the exception of production occupations, these occupations are nontraditional for women (that is, women make up fewer than 25 percent of workers in the occupation; they are 29 percent of production workers[8]). In contrast, occupations in healthcare, education, training and libraries, food preparation and serving, and personal care and services employ considerably fewer workers in the green than in the total economy (Figure 3). With the exception of food preparation and serving, where women are 56 percent of workers in the economy overall, these occupations are nontraditional, or nearly so, for men.[9] In sum, women are much less likely than men are to work in the occupations that predominate in the green economy (just as the previous section showed they are less likely than men to work in the industries that predominate in the green economy).

Appendix Table A4 shows the estimated distribution of men and women across 22 major occupational groupings, as well as the estimated number of green jobs in each of these occupations. Figure 4 provides a picture of the distribution of occupations separately for men and women in the green economy and the overall economy. Both women and men are proportionately more likely in the green economy than the overall economy to work in production occupations, protective services, transportation, architecture and engineering, and, although the

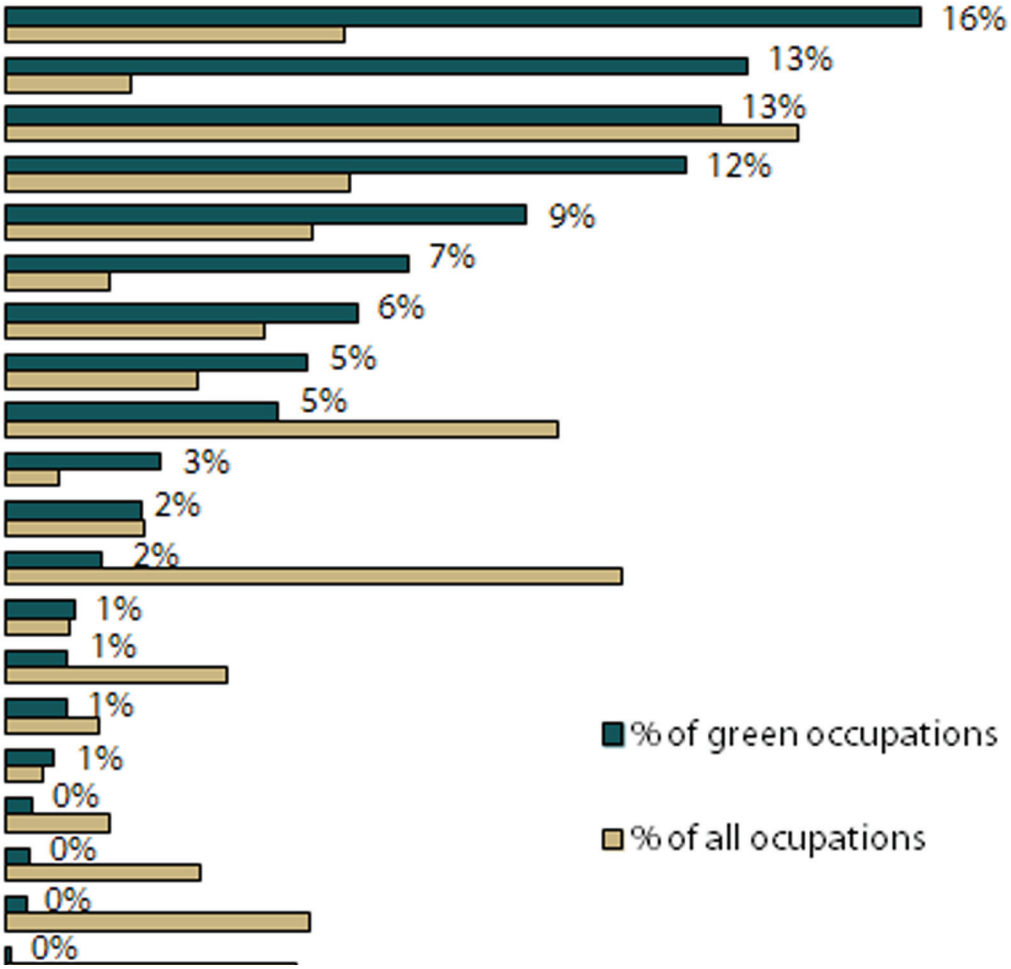
7 IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

8 This definition of nontraditional comes from the Francis Perkins Act of 2006; IWPR analysis of data from 2008–2010 American Community Surveys,{Aus: should this be plural?} Bureau of Labor Statistics Green Goods and Services, and Brookings-Battelle Clean Economy database.

9 In the total economy women are 88 percent of workers in healthcare support occupations, 78 percent of personal care and service occupations, 75 percent of healthcare practitioners and technicians, and 74 percent of education, training, and library occupations. Thus, these occupations are nontraditional, or nearly so, for men, since they hold 25 percent or fewer of the jobs in each.

differences are small, women are more likely to work in construction occupations when they work in green jobs than when they work in the economy overall.

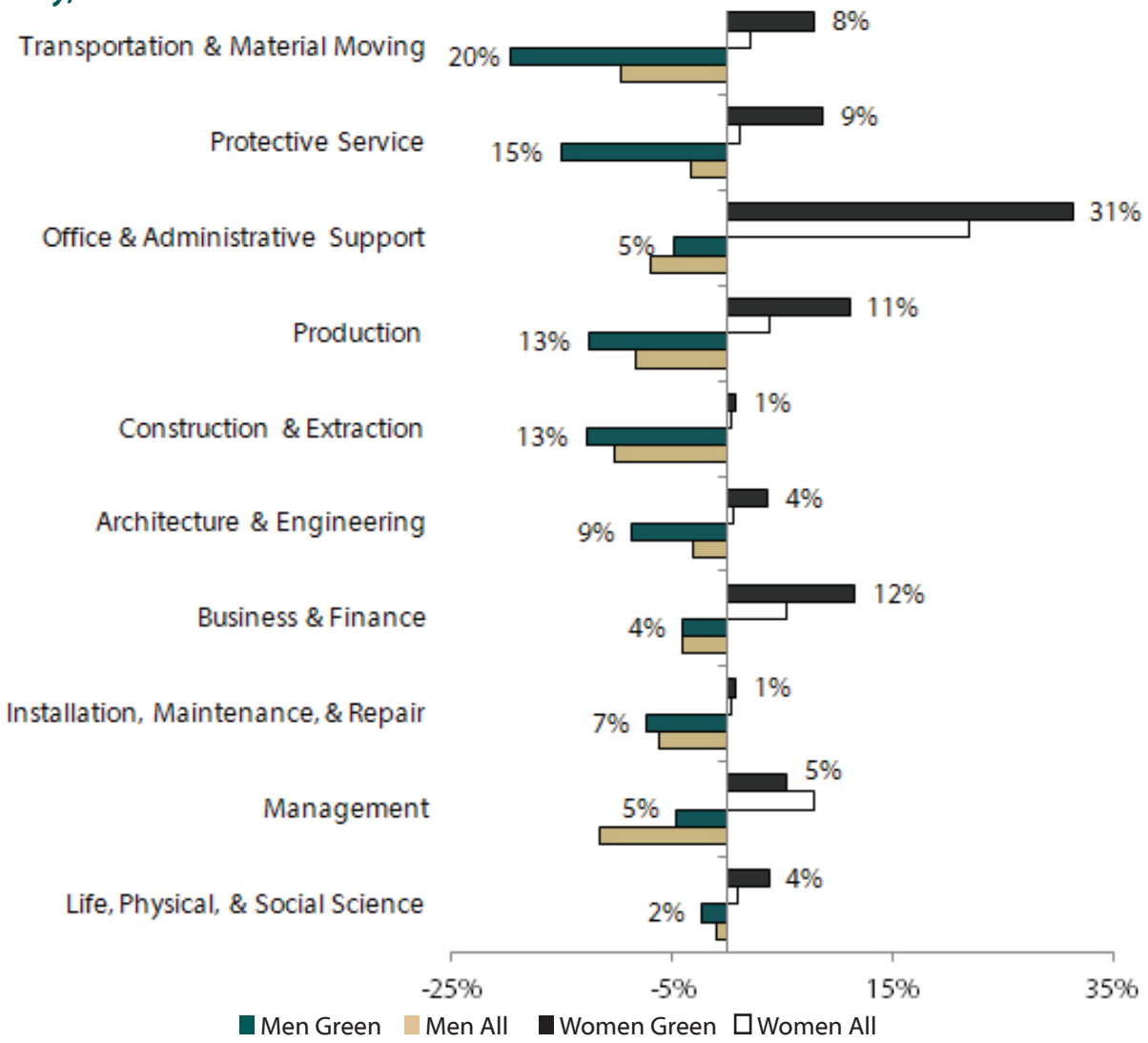
Figure 3. Distribution of Workers Across Major Occupations in the Green Economy and the Overall Economy, Workers Aged 18 Years and Older in the Civilian Economy, 2008–2010



Note: Percentages are shown only for distribution across green jobs.
Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).{

In several occupations, the gender imbalance seen in occupational distribution in the overall economy is even more pronounced in the green economy. For example, women are proportionately more likely in the green than in the overall economy to work in 'office and administrative' occupations (31 percent of women in the green economy compared to 22 percent in the overall economy), while men, already much less likely than women to work in such jobs in the overall economy, are even less likely to work in these occupations in the green economy (4.9 percent in the green economy compared to 7.0 percent in the overall economy; Figure 4).

Figure 4. Distribution of Female and Male Workers Across Selected Occupations* in the Overall Economy and Green Economy, Workers Aged 18 Years and Older in the Civilian Economy, 2008–2010



Note: *Only occupations accounting for more than 3 percent of green employment for either men or women are shown.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note above.

With one exception, building and grounds cleaning and maintenance occupations (where women's share is 40 percent in the total economy compared to 31 percent in the green economy), however, gender segregation within occupations in the green economy does not differ much from the overall economy. That is, for example, while transportation and material moving occupations account for a much larger share of male compared to female jobs in the green economy, women's share of transportation and material moving occupations in the total economy is not much different from their share of these occupations in the green economy (16 and 14 percent respectively). Women are 22 percent of workers in protective service occupations in the total economy, compared to 19 percent in the green economy; 29 percent of workers in production occupations overall,

compared to 27 percent in the green economy; and 3 percent of workers in construction occupations overall, compared to 3 percent in the green economy.[10]

The Educational Profile of Male and Female Workers in the Green Economy

Table 3 presents the study's estimates of green jobs in the economy (compared to the overall economy) that do not require a four-year college degree, disaggregated by gender.

As has been established in several studies, green occupations are less likely to be performed by workers with at least a bachelor's degree than jobs in the economy as a whole. Over three-quarters of green economy workers, compared to two-thirds of workers in the economy overall, have less than a bachelor's degree (Table 3). This study shows that men are more likely than women in green occupations not to have a four-year college degree, but the differences are generally not substantial.

Green Jobs and Earnings

This study finds that, on average, women are doing better in green jobs than in the economy as a whole: women's estimated median earnings for full-time, year-round work in the green economy are higher than in the overall economy ($38,486 compared to $35,574), and the gender wage gap is lower (18 compared to 22 percent, for 2008–2010; Appendix Table 5). Both men and women gain in the green economy, but women's gains from green jobs are higher than men's.

The analysis also shows that this broad pattern, of higher earnings and a lower wage gap, is also found in the majority of states. In 33 states women's median annual earnings for full-time, year-round work are estimated to have been at least $1,000 higher in green jobs than in the overall economy (Appendix Table A5). In 43 states the gender wage gap between women and men in the green economy is smaller than in the overall economy (though eliminated in none).[11]

Table 4 shows that this earnings advantage between green jobs and jobs overall is also true for women workers without a four-year college degree (only the largest green occupations have a large enough sample of workers to provide estimates). In protective services, median earnings for women without a bachelor's degree are 13 percent higher in the green economy than in the economy overall. In office and administrative support occupations, they are 8 percent higher, and in business occupations, 7 percent higher. In production and transportation and material moving, the other two large occupations for women in the green economy, earnings are only marginally higher for women compared with the economy overall (Table 4).

10 IWPR analysis based on IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

11 More detailed econometric analysis to control for factors such as age and experience could confirm whether the wage advantages for women are specific to the green economy, or possibly a reflection of differences in the demographic make-up of the two workforces.

Table 3. Proportion of Workers Aged 25 Years and Older With Less Than a Four-Year College Degree by Occupation in the Overall Economy and Green Economy, Civilian Workforce, 2008–2010

Occupation	Total Economy	Green Economy	Male Green	Female Green
Management	47.2%	53.9%	54.7%	52.2%
Business and Financial Operations	36.9%	42.9%	37.0%	47.8%
Computer and Mathematical Science Occupations	33.6%	40.4%	39.0%	43.8%
Architecture and Engineering Occupations	34.8%	39.5%	40.3%	34.9%
Life, Physical, and Social Science	17.0%	24.4%	25.7%	22.5%
Community and Social Service Occupations	27.9%	36.4%	35.2%	37.1%
Legal Occupations	21.6%	32.9%	11.0%	49.3%
Education, Training, and Library	20.8%	40.2%	45.3%	37.2%
Arts, Design, Entertainment, Sports, and Media	39.6%	45.3%	48.7%	41.7%
Healthcare Practitioner and Technical	43.5%	54.3%	48.3%	56.9%
Healthcare Support	89.7%	90.6%	86.6%	91.3%
Protective Service	76.0%	78.5%	78.5%	78.8%
Food Preparation and Serving Related	90.3%	92.7%	91.9%	93.3%
Building and Grounds Cleaning and Maintenance	93.9%	94.9%	94.4%	95.8%
Personal Care and Service	84.2%	88.1%	83.8%	89.4%
Sales and Related	68.3%	74.3%	69.4%	79.8%
Office and Administrative Support	81.0%	83.7%	77.8%	85.7%
Farming, Fishing, and Forestry	93.8%	95.8%	96.0%	95.1%
Construction and Extraction Occupations	93.4%	95.0%	95.2%	89.3%
Installation, Maintenance, and Repair Occupation	92.4%	94.0%	94.4%	86.6%
Production	92.2%	94.1%	94.0%	94.3%
Transportation and Material Moving	92.0%	93.8%	93.6%	94.7%
Total (percent of workers)	66.1%	75.7%	77.1%	72.5%
Total (number of workers)	81,711,537	2,141,335	1,530,342	610,993

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

Table 4. Median Annual Earnings for Full-Time, Year-Round Female Workers With Less Than a Four-Year College Degree, by Occupation. Employed Workers in Civilian Workforce Aged 25 Years and Older, 2008–2010

	Total Economy	Green Economy***
Occupation*	Women's Median Annual Earnings	Women's Median Annual
Business and Financial Operations	$41,673	$44,600
Protective service	$35,448	$40,000
Office and Administrative Support	$32,000	$34,637
Production	$25,000	$25,320
Transportation and Material Moving	$25,000	$25,826

Note: * Only occupations which are estimated to employ a minimum of 40,000 full-time year around women with less than a 4 year college degree are shown.
Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

In summary, women are underrepresented in the green economy compared to their share of the total workforce and compared to their share of almost all occupations. Yet, median annual earnings for women who work in green economy jobs are slightly higher than median annual earnings for women in the economy overall.

Findings: Growth Projections for the Green Economy

The green economy is made up of a number of different occupations and industry segments that differ both in terms of their likely growth during the next few years and the extent to which any growth in demand for their goods and services is likely to result in additional jobs. While demand for green household goods, such as energy-efficient refrigerators, for example, or for more fuel-efficient cars, is likely to grow, technological innovation is likely to limit the extent to which such growth in demand will lead to additional jobs. In contrast, an increase in the demand for the retrofitting of buildings to make them more energy efficient, in response to, for example, changes in regulatory incentives or other factors such as the price of oil or of alternative energy sources, is likely to more directly translate into additional employment, particularly in construction. Pollin (2012) estimates that investments of $150 billion to achieve cleaner and reduced energy use over a 20-year period will create an additional 1.7 million jobs in total, 30 percent of these construction-related jobs. If implemented, such a strategy would more than double the number of green construction jobs compared with 2008–2010. A report by Deutsche Bank Climate Change Advisors and the Rockefeller Foundation (2012) estimates that investments to reduce the energy consumption of buildings by 30 percent can create 3.3 million new direct and indirect 'job years.' The study estimates that the majority of new full-time equivalent jobs (FTE) would arise from energy retrofits of residential homes (65 percent of FTEs), and, among residential housing, over 80 percent of such new job opportunities would arise in the retrofitting of single-family residential homes and mobile homes (Deutsche Bank 2012).

Growth estimates for the number of women's jobs in the green economy reflect assumptions made about the overall vitality of the economy, specific demands for green jobs and services, and changes in the regulatory and policy environment regarding energy conservation and the development of renewable energy sources. In this report we provide two basic green jobs growth estimates. The growth estimates for Scenario I are based on state-level growth projections for different occupations to 2018; and in this scenario, the share of green workers within an occupation is held constant at 2008–2010 levels. Growth projections reflect differences in demand for different occupations, and, in as far as women's share of occupations differs from men's, green jobs for men and women may grow at different rates. Scenario II is based on state-by-state historic growth rates from 2003 to 2010, as estimated by Muro et al. 2011, and projects these growth rates linearly to 2018. Under this scenario, the distribution of occupations and industries in the green economy, and of women's and men's shares of these, is held constant, so that men's and women's jobs are projected to grow at the same

rate, but this scenario allows for faster growth within the green economy than elsewhere.

Under Scenario I, the total number of green jobs is projected to grow by slightly under 200,000 jobs between 2008/10 and 2018, an increase of 6.2 percent (Appendix Table A6). This scenario illustrates the impact of current gender segregation in occupations on job gains: women are estimated to gain only 14 percent, or 27,000, of these additional green jobs. Growth projections vary considerably between states. All states are estimated to see at least some growth in overall male employment in green jobs whereas women's employment growth is projected to fall in 14 states, reflecting differential growth in demand for different occupations and the differing occupational mix in the green economy among states.

Under Scenario II, applying historic growth rates state-by-state, green jobs are estimated to grow by 31 percent between 2008/10 and 2018 by nearly 1 million jobs (Appendix Table A7). Under this scenario, where the same growth rates apply to men's and women's jobs, women's green employment would grow by 283,400 jobs.

These two scenarios are likely at the opposite ends of a spectrum of possible growth of green jobs. Scenario I is likely to underestimate any specific factors that might lead to higher than average green jobs demand, while Scenario II, reflecting a simple projection of historical growth rates, may well overestimate growth. In supplemental data provided by the Brookings Metropolitan Policy Program, the annual rate of growth between 2003 and 2010 in the private sector is lower, overall, than the total economy rate used in Scenario II. In recent years, moreover, the private sector has experienced job growth while the public sector, which, as discussed, is responsible for a substantial share of green jobs, has been contracting (Hartmann, Fischer, and Logan 2012). A key influence on the size and growth rate of green jobs, particularly jobs in lower- and medium-skilled occupations highlighted in this report, will be regulatory decisions and government incentives promoting investments in energy efficiency, especially in commercial and residential housing and transportation. While it is easy to predict that public policy will have a major impact on green job growth, at the time of writing it is much harder to predict the actual direction of such policy. The American Taxpayer Relief Act of 2012, for example, reinstates a number of tax credits related to energy efficiency that expired at the end of 2011 and extends these to the end of 2013, including for expenses to make existing homes more energy efficient and for the construction of new energy-efficient homes.[12]

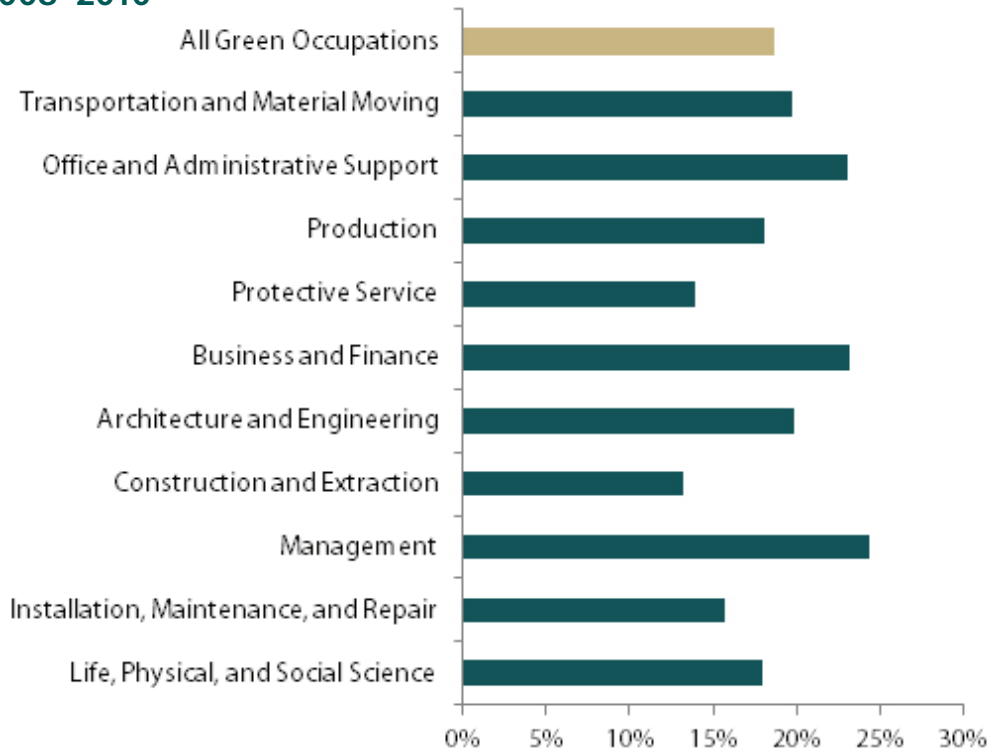
It is important to note that both projections hold the basic gender distribution within occupations and industries constant at 2008–2010 levels and thus assume that women's underrepresentation in the green economy will remain unchanged. A concerted effort to tackle women's underrepresentation in key green occupations would likely increase women's green job gains.

12 The American Taxpayer Relief Act of 2012, Sections 401 to 412. <http://www.gpo.gov/fdsys/pkg/BILLS-112hr8enr/pdf/BILLS-112hr8enr.pdf> (accessed January 17, 2013).

Retirement-Related Green Jobs Employment Opportunities

These two projections provide estimates of the change in total green employment in different occupations and industry segments; additional green employment opportunities arise from the replacement of incumbent workers due to retirement. Figure 5 shows the green occupations with the largest number of workers aged 55 and older in 2008 to 2010 and thus likely to retire in the next five to ten years. Close to a fifth (19 percent) of the green workforce are in this age group, estimated at close to 600,000 workers; over 100,000 workers in green transportation and material moving jobs are older, close to 100,000 in green office and administrative support jobs, and close to 67,000 in green production jobs. Green construction has one of the lowest shares of older workers, at 13 percent of all those working in green construction, but that still sums up to 38,400 workers who will need to be replaced just to maintain existing demand.

Figure 5. The Ten Green Occupations with the Largest Number of Employed Workers Aged 55 and Older, Civilian Workforce 2008–2010



Note: Percentages show the share, the numbers in brackets show the absolute number of workers aged 55 and older in an occupation.
Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

The share of older workers in the green economy is the same as in the overall economy, and differences between green and all jobs are minor also for individual occupations (Appendix Table A8). In construction occupations, occupations

that would expand disproportionately with increased investments in energy efficiency and building retrofits, over a million workers are 55 years and older, even though older workers are a smaller proportion in construction than in most other occupations. The number of transportation workers close to retirement is even higher, at 1.8 million workers, or 20 percent of current workers. While not shown in this table, certain industrial sectors of the economy, such as the utilities, have much higher levels of pending retirement (American Public Power Association 2005; Ray and Snyder 2006, IBEW 2010; Kitterman and Dugan 2012; O'Donnell 2004). This demographic trend and the need to train and educate new generations of workers to be ready to fill jobs left by retiring workers provide new opportunities to redress women's underrepresentation in such technical better-paid occupations.

In-Demand Occupations in the Green Economy by Gender and Race/Ethnicity

Many states have prepared studies to assess the demand for skills in the green economy in an effort to inform workforce development policies and preempt the development of skill shortages that might reduce the potential growth of the green sector in the state. Thirty state-level reports on the green economy include an assessment of in-demand occupations; Appendix Table A9 provides a list of the ten most commonly mentioned occupations in state-level reports. Eight of the ten occupations are construction related, and seven do not require a bachelor's degree. Women's share of these in-demand green occupations is much lower than their estimated share of all green employment. With one exception (environmental engineers), women comprise fewer than 10 percent of workers in these high-growth green occupations.[13] In five of these occupations, women make up fewer than 5 percent of workers.

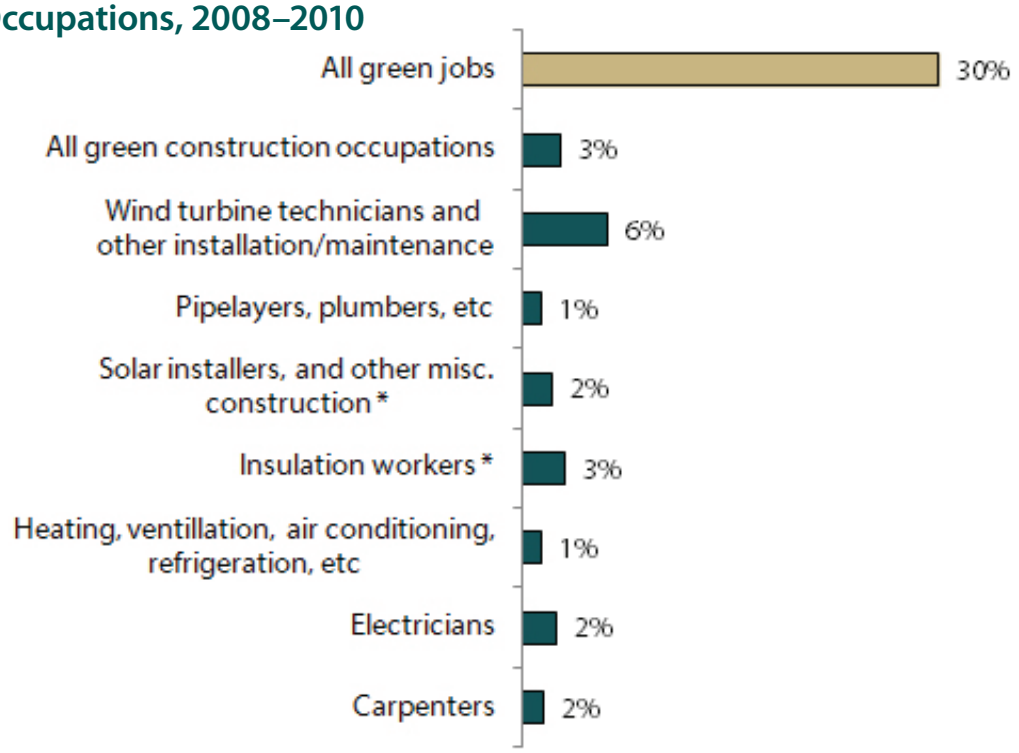
All construction occupations together employed 200,600 women; this is a substantial number of women, not that far behind the absolute numbers of women who are doctors and surgeons but far behind in terms of their overall share of these occupations–fewer than 3 percent of all construction workers are women (U.S. Department of Labor 2011). Women are not doing any better in terms of access to jobs in green construction. Of 284,900 construction workers engaged in green activities in 2008–2010, only 7,500, or 2.7 percent, were women (Figure 6). The occupation mentioned most frequently, 'heating, air conditioning and refrigeration mechanics and repairers' (HVAC technicians; in 22 state-level green reports) in 2008–2010 employed fewer than 2 percent of women workers (1.2 percent, Figure 6, an estimated 2,795 women of a total HVAC workforce of 230,304 workers, Appendix Table A10); the two next most frequently mentioned occupations also employ proportionately very few women. Women were just 2.2 percent of electricians (11,200 women of 509,700 workers) and just 1.7 percent of carpenters (21,600 women of a total workforce of 1,289,700).

13 In 2010 women were 44 percent of those receiving a bachelor's degree in environmental engineering, but only 12 percent of electrical engineers (Gibbons 2010).

During the last few years there has been a rapid increase in demand for supplementary qualifications related to the retrofitting of buildings. Such qualifications are perceived as particularly relevant given the recession-related collapse of the market for new buildings. A survey conducted by the Building Performance Institute (BPI) in 2011 of individuals who sought BPI certified qualifications found that women made up only 10 percent of people who went through BPI certification exams (Building Performance Institute 2012); the BPI sets standards and offers certifications for residential energy efficiency retrofit work.

As shown in Figure 7, women of all races and ethnicities are underrepresented in construction occupations (the numbers of women in construction are too low to provide race/ethnic estimates for the green construction jobs for women), but Hispanic women are slightly more likely to work in construction occupations compared to their overall share of the female workforce (19 percent compared to 13.1 percent). This echoes the proportional overrepresentation of Hispanic men in construction, who comprise 28 percent of the male construction workforce compared with 16 percent of the overall male workforce. White women's share of construction jobs is close to their overall share of the female workforce. Black women on the whole are underrepresented in construction trades (8.5 percent of women working in construction, compared to 12.3 percent of all employed women), although there is considerable variation across different construction occupations. Black women, however, make up a higher share of the female construction workforce than black men do of the male construction workforce (Figure 7). Appendix Tables A11a and A11b provide more detailed occupational estimates by race/ethnicity for construction employment.

Figure 6. Women's Share of In-Demand Green Building and Retrofit Occupations, 2008–2010

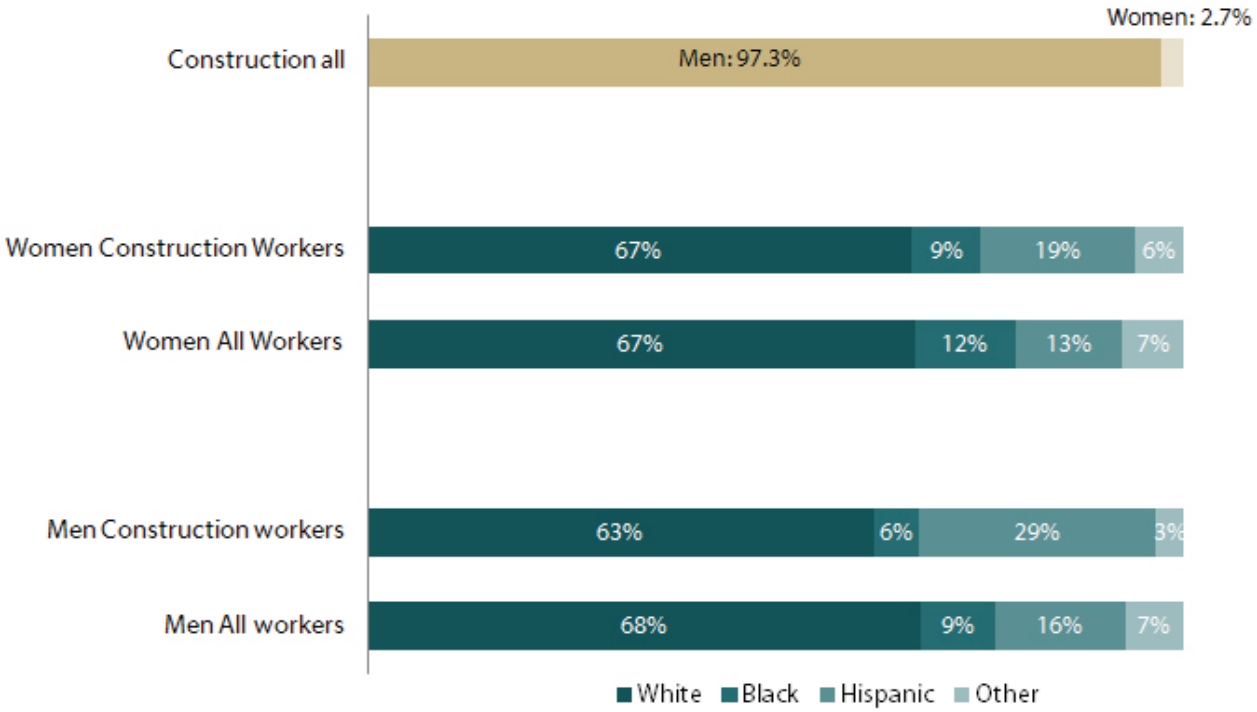


Note: * The total American Community Survey sample for these occupations included fewer than 100 women.
Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).{

The majority of in-demand occupations cited in green jobs reports do not require a bachelor's degree. Women's share of the green in-demand occupations typically requiring a bachelor's degree—electrical engineers, construction managers, and environmental engineers—tends to be higher than in construction trade occupations with less formalized education requirements (U.S. Department of Labor 2011). Researchers of occupational gender segregation suggest that the on-the-job training systems that are common in construction trades (whether these involve formal apprenticeship systems or less formalized patchworks of on-the-job training and certification) make it harder for women to enter predominantly male occupations because doing so requires the cooperation of male co-workers and supervisors in delivering training (Bergmann 2011; Estevez-Abe 2006). College degrees are a more standardized and neutral way for a worker to both gain and demonstrate that she has the required skills and knowledge for a job.

A state-by-state analysis shows that women's underrepresentation in construction occupations is endemic across states. Although some states do better than the national average for women's share of construction jobs, even in Alaska, the state with the highest share of women in construction occupations, women hold only 5.1 percent of these jobs. Appendix Table A12 shows the number and share of women separately for the key in-demand construction occupations (numbers

Figure 7. Distribution of the Workforce by Gender and Race/Ethnicity in Construction Occupations, 2008–2010



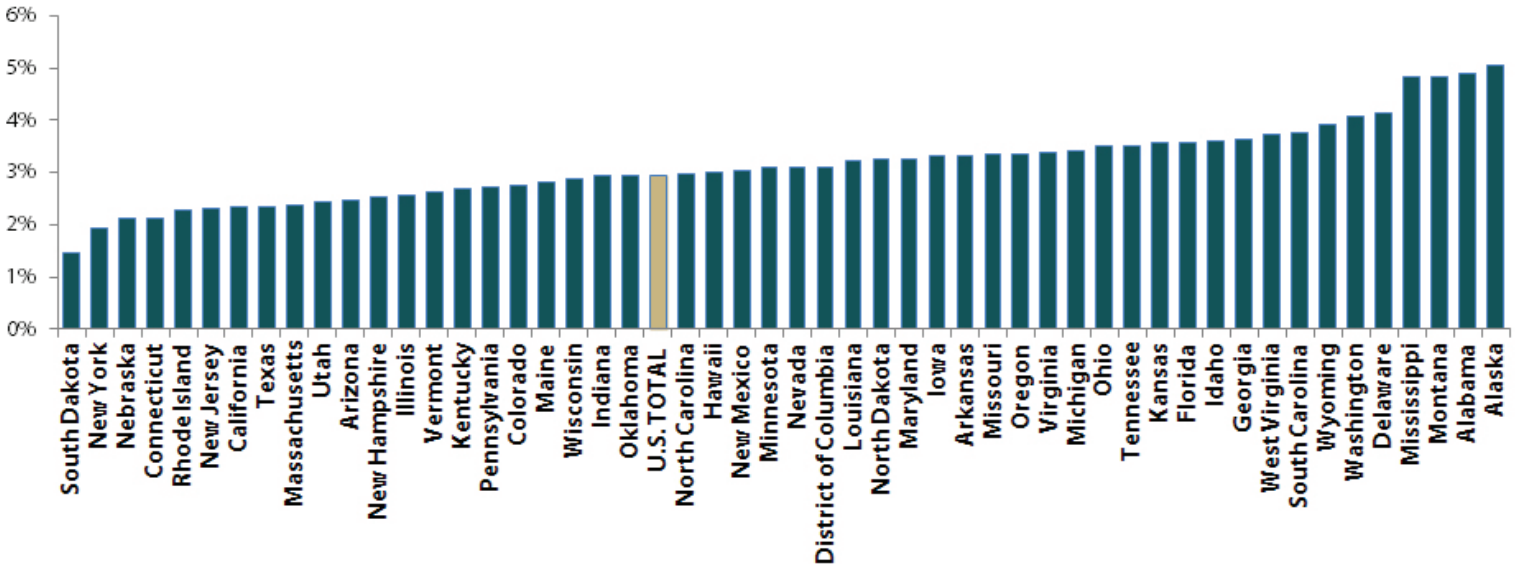
Note: 'White' is defined as 'white alone, non-Hispanic'; 'Black' is 'black alone, non-Hispanic'; 'Hispanic' includes people of all races; "Other' includes persons of two or more races and anyone not elsewhere specified.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

are too small to provide specific state-by-state gender estimates for green construction jobs). Data are for the pre-recession period of 2005–2007. This pre-recession period is chosen to get better insight into the likely supply of experienced workers for these in-demand construction occupations.

It is striking that none of the state-level reports directly addresses women's severe underrepresentation in green in-demand occupations, particularly as these reports typically are written to inform the state's workforce development strategies. Because of high levels of unemployment in construction, states are unlikely to be faced with skill shortages in the short run. Yet, as the economy recovers and demand increases, the challenge will be as much to improve equal opportunity in the number of new trainees as to achieve equity in rehiring of experienced unemployed workers. Investments strategies focusing on building retrofits and other fields requiring construction skills need to specifically target women in order to begin to redress the imbalance and provide significant job opportunities to women in construction-related green jobs.

Figure 8. Women's Share of Employment in Construction Occupations, by State, 2005–2007



Source: IWPR analysis of 2005-2007 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

Conclusion: Gender Segregation, Green Jobs, and Pathways into Careers with Family-Sustaining Wages for Women

Women are not benefiting to the same extent as men from the employment potential of the green economy. Women currently hold fewer than three of ten green jobs, and their share of employment is much lower in the key occupations projected to grow most strongly as the green economy expands. It is striking that 40 years after the passage of Title IX and almost 50 years after the passage of the Civil Rights Act of 1964, women are still less than 5 percent of the workers in key middle-income, middle-class occupations. Perhaps even more striking is that, even though there is a glaring gender imbalance in green occupations, this issue is rarely explicitly addressed in workforce development and job creation strategies concerned with the green economy.

The state-by-state analysis of women's employment in the green economy confirms that green jobs are comparatively good jobs for women, with higher earnings and a lower gender wage gap than in the overall economy. While women are less likely than men to work in green jobs in each of the states and are particularly underrepresented in the green occupations that are predicted to grow most strongly, there are substantial differences between states. Women in the better states are two to three times as likely to work in green occupations than women in the worst states. These differences suggest that women's underrepresentation is not inevitable and that there is scope for improving women's access to quality green jobs with family-sustaining wages by learning from and building on successful practices in workforce development.

The underrepresentation of women in green jobs is of course part of a broader problem of women's underrepresentation in technical and STEM occupations. Yet the 'green' aspect of these jobs provides a new opportunity to encourage more women to pursue such careers. 'Green' is of interest to women; women are one in seven civil engineers but over a quarter of environmental engineers. Women's interest in the environment may provide a new opportunity to address women's glaring absence from key occupations and fields of work.

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APPENDIX

Table A1. Overview of State Reports on the Green Economy

State	Publication Year	Report Commissioned by the State	Projected Years of Green Job Growth	Estimated Percentage of Green Job Growth	Source of Employment Projections 1=State survey of employers 2= External model used (REMI or IMPLAN) 3 =Federal data sources used to extrapolate (CES, QCEW, etc.) 4=State Analysis of Job Vacancies 5= Did not state	Green Jobs Definition 1=BLS Definition 2=State Definition	Addressed Gender Distribution of Green Jobs
Alabama	2011	X	2008–2018	12% change (10,050 to 11,305)	1	1	No
Alaska	2010	X	None	None	1	1	No
Arizona	2010	X	2011	None	1,3	1	No
Arkansas	2010		2008–2010	8% change (no specific figure)	5	2	No
California							No
CA Report 1	2009						No
CA Report 2	2010	X			1	1	No
CA Report 3	2011		2011				No
Colorado	2009		2007–2030	192,181 jobs created (no percentage)	Scenario Planning	2	No
Connecticut	None	N/A	N/A	N/A	N/A	N/A	N/A
Delaware	2011		None	None	1	2	No
District of Columbia	2011	X	2010–2012	12% change (28,000 jobs created)	1	2	No
Florida	2010	X	2010–2011	8% (3,385)	1	2	No
Georgia	None	N/A	N/A	N/A	N/A	N/A	N/A
Hawaii	2010	X	2010–2012	26%	1	2	No
Idaho	2011	X	2008-2018	1.15% (annual growth, 1,970 jobs)	1	1	No
Illinois	2009		None	None	5	1	No
Indiana	2011	X	2010–2012	None	1	1	No
Iowa	2011	X	2008-–2018	1,843 jobs created (no percentage)	1	2	No
Kansas	2009	X	2010–2012	34% change (20,047 to 30,236)	1	1	No
Kentucky	2011	X	2011–2013	3,267 jobs created (no percentage)	1	1	No
Louisiana	2011	X	2010–2020	9% change (101,319 to 111,196)	1	1	No
Maine	2010	X	2006–2038	7.1% (annual growth, 600 jobs)	2	2	No
Maryland	2012	X	None	None	5	1	No

Table A1 continued

	Publication Year	Report Commissioned by the State	Projected Years of Green Job Growth	Estimated Percentage of Green Job Growth	Source of Employment Projections 1=State survey of employers 2= External model used (REMI or IMPLAN) 3 =Federal data sources used to extrapolate (CES, QCEW, etc.) 4=State Analysis of Job Vacancies 5= Did not state	Green Jobs Definition 1=BLS Definition 2=State Definition	Addressed Gender Distribution of Green Jobs
Massachusetts*	2011		2010-2012	None	1	2	No
Michigan	2009	X	2006-2016	6% (annual growth; 12,000 jobs)	1	1	No
Minnesota	2009	X	2010-2020	4% change (52,927 to 55,025, conservative estimate)	5	1	X
Mississippi	2011	X	2010-2020	13% change (50,605 to 57,925)	1	1	No
Missouri	2009	X	2008-2018	None	1	1	No
Montana	2010	X	2010-2020	100 jobs annually through 2012; 260 jobs annually through 2020 (no percentage)	1,3	2	No
Nebraska	2009	X	2008-2018	11% change (19,093 to 21,278)	1	2	No
Nevada	None	N/A	N/A	N/A	N/A	N/A	N/A
New Hampshire	2012	X		None	1,4	2	No
New Jersey	2009	X	2009-2015	Over 20,000 jobs created (no percentage)	?	2	No
New Mexico	2011	X	2009-2019	ten-year growth rate of 216%	1,3	2	No
New York*	2010	X	None	None	1	1	No
North Carolina*	2012	X	None	None	1	1	No
North Dakota	2010		None	None	5	1	No
Ohio*	2011		None	None	5	2	No
Oklahoma	None	N/A	N/A	N/A	N/A	N/A	N/A
Oregon	2012	X	2010-2012	Net loss of 598 green jobs (-1%)	1	1	
Pennsylvania	2010	X	2010-2012	115,889 total green jobs	1,2	2	
Rhode Island*	2010		2006-2008	None	3		X
South Carolina	None	N/A	N/A	N/A	N/A	N/A	N/A
South Dakota	2011	X	2010-2012	None	1,2	2	No
Tennessee	2011		2011-2014	10,143 green jobs by 2014	1,2	2	No
Texas*	2010		2010-2020	6,000 jobs per year from 2010 to 2020;	5	2	No
Utah*	2010	X	2010-2020	7,000 net jobs by 2020	Case Studies and Scenario Planning	2	No
Vermont	2011	X	None	None	5	1	No
Virginia*	2009		None	None	Net Time Series Database, Dun and Bradstreet	2	No
Washington	2009	X	2008-2018	None	1	2	No
West Virginia	None	N/A	N/A	N/A	N/A	N/A	N/A
Wisconsin*	2010		None	None	Case Studies	2	No
Wyoming*	2009		None	None	Net Time Series Database	2	No

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A2. State-Level Employment: Overall Economy and Green Economy for Male and Female Employed Workers Aged 18 Years and Older in the Civilian Workforce, 2008–2010

State of Employment[1]	Overall Economy				Green Economy					
	Men Total Jobs	Women Total Jobs	All jobs	Women's Share of all Jobs (Percent)	Men Green jobs	Women Green jobs	All Green jobs	Women's Share of Green jobs (Percent)	Green Jobs Gender Gap[2]	State Ranking for Green Gender Gap
Alabama	1,042,157	944,438	1,986,595	48%	30,623	13,665	44,288	31%	-17%	16
Alaska	196,472	156,894	353,366	44%	7,534	3,926	11,460	34%	-10%	2
Arizona	1,441,839	1,255,815	2,697,654	47%	36,025	13,692	49,717	28%	-19%	29
Arkansas	653,247	591,298	1,244,545	48%	22,798	10,482	33,280	31%	-16%	11
California	8,962,825	7,591,704	16,554,529	46%	238,437	100,008	338,445	30%	-16%	13
Colorado	1,309,954	1,140,897	2,450,851	47%	49,827	22,625	72,452	31%	-15%	10
Connecticut	891,344	845,458	1,736,802	49%	28,321	10,886	39,207	28%	-21%	40
Delaware	214,022	211,801	425,823	50%	5,808	2,170	7,978	27%	-23%	47
District of Columbia	395,607	381,234	776,841	49%	14,667	12,274	26,941	46%	-4%	1
Florida	4,202,381	3,928,907	8,131,288	48%	69,964	25,999	95,963	27%	-21%	42
Georgia	2,226,923	2,058,865	4,285,788	48%	55,137	26,859	81,996	33%	-15%	9
Hawaii	343,342	315,839	659,181	48%	11,307	4,276	15,583	27%	-20%	38
Idaho	359,615	311,856	671,471	46%	15,875	6,317	22,192	28%	-18%	25
Illinois	3,139,624	2,850,406	5,990,030	48%	97,815	42,015	139,830	30%	-18%	20
Indiana	1,500,266	1,378,141	2,878,407	48%	47,615	20,333	67,948	30%	-18%	24
Iowa	798,141	730,240	1,528,381	48%	28,159	10,939	39,098	28%	-20%	35
Kansas	731,675	662,293	1,393,968	48%	21,010	6,846	27,856	25%	-23%	48
Kentucky	969,534	887,520	1,857,054	48%	22,743	9,353	32,096	29%	-19%	27
Louisiana	1,050,514	945,768	1,996,282	47%	24,131	10,158	34,289	30%	-18%	22
Maine	319,359	312,747	632,106	49%	10,377	3,548	13,925	25%	-24%	51
Maryland	1,327,486	1,292,012	2,619,498	49%	58,577	28,831	87,408	33%	-16%	14
Massachusetts	1,682,906	1,622,614	3,305,520	49%	52,441	26,866	79,307	34%	-15%	8
Michigan	2,136,177	2,065,210	4,201,387	49%	57,569	22,202	79,771	28%	-21%	43
Minnesota	1,397,167	1,312,134	2,709,301	48%	50,440	19,296	69,736	28%	-21%	39
Mississippi	597,333	574,934	1,172,267	49%	12,268	5,144	17,412	30%	-20%	34
Missouri	1,428,339	1,365,729	2,794,068	49%	44,126	21,079	65,205	32%	-17%	15
Montana	243,305	225,282	468,587	48%	9,531	5,014	14,545	34%	-14%	4

Table 2. Continued

State of Employment	Overall Economy				Green Economy					
	Men Total jobs	Women Total jobs	All jobs	Women's Share of all jobs (Percent)	Men Green jobs	Women Green jobs	All Green jobs	Women's Share of Green jobs (percent)	Green Jobs Gender Gap	State Ranking for Green Gender Gap
Nevada	682,528	574,392	1,256,920	46%	12,702	4,552	17,254	26%	-19%	30
New Hampshire	324,820	318,102	642,922	49%	8,332	3,170	11,502	28%	-22%	45
New Jersey	2,057,945	1,889,088	3,947,033	48%	53,988	22,037	76,025	29%	-19%	28
New Mexico	458,382	417,647	876,029	48%	14,789	6,478	21,267	30%	-17%	18
New York	4,838,626	4,492,901	9,331,527	48%	174,548	73,978	248,526	30%	-18%	26
North Carolina	2,190,611	2,052,156	4,242,767	48%	55,476	22,022	77,498	28%	-20%	36
North Dakota	198,063	173,789	371,852	47%	6,414	1,993	8,407	24%	-23%	49
Ohio	2,694,905	2,563,226	5,258,131	49%	91,747	35,108	126,855	28%	-21%	41
Oklahoma	882,183	773,024	1,655,207	47%	16,298	6,113	22,411	27%	-19%	32
Oregon	934,241	849,188	1,783,429	48%	37,736	17,217	54,953	31%	-16%	12
Pennsylvania	2,986,738	2,798,823	5,785,561	48%	130,973	51,220	182,193	28%	-20%	37
Rhode Island	238,523	247,045	485,568	51%	8,669	3,255	11,924	27%	-24%	50
South Carolina	1,003,229	950,060	1,953,289	49%	25,536	9,564	35,100	27%	-21%	44
South Dakota	209,630	194,060	403,690	48%	8,010	3,229	11,239	29%	-19%	31
Tennessee	1,482,930	1,351,621	2,834,551	48%	43,095	18,909	62,004	30%	-17%	17
Texas	6,103,281	5,132,038	11,235,319	46%	164,602	65,083	229,685	28%	-17%	19
Utah	678,128	544,267	1,222,395	45%	19,400	8,548	27,948	31%	-14%	5
Vermont	165,476	156,321	321,797	49%	8,458	4,426	12,884	34%	-14%	6
Virginia	1,965,487	1,812,033	3,777,520	48%	64,183	27,688	91,871	30%	-18%	23
Washington	1,637,781	1,450,366	3,088,147	47%	64,983	26,923	91,906	29%	-18%	21
West Virginia	387,143	355,126	742,269	48%	9,789	4,744	14,533	33%	-15%	7
Wisconsin	1,428,465	1,341,015	2,769,480	48%	43,838	15,625	59,463	26%	-22%	46
Wyoming	162,256	129,002	291,258	44%	5,524	2,507	8,031	31%	-13%	3
Total	73,770,446	66,976,012	140,746,458	48%	2,204,947	924,163	3,129,110	30%	-18%	

Note: 1 State estimates are based on the location of work, not on the residence of worker. 2 Difference between women's share of all jobs and women's share of green jobs. See methodology note p.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

Table A3. Industry Level Employment: Overall and Green Economy for Male and Female Employed Workers Aged 18 Years and Older in the Civilian Workforce, 2008–2010

	Overall Economy				Green Economy				
	Men Total Jobs	Women Total Jobs	All Jobs	Women's Share of Industry (Percent)	Men Green Jobs	Women Green Jobs	All Green Jobs	Women's Share of Green Industry (Percent)	Women's Share of Total Compared to Green Jobs
Administrative and waste services	3,525,328	2,258,704	5,784,032	39.1%	216,357	103,558	319,915	32.4%	-6.7%
Construction	8,648,171	888,951	9,537,122	9.3%	344,136	27,941	372,077	7.5%	-1.8%
Education and health services	8,034,998	23,934,582	31,969,580	74.9%	12,006	25,063	37,069	67.6%	-7.3%
Financial activities	4,304,810	5,371,008	9,675,818	55.5%	80	110	190	57.9%	2.4%
Information	1,811,213	1,390,911	3,202,124	43.4%	23,611	13,552	37,163	36.5%	-7.0%
Leisure and hospitality	5,818,425	6,229,550	12,047,975	51.7%	12,906	9,604	22,510	42.7%	-9.0%
Management of companies and enterprises	45,156	57,249	102,405	55.9%	14,734	19,977	34,711	57.6%	1.6%
Manufacturing	10,672,554	4,468,529	15,141,083	29.5%	335,904	125,943	461,847	27.3%	-2.2%
Natural resources and mining	2,120,223	467,529	2,587,752	18.1%	52,883	12,167	65,050	18.7%	0.6%
Other services, except public admin.	3,222,903	3,685,436	6,908,339	53.3%	36,646	19,528	56,174	34.8%	-18.6%
Professional, scientific, and technical	4,991,911	4,011,394	9,003,305	44.6%	210,109	138,915	349,024	39.8%	-4.8%
Public administration	4,287,686	3,250,773	7,538,459	43.1%	559,215	301,074	860,289	35.0%	-8.1%
Trade	10,908,727	9,208,220	20,116,947	45.8%	131,234	71,136	202,370	35.2%	-10.6%
Transportation and warehousing	4,431,789	1,480,676	5,912,465	25.0%	200,335	44,722	245,057	18.2%	-6.8%
Utilities	946,552	272,500	1,219,052	22.4%	54,791	10,873	65,664	16.6%	-5.8%
Total	73,770,446	66,976,012	140,746,458	47.6%	2,204,947	924,163	3,129,110	29.5%	-18.1%

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A4. The Distribution of Men and Women Across Occupations in the Overall Economy and Green Economy; Employed Workers Aged 18 Years and Older in the Civilian Workforce, 2008–2010

Occupation	Men distribution across all occupations	Men All Jobs	Men distribution across green occupations	Men Green Jobs	Women Distribution Across All Occupations	Women All Jobs	Women distribution across green occupations	Women Green Jobs
Management	11.5%	8,507,210	4.7%	102,538	7.9%	5,319,754	5.3%	49,423
Business and Finance	4.0%	2,930,844	4.0%	88,791	5.3%	3,551,153	11.6%	107,101
Computer and Mathematics	3.5%	2,546,339	2.5%	55,695	1.4%	942,828	2.3%	20,955
Architecture and Engineering	3.1%	2,259,835	8.6%	190,573	0.6%	390,482	3.6%	33,668
Life, Physical, and Social Science	1.0%	722,607	2.3%	51,810	0.9%	607,764	3.8%	34,797
Community and Social Services	1.2%	877,829	0.6%	13,200	2.2%	1,471,178	2.3%	20,824
Legal	1.1%	817,527	0.8%	16,562	1.2%	835,648	2.4%	22,452
Education, Training, and Library	3.1%	2,282,188	0.0%	1,028	9.5%	6,338,814	0.2%	1,744
Arts, Design, Entertainment, Sports, and Media	1.9%	1,386,888	0.3%	7,539	1.8%	1,238,382	0.8%	7,163
Healthcare Practitioner and Technical	2.6%	1,944,483	0.2%	3,652	8.5%	5,686,405	0.9%	8,350
Healthcare Support	0.5%	399,264	0.0%	382	4.5%	3,013,951	0.2%	1,858
Protective Service	3.4%	2,482,638	15.1%	332,613	1.0%	697,234	8.7%	80,453
Food Preparation and Serving	4.3%	3,190,350	0.1%	1,548	6.1%	4,118,504	0.2%	1,740
Building and Grounds Cleaning and Maintenance	4.5%	3,319,950	1.1%	24,259	3.3%	2,213,486	1.2%	10,982
Personal Care and Service	1.4%	1,051,439	0.1%	3,207	5.7%	3,817,363	1.1%	9,949
Sales and Related	10.6%	7,824,053	1.2%	27,174	11.4%	7,619,885	2.9%	26,715
Office and Administrative Support	7.0%	5,155,083	4.9%	108,044	21.9%	14,645,508	31.3%	289,400
Farming, Fishing, and Forestry	1.1%	787,950	1.0%	21,816	0.3%	191,765	0.6%	5,689
Construction and Extraction	10.1%	7,470,040	12.8%	282,340	0.3%	206,418	0.8%	7,772
Installation, Maintenance, and Repair	6.3%	4,626,171	7.3%	161,133	0.3%	198,755	0.8%	7,318
Production	8.2%	6,067,958	12.5%	275,837	3.8%	2,519,391	11.1%	102,593
Transportation and Material Moving	9.7%	7,119,800	19.7%	435,208	2.0%	1,351,344	7.9%	73,217
Total	100.0%	73,770,446	100.0%	2,204,947	100.0%	66,976,012	100.0%	924,163

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A5. Median Annual Earnings and Gender Earnings Ratio for Full-Time, Year-Round Workers Aged 18 Years and Older for Overall Economy and Green Economy by State, Civilian Workforce, 2008–2010

State	Overall Economy			Green Economy				
	Men's Median Annual Earnings	Women's Median Annual Earnings	Gender Earnings	Men's Median Annual Earnings	Women's Median Annual Earnings	Ratio	Green Economy Has Lower Gender Gap	Green Economy Has Higher Earnings for Women*
Alabama	$40,656	$30,492	75%	$41,673	$32,000	76.8%	Yes	Yes
Alaska	$54,000	$40,046	74%	$60,767	$45,000	74.1%		Yes
Arizona	$43,200	$35,000	81%	$45,500	$38,000	83.5%	Yes	Yes
Arkansas	$37,473	$28,966	77%	$36,460	$27,000	74.1%		
California	$49,627	$40,511	82%	$51,837	$45,433	87.6%	Yes	Yes
Colorado	$48,991	$38,486	79%	$50,639	$42,537	84.0%	Yes	Yes
Connecticut	$58,951	$45,000	76%	$58,742	$45,738	77.9%	Yes	
Delaware	$50,000	$39,499	79%	$50,000	$45,000	90.0%	Yes	Yes
District of Columbia	$76,230	$62,000	81%	$70,000	$62,793	89.7%	Yes	
Florida	$40,400	$32,409	80%	$38,486	$33,422	86.8%	Yes	Yes
Georgia	$43,043	$34,435	80%	$40,000	$31,396	78.5%		
Hawaii	$45,600	$36,000	79%	$47,771	$39,499	82.7%	Yes	Yes
Idaho	$40,656	$30,000	74%	$43,705	$32,900	75.3%	Yes	Yes
Illinois	$50,639	$38,000	75%	$50,820	$40,511	79.7%	Yes	Yes
Indiana	$44,563	$32,000	72%	$42,537	$31,712	74.6%	Yes	
Iowa	$42,000	$32,000	76%	$40,656	$32,000	78.7%	Yes	
Kansas	$42,689	$32,000	75%	$45,500	$33,422	73.5%		Yes
Kentucky	$40,656	$30,492	75%	$40,511	$31,396	77.5%	Yes	
Louisiana	$45,000	$30,000	67%	$45,000	$32,000	71.1%	Yes	Yes
Maine	$40,656	$32,525	80%	$42,689	$35,448	83.0%	Yes	Yes
Maryland	$52,853	$42,689	81%	$53,000	$48,614	91.7%	Yes	Yes
Massachusetts	$56,716	$45,000	79%	$53,678	$42,000	78.2%		
Michigan	$49,000	$35,574	73%	$45,738	$36,591	80.0%	Yes	Yes
Minnesota	$50,000	$38,623	77%	$47,000	$40,000	85.1%	Yes	Yes
Mississippi	$37,607	$28,000	74%	$38,486	$30,000	78.0%	Yes	Yes
Missouri	$42,689	$32,409	76%	$42,000	$32,713	77.9%	Yes	
Montana	$40,511	$30,000	74%	$45,575	$38,486	84.4%	Yes	Yes

Table 5. Continued

State	Overall Economy			Green Economy				
	Men's Median Annual Earnings	Women's Median Annual Earnings	Gender Earnings	Men's Median Annual Earnings	Women's Median Annual Earnings	Ratio	Green Economy Has Lower Gender Gap	Green Economy Has Higher Earnings for Women*
Nevada	$44,000	$34,558	79%	$50,639	$40,511	80.0%	Yes	Yes
New Hampshire	$50,000	$36,000	72%	$50,639	$39,132	77.3%	Yes	Yes
New Jersey	$55,000	$42,689	78%	$54,690	$43,550	79.6%	Yes	
New Mexico	$40,613	$30,492	75%	$45,000	$36,591	81.3%	Yes	Yes
New York	$50,639	$40,656	80%	$52,853	$43,705	82.7%	Yes	Yes
North Carolina	$40,511	$32,525	80%	$38,115	$31,712	83.2%	Yes	
North Dakota	$41,700	$30,000	72%	$40,106	$30,492	76.0%	Yes	
Ohio	$45,575	$34,435	76%	$45,575	$35,448	77.8%	Yes	Yes
Oklahoma	$40,000	$30,000	75%	$40,000	$31,000	77.5%	Yes	
Oregon	$45,575	$34,840	76%	$48,614	$39,600	81.5%	Yes	Yes
Pennsylvania	$46,000	$35,448	77%	$48,614	$38,486	79.2%	Yes	Yes
Rhode Island	$50,639	$39,640	78%	$50,820	$38,486	75.7%		
South Carolina	$40,511	$31,000	77%	$40,511	$30,695	75.8%		
South Dakota	$37,607	$29,476	78%	$36,460	$28,000	76.8%		
Tennessee	$40,511	$30,890	76%	$40,511	$31,000	76.5%	Yes	
Texas	$41,800	$33,000	79%	$42,537	$35,448	83.3%	Yes	Yes
Utah	$46,000	$31,396	68%	$45,738	$34,900	76.3%	Yes	Yes
Vermont	$43,550	$35,448	81%	$46,200	$39,640	85.8%	Yes	Yes
Virginia	$50,000	$38,486	77%	$49,627	$41,626	83.9%	Yes	Yes
Washington	$50,820	$39,000	77%	$49,804	$42,000	84.3%	Yes	Yes
West Virginia	$40,656	$28,000	69%	$40,656	$33,300	81.9%	Yes	Yes
Wisconsin	$45,000	$34,151	76%	$43,000	$33,422	77.7%	Yes	
Wyoming	$50,000	$31,508	63%	$47,771	$37,473	78.4%	Yes	Yes
United States	$45,738	$35,574	78%	$46,755	$38,486	82.3%	Yes	Yes

Notes:* 'Yes' only where estimated differences is $1,000 or more per year.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A6. Scenario I: Projected Number of Green Jobs in 2018 Compared to 2008–2010 for Women and Men by State Using General State-Level Occupational Projections

	Projected Size of the Green Economy in 2018 State Occupational Growth Projections			Projected Green Job Gain 2008/10 to 2018 State Occupational Growth Projections			Projected Rate of Green Job Gain 2008/10 to 2018 State Occupational Growth Projections		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Alabama	48,605	33,909	14,695	4,317	3,286	1,030	9.7%	10.7%	7.5%
Alaska	12,715	8,382	4,333	1,255	848	407	11.0%	11.3%	10.4%
Arizona	51,388	37,677	13,711	1,671	1,652	19	3.4%	4.6%	0.1%
Arkansas	35,472	24,566	10,906	2,192	1,768	424	6.6%	7.8%	4.0%
California	366,838	262,151	104,687	28,393	23,714	4,679	8.4%	9.9%	4.7%
Colorado	76,315	52,689	23,625	3,863	2,862	1,000	5.3%	5.7%	4.4%
Connecticut	39,892	29,015	10,877	685	694	(9)	1.7%	2.5%	-0.1%
Delaware	8,514	6,281	2,233	536	473	63	6.7%	8.1%	2.9%
District of Columbia	29,717	16,138	13,579	2,776	1,471	1,305	10.3%	10.0%	10.6%
Florida	98,153	73,154	25,000	2,190	3,190	(999)	2.3%	4.6%	-3.8%
Georgia	91,193	62,305	28,887	9,197	7,168	2,028	11.2%	13.0%	7.6%
Hawaii	16,593	12,214	4,380	1,010	907	104	6.5%	8.0%	2.4%
Idaho	25,418	18,194	7,224	3,226	2,319	907	14.5%	14.6%	14.4%
Illinois	150,478	107,679	42,799	10,648	9,864	784	7.6%	10.1%	1.9%
Indiana	72,962	52,150	20,812	5,014	4,535	479	7.4%	9.5%	2.4%
Iowa	42,148	30,731	11,417	3,050	2,572	478	7.8%	9.1%	4.4%
Kansas	30,221	22,993	7,228	2,365	1,983	382	8.5%	9.4%	5.6%
Kentucky	33,866	24,301	9,565	1,770	1,558	212	5.5%	6.9%	2.3%
Louisiana	36,482	25,880	10,603	2,193	1,749	445	6.4%	7.2%	4.4%
Maine	14,124	10,649	3,475	199	272	(73)	1.4%	2.6%	-2.1%
Maryland	95,385	64,668	30,717	7,977	6,091	1,886	9.1%	10.4%	6.5%
Massachusetts	79,793	53,470	26,323	486	1,029	(543)	0.6%	2.0%	-2.0%
Michigan	82,648	60,656	21,992	2,877	3,087	(210)	3.6%	5.4%	-0.9%
Minnesota	72,400	52,695	19,705	2,664	2,255	409	3.8%	4.5%	2.1%
Mississippi	20,048	14,215	5,833	2,636	1,947	689	15.1%	15.9%	13.4%
Missouri	66,439	45,795	20,644	1,234	1,669	(435)	1.9%	3.8%	-2.1%
Montana	16,342	10,741	5,601	1,797	1,210	587	12.4%	12.7%	11.7%
Nebraska	19,525	14,162	5,363	1,822	1,433	389	10.3%	11.3%	7.8%

Table 6. Continued

	Projected Size of the Green Economy in 2018 State Occupational Growth Projections			Projected Green Job Gain 2008/10 to 2018 State Occupational Growth Projections			Projected Rate of Green Job Gain 2008/10 to 2018 State Occupational Growth Projections		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
New Hampshire	12,344	9,065	3,278	842	733	108	7.3%	8.8%	3.4%
New Jersey	75,838	54,803	21,035	(187)	815	(1,002)	-0.2%	1.5%	-4.5%
New Mexico	22,954	15,968	6,986	1,687	1,179	508	7.9%	8.0%	7.8%
New York	249,585	178,926	70,659	1,059	4,378	(3,319)	0.4%	2.5%	-4.5%
North Carolina	82,029	59,625	22,404	4,531	4,149	382	5.8%	7.5%	1.7%
North Dakota	9,132	7,081	2,051	725	667	58	8.6%	10.4%	2.9%
Ohio	129,375	94,414	34,961	2,520	2,667	(147)	2.0%	2.9%	-0.4%
Oklahoma	24,981	18,429	6,552	2,570	2,131	439	11.5%	13.1%	7.2%
Oregon	59,001	40,584	18,417	4,048	2,848	1,200	7.4%	7.5%	7.0%
Pennsylvania	181,647	132,245	49,402	(546)	1,272	(1,818)	-0.3%	1.0%	-3.5%
Rhode Island	12,433	9,158	3,275	509	489	20	4.3%	5.6%	0.6%
South Carolina	37,045	27,592	9,453	1,945	2,056	(111)	5.5%	8.1%	-1.2%
South Dakota	11,320	8,116	3,204	81	106	(25)	0.7%	1.3%	-0.8%
Tennessee	63,562	44,409	19,152	1,558	1,314	243	2.5%	3.0%	1.3%
Texas	263,962	191,641	72,322	34,277	27,039	7,239	14.9%	16.4%	11.1%
Utah	33,566	23,516	10,050	5,618	4,116	1,502	20.1%	21.2%	17.6%
Vermont	13,926	9,238	4,687	1,042	780	261	8.1%	9.2%	5.9%
Virginia	105,545	74,316	31,229	13,674	10,133	3,541	14.9%	15.8%	12.8%
Washington	98,504	69,691	28,813	6,598	4,708	1,890	7.2%	7.2%	7.0%
West Virginia	14,937	10,111	4,826	404	322	82	2.8%	3.3%	1.7%
Wisconsin	60,486	45,511	14,974	1,023	1,673	(651)	1.7%	3.8%	-4.2%
Wyoming	8,885	6,133	2,752	854	609	245	10.6%	11.0%	9.8%
United States	3,323,288	2,372,074	951,214	194,178	167,127	27,051	6.2%	7.6%	2.9%

Note: State-specific occupational growth information is not available for South Dakota in 2008-2018. National occupational growth rates were applied in South Dakota.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).. See methodology note.

Table A7. Scenario II: Projected Number and Percentage of Green Jobs Added by 2018 for Women and Men by State Using Brookings Clean Economy Growth Projections

State	Annual Average Change in Green Jobs, 2003–2010(%)	Green Jobs in 2018 Applying Brookings' Annual Growth Rate (2003–2010) for Eight Years			Projected Green Job Gain 2008/10 to 2018 Applying Brookings' Annual Growth Rate for 8 Years (Muro et al. 2011)			Projected Green Job Growth 2008/10 to 2018 Using Brookings' Annual Growth Rate for 8 Years
		Total	Men	Women	Total	Men	Women	Total
Alabama	2.3	53,124	36,733	16,391	8,836	6,110	2,726	20.0%
Alaska	10.2	24,925	16,386	8,539	13,465	8,852	4,613	117.5%
Arizona	3.2	63,965	46,349	17,616	14,248	10,324	3,924	28.7%
Arkansas	2.2	39,609	27,133	12,475	6,329	4,335	1,993	19.0%
California	4.2	470,359	331,372	138,988	131,914	92,935	38,980	39.0%
Colorado	5.6	112,037	77,051	34,986	39,585	27,224	12,361	54.6%
Connecticut	4.0	53,657	38,759	14,898	14,450	10,438	4,012	36.9%
Delaware	5.1	11,877	8,647	3,231	3,899	2,839	1,061	48.9%
District of Columbia	1.5	30,349	16,522	13,827	3,408	1,855	1,553	12.6%
Florida	4.7	138,573	101,029	37,543	42,610	31,065	11,544	44.4%
Georgia	3.7	109,654	73,735	35,919	27,658	18,598	9,060	33.7%
Hawaii	6.5	25,790	18,713	7,077	10,207	7,406	2,801	65.5%
Idaho	4.4	31,318	22,404	8,915	9,126	6,529	2,598	41.1%
Illinois	3.1	178,513	124,875	53,638	38,683	27,060	11,623	27.7%
Indiana	1.5	76,543	53,638	22,905	8,595	6,023	2,572	12.6%
Iowa	3.3	50,694	36,511	14,183	11,596	8,352	3,244	29.7%
Kansas	3.0	35,287	26,615	8,672	7,431	5,605	1,826	26.7%
Kentucky	2.1	37,902	26,857	11,045	5,806	4,114	1,692	18.1%
Louisiana	0.1	34,564	24,325	10,240	275	194	82	0.8%
Maine	4.0	19,057	14,202	4,856	5,132	3,825	1,308	36.9%
Maryland	3.1	111,589	74,782	36,807	24,181	16,205	7,976	27.7%
Massachusetts	3.3	102,829	67,994	34,834	23,522	15,553	7,968	29.7%
Michigan	-0.3	77,876	56,202	21,675	(1,895)	(1,367)	(527)	-2.4%
Minnesota	4.9	102,249	73,957	28,292	32,513	23,517	8,996	46.6%
Mississippi	2.4	21,050	14,831	6,219	3,638	2,563	1,075	20.9%
Missouri	2.6	80,068	54,184	25,884	14,863	10,058	4,805	22.8%
Montana	2.7	18,000	11,795	6,205	3,455	2,264	1,191	23.8%

Table 7. Continued

State	Annual Average Change in Green Jobs, 2003–2010(%)	Green Jobs in 2018 Applying Brookings' Annual Growth Rate (2003–2010) for Eight Years			Projected Green Job Gain 2008/10 to 2018 Applying Brookings' Annual Growth Rate for 8 Years (Muro et al. 2011)			Projected Green Job Growth 2008/10 to 2018 Using Brookings' Annual Growth Rate for 8 Years
		Total	Men	Women	Total	Men	Women	Total
Nevada	5.8	27,088	19,941	7,146	9,834	7,239	2,594	57.0%
New Hampshire	5.3	17,386	12,594	4,792	5,884	4,262	1,622	51.2%
New Jersey	4.7	109,782	77,960	31,822	33,757	23,972	9,785	44.4%
New Mexico	6.0	33,896	23,571	10,325	12,629	8,782	3,847	59.4%
New York	5.8	390,173	274,031	116,142	141,647	99,483	42,164	57.0%
North Carolina	5.9	122,591	87,755	34,836	45,093	32,279	12,814	58.2%
North Dakota	6.7	14,124	10,776	3,348	5,717	4,362	1,355	68.0%
Ohio	2.5	154,560	111,785	42,776	27,705	20,038	7,668	21.8%
Oklahoma	4.8	32,610	23,715	8,895	10,199	7,417	2,782	45.5%
Oregon	2.2	65,403	44,912	20,491	10,450	7,176	3,274	19.0%
Pennsylvania	2.6	223,723	160,828	62,895	41,530	29,855	11,675	22.8%
Rhode Island	0.8	12,709	9,240	3,469	785	571	214	6.6%
South Carolina	1.1	38,310	27,872	10,439	3,210	2,336	875	9.1%
South Dakota	2.9	14,127	10,068	4,059	2,888	2,058	830	25.7%
Tennessee	3.8	83,560	58,077	25,483	21,556	14,982	6,574	34.8%
Texas	3.2	295,509	211,774	83,735	65,824	47,172	18,652	28.7%
Utah	3.5	36,802	25,546	11,256	8,854	6,146	2,708	31.7%
Vermont	1.8	14,860	9,756	5,105	1,976	1,298	679	15.3%
Virginia	4.7	132,664	92,682	39,982	40,793	28,499	12,294	44.4%
Washington	2.8	114,627	81,048	33,579	22,721	16,065	6,656	24.7%
West Virginia	2.6	17,846	12,020	5,825	3,313	2,231	1,081	22.8%
Wisconsin	0.7	62,876	46,354	16,522	3,413	2,516	897	5.7%
Wyoming	6.3	13,093	9,006	4,087	5,062	3,482	1,580	63.0%
United States	3.4	4,088,699	2,881,127	1,207,572	959,589	676,180	283,409	30.7%

Note: Sizes of states' green economy for 2008–2010 are shown in Appendix Table A2. Note: State-specific occupational growth information is not available for South Dakota in 2008-2018. National occupational growth rates were applied in South Dakota.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011); growth projections based on Muro et al. 2011. See methodology note.

Table A8. Employed Workers Aged 55 Years and Older by Occupation in the Overall Economy and Green Economy, Civilian Workforce, 2008–2010

	Overall Economy				Green Economy				Overall Economy		Green Economy	
	Male	Female	Total (%)	Total	Male	Female	Total (%)	Total	55-64	65+	55-64	65+
Architecture and Engineering	21%	11%	20%	519,092	21%	11%	20%	44,678	422,519	96,573	36,332	8,346
Arts, Design, Entertainment, Sports, and Media	19%	19%	19%	495,547	19%	18%	19%	2,760	365,556	129,991	2,123	637
Building and Grounds Cleaning and Maintenance	22%	23%	23%	1,245,485	17%	20%	18%	6,324	925,544	319,941	4,754	1,570
Business and Finance	24%	17%	21%	1,333,896	27%	20%	23%	45,388	1,061,405	272,491	36,220	9,168
Community and Social Services	32%	22%	25%	594,181	24%	18%	21%	7,039	448,052	146,129	5,728	1,311
Computer and Mathematics	12%	13%	12%	419,968	13%	15%	13%	10,207	375,558	44,410	9,071	1,136
Construction and Extraction	14%	15%	14%	1,043,268	13%	14%	13%	38,406	883,620	159,648	32,311	6,095
Education, Training, and Library	25%	22%	23%	1,948,365	21%	23%	22%	608	1,589,527	358,838	490	118
Farming, Fishing, and Forestry	15%	14%	15%	146,521	14%	11%	13%	3,711	107,537	38,984	2,766	945
Food Preparation and Serving	7%	12%	10%	714,991	8%	13%	11%	353	535,792	179,199	271	82
Healthcare Practitioner and Technical	25%	19%	21%	1,580,310	19%	21%	20%	2,436	1,291,653	288,657	1,986	450
Healthcare Support	14%	16%	16%	530,767	14%	18%	17%	384	427,117	103,650	310	74
Installation, Maintenance, and Repair	17%	15%	17%	829,591	16%	13%	16%	26,403	695,882	133,709	22,490	3,913
Legal	33%	17%	25%	407,685	34%	19%	25%	9,812	308,513	99,172	7,664	2,148
Life, Physical, and Social Science	22%	17%	20%	260,431	21%	13%	18%	15,583	206,267	54,164	12,867	2,716
Management	25%	20%	23%	3,191,404	25%	22%	24%	36,979	2,541,959	649,445	29,493	7,486
Office and Administrative Support	18%	22%	21%	4,178,939	20%	24%	23%	91,697	3,274,281	904,658	72,434	19,263
Personal Care and Service	20%	19%	20%	954,117	20%	21%	20%	2,693	676,056	278,061	1,917	776
Production	18%	21%	19%	1,622,806	17%	20%	18%	68,627	1,362,047	260,759	58,020	10,607
Protective Service	17%	15%	16%	522,381	14%	14%	14%	57,478	381,796	140,585	44,658	12,820
Sales and Related	21%	18%	20%	3,052,046	20%	18%	19%	10,406	2,221,619	830,427	7,557	2,849
Transportation and Material Moving	21%	19%	20%	1,734,395	20%	18%	20%	100,327	1,298,433	435,962	76,410	23,917
Total	19%	19%	19%	27,326,186	18%	20%	19%	582,300	21,400,733	5,925,453	465,873	116,427

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A9. In-Demand Occupations* Highlighted in State-Level Green Jobs Reports

State	Occupation Specific Analysis	HVAC* technicians	Electricians	Construction Workers	Carpenters	Truck Drivers or Transportation Workers	Plumbers, Pipefitters, and Steamfitters	Landscapers	Construction Managers	Electrical Engineers	Environmental Engineers
Alabama	X	X	X							X	
Alaska	X			X	X				X		
Arizona	X	X		X		X		X			
Arkansas	X	X	X	X	X	X			X	X	X
California	X	X	X		X		X		X		
Colorado	X	X	X			X	X		X	X	X
Connecticut	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Delaware	X	X		X			X	X	X		
District of Columbia											
Florida	X	X	X	X		X	X		X		
Georgia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hawaii	X					X				X	
Idaho	X	X									X
Illinois	X	x	X	X	X	X			X	X	X
Indiana	X	X	X			X		X		X	
Iowa	X	X	X		X	X		X			
Kansas	X	X		X	X		X	X			
Kentucky											
Louisiana	X			X							
Maine											
Maryland											
Massachusetts											
Michigan	X	X	X					X		X	
Minnesota	X			X	X			X			
Mississippi											
Missouri	X	X	X	X	X		X				X
Montana	X	X	X		X		X	X			
Nebraska	X	X	X	X		X	X				

Table 9 Continued

State	Occupation Specific Analysis	HVAC* technicians	Electricians	Construction Workers	Carpenters	Truck Drivers or Transportation Workers	Plumbers, Pipefitters, and Steamfitters	Landscapers	Construction Managers	Electrical Engineers	Environmental Engineers
Nevada	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Hampshire	X					X					
New Jersey	X	X	X	X							
New Mexico	X	X	X			X	X				
New York	X						X				
North Carolina											
North Dakota											
Ohio											
Oklahoma	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oregon	X	X			X						
Pennsylvania	X	X	X								
Rhode Island	X		X		X						
South Carolina	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Dakota	X	X	X		X						
Tennessee											
Texas											
Utah											
Vermont											
Virginia											
Washington	X		X		X						
West Virginia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wisconsin	X	X	X	X	X	X					
Wyoming											
Number of State Mentions	**30**	22	19	13	14	12	10	8	7	7	5

Notes: n/a: state has not conducted a specific green jobs study. Occupations are included when a green jobs state-level report highlights an occupation as either growing rapidly or having growth potential in response to green economy demand and/or employs proportionately high number of workers in the green economy. *HVAC technicians: Heating, Air Conditioning & Refrigeration Mechanics and Repairers
Source: IWPR compilation and analysis of state reports.

Table A10. Key Building Retrofit Occupations: Number of Total Employed Workers and Number and Share of Female Employed Workers Aged 18 Years and Older in Overall Economy and Green Economy, 2005–2007 and 2008–2010

	Overall 2005–2007[4]			Overall 2008–2010[4]			Green 2008–2010		
	Total[5]	Female	% Female	Total	Female	% Female	Total	Female	% Female
All construction occupations	8,385,464	246,715	2.9%	7,454,991	200,598	2.7%	284,913	7,541	2.7%
Carpenters	1,547,651	27,953	1.8%	1,289,736	21,576	1.7%	48,135	729	1.5%
Electricians	765,281	17,418	2.3%	509,674	11,234	2.2%	18,345	452	2.5%
HVAC Technicians[1]	359,892	4,703	1.3%	230,304	2,795*	1.2%	10,275	146*	1.4%
Insulation workers	44,384	1,662*	3.7%	41,577	1,557*	3.7%	1,668	52*	3.1%
Miscellaneous construction workers, including solar photovoltaic installers[2]	N/A6	N/A	N/A	15,276	327*	2.1%	674	9*	1.4%
Pipelayers, plumbers, pipefitters, and steamfitters	584,157	9,616	1.6%	531,039	7,177	1.4%	20,052	287	1.4%
Other installation and maintenance, including wind turbine technicians[3]	N/A	N/A	N/A	78,028	4,606	5.9%	3,390	208	6.2%

Notes: 1: Heating, air conditioning, and refrigeration mechanics and installers; 2: Miscellaneous construction workers, including solar photovoltaic installers, and septic tank services and sewer pipe cleaners; 3: Other installation, maintenance, and repair workers, including wind turbine service technicians, and commercial divers, and signal and track switch repairers; 4: 2005–2007 and 2008–2010 data include employed workers only; 5: Totals are calculated on the 50 states and the District of Columbia, Puerto Rico not included; 6: The ACS 2005–2007 survey did not include these occupations; *: There were fewer than 100 female workers in these occupations in the sample.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011). See methodology note.

Table A11a. Key Building Occupations: Female Employed Workforce by Race and Ethnicity, 2008–2010

	All women	White non-Hispanic	% of all women	Black non-Hispanic	% of all women	Hispanic	% of all women	Other[5]	% of all women
All construction occupations	200,598	133,690	66.6%	17,127	8.5%	38,052	19.0%	11,729	5.8%
Carpenters	21,576	14,366	66.6%	1,187	5.5%	4,560	21.1%	1,463	6.8%
Electricians	11,234	7,514	66.9%	1,941	17.3%	1,001	8.9%	778	6.9%
HVAC technicians[1]*	2,795	1,927	68.9%	376	13.5%	461	16.5%	31	1.1%
Insulation workers*	1,557	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Miscellaneous construction workers, incl. solar photo-voltaic installers[2]*	327	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Pipelayers, plumbers, pipefitters, and steamfitters	7,177	4,702	65.5%	632	8.8%	1,324	18.4%	519	7.2%
Other installation and maintenance, including wind turbine technicians[3]	4,606	3,247	70.5%	694	15.1%	445	9.7%	220	4.8%
Women in all occupations[4]	66,976,012	44,964,648	67.1%	8,269,048	12.3%	8,802,364	13.1%	4,939,952	7.4%

Notes: 1, 2, 3, 4: See Table 7 Notes; 5: Other races include non-Hispanic American Indians, Pacific Islanders, Asians, and those with more than one race; * The sample includes fewer than 100 women, data not shown.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010.

Table A11b. Key Building Occupations: Male Employed Workforce by Race and Ethnicity, 2008–2010

	All Men	White Non-Hispanic	% of all men	Black Non-Hispanic	% of all men	Hispanic	% of all men	Other[5]	% of all men
All construction occupations	7,254,393	4,547,003	62.7%	414,728	5.7%	2,051,313	28.3%	241,349	3.3%
Carpenters	1,268,160	832,225	65.6%	53,838	4.2%	336,452	26.5%	45,645	3.6%
Electricians	498,440	373,344	74.9%	30,717	6.2%	75,461	15.1%	18,918	3.8%
HVAC technicians[1]	227,509	167,877	73.8%	14,634	6.4%	35,969	15.8%	9,029	4.0%
Insulation workers	40,020	20,576	51.4%	3,122	7.8%	15,525	38.8%	797	2.0%
Miscellaneous construction workers, including solar photovoltaic installers[2]	14,949	9,798	65.5%	1,521	10.2%	3,217	21.5%	413	2.8%
Pipelayers, plumbers, pipefitters, and steamfitters	523,862	370,976	70.8%	33,212	6.3%	103,168	19.7%	16,506	3.2%
Other installation and maintenance, including wind turbine technicians[3]	73,422	52,213	71.1%	4,086	5.6%	13,253	18.1%	3,870	5.3%
Men in all occupations[4]	73,770,446	50,013,896	67.8%	6,738,444	9.1%	11,800,030	16.0%	5,218,076	7.1%

Notes: 1, 2, 3, 4: See Table A8a 5: Other races include non-Hispanic American Indians, Pacific Islanders, Asians, and those with more than one race.

Source: IWPR IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010).

Table A12. Estimated Number and Share of Female Workers* Aged 18 Years and Older in In-Demand Construction Occupations in the Overall Economy by State, 2005–2007

Place of work: state*	Electricians			Carpenters			Pipelayers, plumbers, pipefitters, and steamfitters			HVAC technicians			All construction Occupations		
	Female	% Female	Rank	Female	% Female	Rank	Female	% Female	Rank	Female	% Female	Rank	Female	% F emale	Rank
Alabama	253	2.2%	22	799	3.7%	1	419	4.6%	2	188	3.0%	4	6,133	4.9%	2
Alaska	N/A	N/A	N/A	0	0.0%	50	N/A	N/A	N/A	N/A	N/A	N/A	1,085	5.1%	1
Arizona	314	1.9%	29	855	2.1%	18	263	1.9%	11	137	1.7%	14	5,513	2.5%	40
Arkansas	65	0.9%	39	457	3.0%	4	72	1.5%	19	86	2.0%	9	2,518	3.3%	18
California	1589	2.0%	26	2365	1.4%	37	1,223	1.8%	14	198	0.6%	28	23,611	2.3%	45
Colorado	290	2.3%	20	477	1.4%	37	18	0.2%	41	293	4.3%	1	4,703	2.8%	34
Connecticut	77	0.8%	40	291	1.4%	37	67	1.1%	32	77	1.9%	10	1,889	2.1%	48
Delaware	28	1.1%	38	85	2.0%	20	8	0.3%	40	N/A	N/A	N/A	1,022	4.1%	5
District of Columbia	95	3.1%	10	87	2.6%	8	N/A	N/A	N/A	N/A	N/A	N/A	701	3.1%	25
Florida	1040	1.9%	29	2586	2.4%	10	575	1.5%	19	555	1.9%	10	22,152	3.6%	10
Georgia	649	2.6%	14	1700	3.3%	3	227	1.3%	27	42	0.3%	32	10,337	3.6%	10
Hawaii	175	6.0%	1	111	1.2%	41	25	1.1%	32	N/A	N/A	N/A	1,175	3.0%	28
Idaho	128	2.7%	13	177	1.6%	29	0	0.0%	42	26	1.4%	16	1,851	3.6%	10
Illinois	479	1.5%	35	536	0.8%	47	287	1.4%	21	67	0.6%	28	7,887	2.6%	38
Indiana	252	1.6%	33	471	1.7%	26	299	2.1%	9	106	1.4%	16	4,697	2.9%	31
Iowa	212	2.6%	14	244	1.6%	29	107	1.4%	21	31	1.2%	18	2,643	3.3%	18
Kansas	303	4.4%	5	107	0.9%	45	0	0.0%	42	0	0.0%	34	2,689	3.6%	10
Kentucky	173	1.4%	37	337	1.9%	23	232	3.3%	3	131	2.7%	7	2,836	2.7%	36
Louisiana	400	2.9%	12	653	2.4%	10	164	1.4%	21	0	0.0%	34	4,787	3.2%	22
Maine	57	1.6%	33	176	1.6%	29	11	0.4%	38	N/A	N/A	N/A	1,190	2.8%	34
Maryland	386	2.6%	14	224	0.9%	45	266	2.1%	9	186	2.3%	8	4,696	3.2%	22
Massachusetts	126	0.7%	42	522	1.3%	40	154	1.1%	32	21	0.3%	32	3,973	2.4%	42
Michigan	492	2.1%	23	673	1.7%	26	324	1.9%	11	114	1.2%	18	7,207	3.4%	16
Minnesota	671	5.5%	3	474	1.5%	34	182	1.6%	17	0	0.0%	34	4,321	3.1%	25
Mississippi	452	5.4%	4	215	1.5%	34	141	2.7%	5	78	2.9%	5	3,631	4.8%	3
Missouri	535	4.0%	6	542	1.6%	29	70	0.6%	36	56	0.8%	25	5,402	3.3%	18
Montana	N/A	N/A	N/A	268	3.4%	2	N/A	N/A	N/A	N/A	N/A	N/A	1,676	4.8%	3

Table 12. Continued

	Electricians			Carpenters			Pipelayers, plumbers, pipefitters, and steamfitters			HVAC technicians			All construction Occupations		
	Female	% Female	Rank	Female	% Female	Rank	Female	% Female	Rank	Female	% Female	Rank	Female	% Female	Rank
Nebraska	44	0.8%	40	158	2.0%	20	59	1.6%	17	82	3.2%	3	1,030	2.1%	48
Nevada	198	2.3%	20	435	2.3%	12	84	1.3%	27	25	0.9%	23	3,354	3.1%	25
New Hampshire	0	0.0%	45	111	1.1%	43	24	1.0%	35	N/A	N/A	N/A	969	2.5%	41
New Jersey	125	0.7%	42	191	0.5%	48	207	1.4%	21	72	0.7%	27	4,488	2.3%	45
New Mexico	18	0.4%	44	166	1.8%	24	75	1.8%	14	N/A	N/A	N/A	1,863	3.0%	28
New York	962	2.1%	23	973	1.2%	41	181	0.5%	37	351	1.9%	10	8,673	1.9%	50
North Carolina	435	2.0%	26	1022	1.8%	25	259	1.3%	27	210	1.8%	13	8,368	3.0%	28
North Dakota	N/A	N/A	N/A	93	3.0%	4	N/A	N/A	N/A	N/A	N/A	N/A	640	3.2%	22
Ohio	906	3.4%	9	1107	2.5%	9	478	2.7%	5	262	1.7%	14	8,828	3.5%	14
Oklahoma	239	2.6%	14	502	2.9%	7	214	2.7%	5	37	0.9%	23	2,810	2.9%	31
Oregon	176	2.1%	23	471	2.2%	15	177	2.6%	8	0	0.0%	34	3,476	3.3%	18
Pennsylvania	584	2.0%	26	1067	2.0%	20	364	1.8%	14	94	0.6%	28	7,850	2.7%	36
Rhode Island	0	0.0%	45	24	0.4%	49	0	0.0%	42	N/A	N/A	N/A	626	2.3%	45
South Carolina	430	3.0%	11	632	3.0%	4	107	1.4%	21	199	2.9%	5	4,831	3.8%	8
South Dakota	0	0.0%	45	68	1.5%	34	N/A	N/A	N/A	N/A	N/A	N/A	300	1.5%	51
Tennessee	315	1.9%	29	767	2.2%	15	146	1.2%	31	103	1.2%	18	5,967	3.5%	14
Texas	1087	1.8%	32	2029	1.7%	25	1,043	1.9%	11	388	1.2%	18	17,981	2.4%	42
Utah	233	3.8%	7	154	1.1%	43	22	0.4%	38	36	1.0%	22	2,042	2.4%	42
Vermont	25	1.5%	35	135	2.2%	15	N/A	N/A	N/A	N/A	N/A	N/A	519	2.6%	38
Virginia	619	2.5%	19	864	2.1%	18	244	1.4%	21	64	0.5%	31	,819	3.4%	16
Washington	1060	5.8%	2	903	2.3%	12	328	2.8%	4	56	0.8%	25	143	4.1%	5
West Virginia	N/A	N/A	N/A	189	2.3%	12	205	7.5%	1	N/A	N/A	N/A	867	3.7%	9
Wisconsin	566	3.7%	8	460	1.6%	29	136	1.3%	27	211	3.8%	2	4,070	2.9%	31
Wyoming	66	2.6%	14	0	0.0%	50	N/A	N/A	N/A	N/A	N/A	N/A	876	3.9%	7
Total	17,418	2.3%		27953	1.8%		9,616	1.6%		4,703	1.3%		246,715	3.0%	

Note: *Estimated employment in 'Financial Activities' in green economy is too small to provide detailed estimates.

Source: IWPR analysis of 2008–2010 Integrated Public Use Microdata Series (IPUMS) American Community Survey microdata (Ruggles et al. 2010); Bureau of Labor Statistics Green Goods and Services (U.S. Department of Labor 2012a); and Brookings-Battelle Clean Economy database (Muro et al. 2011).

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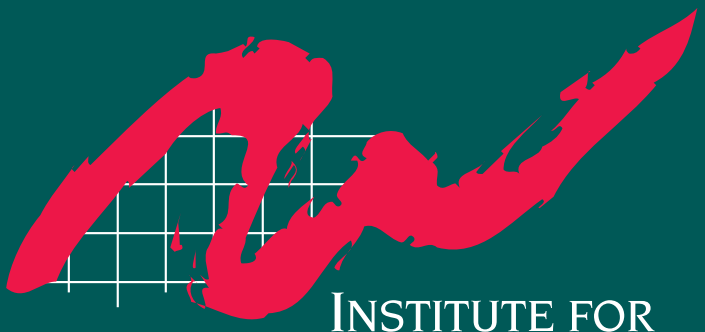

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