



# ISSUE BRIEF

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## GREEN INVESTMENTS AND THE LABOR MARKET

### How many jobs could be generated and what type?

BY JOSH BIVENS, JOHN IRONS, AND ETHAN POLLACK

The budget put forward in March by the Obama administration clearly commits to reducing carbon emissions as a means to fight global climate change. Specifically, the Obama budget advocates on behalf of a “cap-and-trade” policy that would put a price on carbon emissions.

However, to aid the economic transformation that a cap-and-trade system will jumpstart, new federal investments are needed. These new investments carry the potential to provide economic benefits that go beyond the primary one of emissions reduction; they hold out the potential for new jobs in the economy. In the near-term, there is no more pressing need than job creation: the U.S. economy has lost 5.1 million jobs over the past 15 months. In the longer-run, even if the economy approaches full employment, green investments carry the potential to change the *type* of jobs in the U.S. economy in ways that could help push back against the rising inequality that has characterized most of the past three decades.

This Issue Brief draws on the methodology described in an EPI Working Paper (Bivens, Irons, and Pollack 2009) in order to determine the labor market impact of the green investments outlined in Obama’s budget. Our central findings are that a commitment of \$100 billion annually in new public investments over the next decade would yield:

- Approximately \$160 billion in additional output annually for the next two years, which translates into approximately 1.1 million net new jobs created.
- An increase in the relative wages of those 70% of U.S. workers without a four-year college degree by almost 0.5% each year that the increased commitment to green investments persists. While modest, this amount does represent a wage increase for high school graduates that is roughly 40% as large as the entire increase this group has seen since 1979.
- An increase of approximately 100,000 in the number of unionized jobs in the United States (even in the unlikely case that all of the jobs supported through this new spending merely displaced currently existing jobs).

## Green investments and economic stabilization

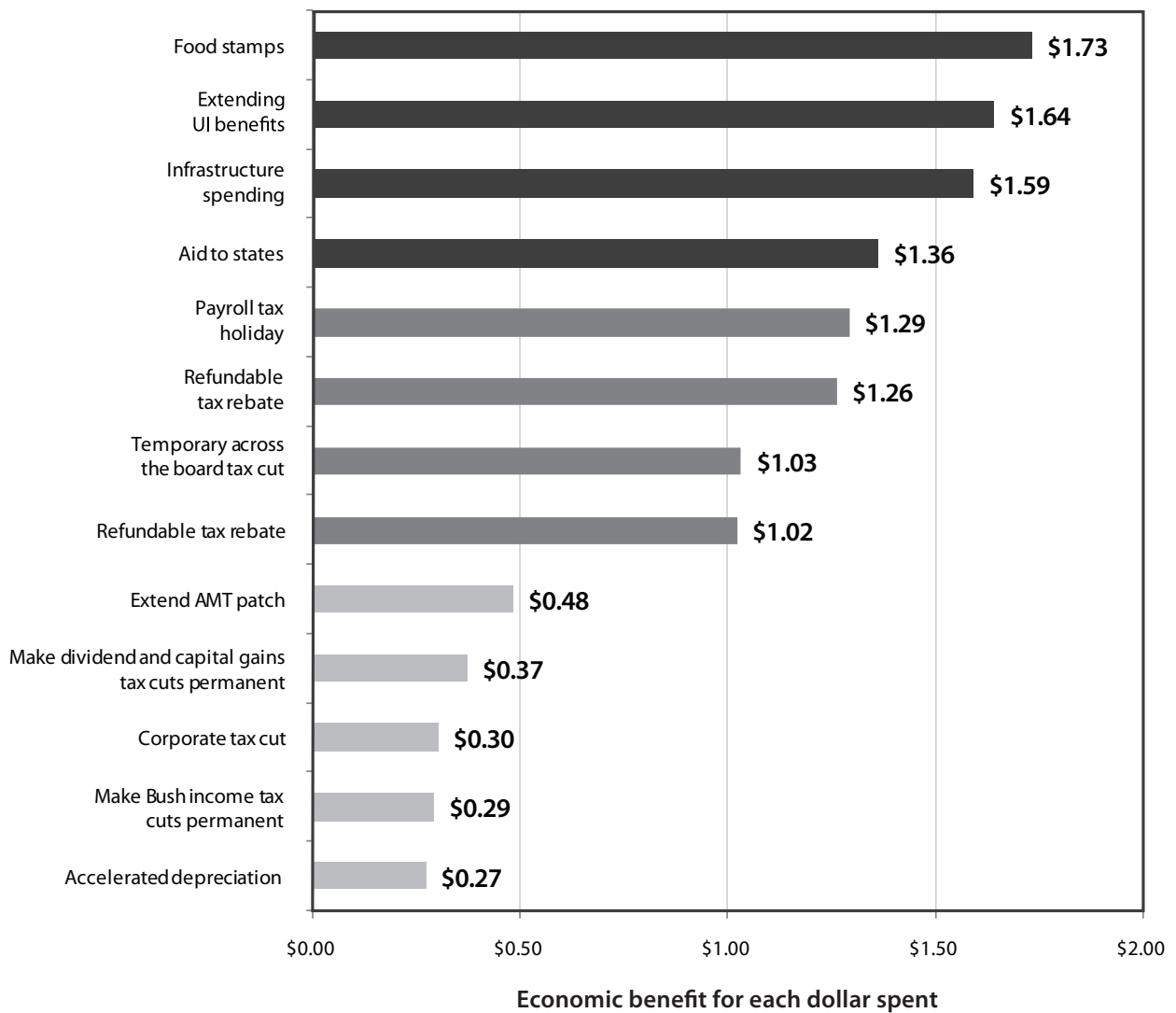
Recessions are often characterized by a self-reinforcing demand slump. The current recession is no exception, but the dual crashes in housing and financial markets have only made this recession more severe and long-lasting relative to other downturns. These crashes led to a sharp reduction in household wealth, which led to a pullback in consumer spending, especially on new homes and durable manufactured goods (autos, in particular).

As workers were laid off in the construction, finance, and durable goods sectors, their spending fell. Employed workers followed by cutting consumption, both to make up for the savings lost as home prices and stocks plummeted and also out of fears that they would be next to lose their job. As businesses lost these consumers, they also lost the incentive to purchase new capital goods (plants and equipment) to expand capacity, which further depresses the economy.

While the last two recessions lasted only eight months, the current recession has already stretched on

**FIGURE A**

### Economic benefits of various stimulus provisions



SOURCE: Mark Zandi from Moody's Economy.com.

for 15 months and is only getting worse. The Congressional Budget Office (CBO) recently projected continued economic contraction and continued layoffs through 2009 (CBO 2009), with unemployment averaging over 9% for the entire year of 2010.<sup>1</sup> The CBO also estimates that the gross domestic product (GDP) gap, which measures the extent to which the economy is underperforming, will total about \$2 trillion over the next two years (CBO 2009). This is a staggering economic loss, equivalent to \$6,600 for every man, woman, and child in the United States.

The most-reliable tool in policy makers' kit for fighting recessions—the Federal Reserve cutting short-term interest rates—has failed to spark any recovery. These short-term rates are essentially zero today.<sup>2</sup>

When an economy is mired in recession even with near-zero interest rates, the case for government directly boosting demand for final production is clear. This can be accomplished either through tax cuts or government purchases—that is, either the government gives money back to households to boost their spending or spends the money itself.<sup>3</sup>

Federal spending on investment projects will boost demand directly as funds are used by contractors to hire construction workers, planners, architects, engineers, project managers, and foremen, who then turn around and use their new income to boost their own spending. A key point is that this effect is not limited to only the industry directly receiving investment funds. For example, every job directly supported in the construction industry supports two additional jobs in supplier industries, such as accounting, office supplies, and construction capital manufacturing (such as Caterpillar, which recently laid off 20,000 workers). Furthermore, additional jobs are created as these workers re-spend their income back into the economy—for example, construction workers newly hired by money from the American Recovery and Reinvestment Act of 2009 (ARRA) will patronize diners and restaurants around the worksite, spurring demand for cooks and waitresses.

Of course, a portion of all these new hires will just pull already-employed resources out of other sectors and industries. However, a portion of these new hires will instead put currently idle resources to work. **Figure A** below shows the net addition to employed resources

resulting from various measures of economic stimulus, ranked by comparative effectiveness.

Each dollar of infrastructure investment—broadly defined—provides on net about \$1.59 in additional economic growth, making it about 33% more effective than generic tax cuts and literally 10-15 times more effective than most business tax cuts. In short, infrastructure spending, including “green” investments, is about as good economic stimulus as there is.

### ***Job impact of green investments***

There is also reason to believe that investments in energy conservation would actually be even more stimulative than suggested by the generic infrastructure numbers discussed above. For example, much of the construction spending undertaken in the name of energy conservation would be mostly directed toward retrofitting existing structures rather than building new ones from scratch. This sort of “fix-it-first” construction typically is more labor-intensive than average and hence would make better economic stimulus.

A new commercial building, for example, requires huge amounts of steel beams, rebar, and concrete, along with heavy machinery. New capacity also often involves land costs, either purchasing the rights-of-way or the land itself. By contrast, renovation and retrofitting do not have costly capital and land expenses, so a larger share of each “fix-it-first” dollar goes more directly toward job creation. Recent studies have found that about 8% to 17% more jobs are created by fix-it-first investments than by investments in new capacity (Mattera and LeRoy 2003; Surface Transportation Policy Project 2004; Bivens, Irons, and Pollack 2009, Appendix A).

This strategy also has the benefit of speedy implementation, a key advantage in a recession economy. New capacity projects must first go through a lengthy planning process, often including cost analysis, environmental impact assessments, engineering, and land acquisition. By contrast, the lead time for maintenance and repair projects is much shorter, often a highly truncated version of the above process and requiring much less land acquisition. An economy in a recession can deteriorate quickly, and often exponentially, so the faster that government can create jobs and boost aggregate demand, the better.

## Long-run structural change and job composition

Public investments in the “green” economy—including energy efficiency, renewable energy, and other areas—can have a more permanent impact on labor markets, most notably on the composition of jobs (including wage levels, educational requirements, union status, etc).

Thus, these investments should be assessed in light of broader economic trends. For example, while the economic downturn is a recent and (hopefully) temporary problem, inequality of hourly wages has been growing for decades. This rising inequality has been the single largest impediment to raising the living standards of typical American workers, even in an era of respectable productivity growth.

Much (though far from all) of this rise in wage inequality is attributable to the rapid increase in the “college premium” since 1979. The college premium refers to the pay advantage enjoyed by workers who have completed a four-year college degree, a premium that persists even after controlling for other relevant labor market characteristics, such as gender, race, ethnicity, experience, region of residence, etc. In 1979 the college premium was approximately 50% (college workers earned wages that

were 50% higher than those of non-graduates), while by 2007 it had risen to approximately 80%.

Another key contributing factor to this rising inequality is the de-unionization of the U.S. workforce over the last few decades (DiNardo, Fortin, and Lemeux 1996). Unions provide bargaining power to many workers who otherwise lack it in the modern U.S. economy. Consequently, the union “wage-and-benefit premium” (an advantage enjoyed by union members that persists even after controlling for other relevant labor market characteristics) is approximately 15%, and is much larger for lower-wage workers. This advantage that unions provide to low-wage workers is a key reason why de-unionization has led to a much less equal U.S. economy. Since 1979, unionization rates have fallen by more than half, from 27% of the workforce to 12% today.

### ***The types and quantity of jobs supported by green investment***

The model developed in the related Working Paper (see the Appendix for a summary) enables us to determine in what direction large scale public infrastructure investments would push the economy’s overall labor demand.

TABLE 1

### Model inputs for receiving industry flows

Industry	Share	Three scenarios (\$ billions)		
		Scenario 1	Scenario 2	Scenario 3
Construction	40%	40	80	120
Rail transportation	10	10	20	30
Transit and ground psgr	10	10	20	30
Utilities	30	30	60	90
Biofuels	10	10	20	30
<i>Crop production</i>	3	3	7	10
<i>Basic chemical manufacturing</i>	3	3	7	10
<i>Agricultural chemical manufacturing</i>	3	3	7	10
<b>TOTALS</b>	100%	100	200	300

SOURCE: Authors’ analysis of BLS and Census data. For more information on methodology, see Bivens, Irons, and Pollack (2009).

To illustrate the impact of undertaking a substantial program of public investments aimed at greening the U.S. economy, we draw on a report, *Green Recovery*, authored for the Center for American Progress by researchers at the Political Economy Research Institute (Pollin et al. 2008). The *Green Recovery* report focuses predominantly on the

short-run macroeconomic benefits of targeted green investments. It recommends \$100 billion in investments spread among a number of categories. We use the *Green Recovery* breakdown of spending shares by industry, but we also score two more-ambitious proposals in terms of the total dollar amount. **Table 1** provides the level and

**TABLE 2****Direct and indirect jobs supported through \$100 billion in green investment**

	Direct	Indirect	Total	Direct	Indirect	Total
				(% of total)		
<b>Totals</b>	430,717	315,385	746,102	58%	42%	100%
<b>Gender</b>						
<i>Male</i>	367,666	191,230	558,896	85%	61%	75%
<i>Female</i>	63,051	124,155	187,206	15	39	25
<b>Race</b>						
<i>White</i>	289,519	188,277	477,796	67%	60%	64%
<i>Black</i>	24,523	60,197	84,720	6	19	11
<i>Hispanic</i>	98,228	50,456	148,685	23	16	20
<i>Asian</i>	6,801	15,687	22,487	2	5	3
<i>Other</i>	11,647	939	12,585	3	0	2
<b>Union status</b>						
<i>Covered</i>	51,425	67,144	118,569	12%	21%	16%
<i>Non-covered</i>	379,293	248,288	627,580	88	79	84
<b>Education</b>						
<i>Less than high school</i>	79,623	42,731	122,354	18%	14%	16%
<i>High school only</i>	171,184	118,848	290,032	40	38	39
<i>Some college</i>	111,752	91,345	203,096	26	29	27
<i>BA or greater</i>	68,158	544,356	130,620	16	173	18
<b>Wage quintiles</b>						
<i>First (lowest)</i>	50,163	71,098	121,262	12%	23%	16%
<i>Second</i>	87,382	79,190	166,572	20	25	22
<i>Third</i>	85,131	82,832	167,964	20	26	23
<i>Fourth</i>	104,063	59,821	163,884	24	19	22
<i>Fifth (highest)</i>	103,978	22,518	126,496	24	7	17
<b>Region</b>						
<i>Northeast</i>	48,935	100,087	149,022	11%	32%	20%
<i>Midwest</i>	82,094	77,446	159,540	19	25	21
<i>South</i>	198,561	68,721	267,281	46	22	36
<i>West</i>	101,128	69,130	170,258	23	22	23

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TABLE 2 (cont.)

## Direct and indirect jobs supported through \$100 billion in green investment

	Direct	Indirect	Total	Direct	Indirect	Total
				(% of total)		
<b>Totals</b>	430,717	315,385	746,102	58%	42%	100%
<b>Occupations</b>						
<i>Mgt, bus and fin</i>	55,068	29,692	84,761	13%	9%	11%
<i>Professional</i>	25,646	26,559	52,205	6	8	7
<i>Service</i>	4,023	30,795	34,818	1	10	5
<i>Sales &amp; related</i>	6,808	34,272	41,079	2	11	6
<i>Office &amp; admin support</i>	35,528	43,432	78,960	8	14	11
<i>Farm, fish, forest</i>	0	0	0	0	0	0
<i>Construction &amp; extraction</i>	205,658	1,430	207,088	48	0	28
<i>Install, maintain &amp; repair</i>	25,247	19,000	44,246	6	6	6
<i>Production</i>	30,180	24,092	54,272	7	8	7
<i>Transport</i>	42,399	103,414	145,813	10	33	20
<b>Central city status</b>						
<i>In central city of MSA</i>	101,549	107,292	208,842	24%	34%	28%
<i>In MSA, not central city</i>	181,317	145,914	327,231	42	46	44
<i>Not in MSA</i>	82,648	22,668	105,316	19	7	14
<i>Not identified</i>	65,204	39,510	104,713	15	13	14

\* Estimates do not include spending effects.

**SOURCE:** Authors' analysis of BLS and Census data. For more information on methodology, see Bivens, Irons, and Pollack (2009).

breakdown of spending flows by industry that we use as inputs into the jobs model.

The results presented here assume that the number and kinds of jobs created would be similar to the jobs that already exist in the impacted industries. Also, the job impact assessed here is only that of the construction of the projects (and operation, in the case of transit projects). The projects would likely have broader lasting impacts on the economy as the economy shifts to a low-carbon platform; however, an assessment of those impacts is beyond the scope of this work.

Using these inputs, our analysis finds that such green investments would have many positive impacts on the American jobs market, particularly in pushing back on the trends from recent decades that have resulted in the rising inequality discussed earlier. The highlights are reported in **Table 2**.

The jobs supported by green investments would skew heavily away from workers with a four-year college degree with only 18% of the jobs occupied by workers with a college degree or greater, compared to approximately 28% in the overall economy. These jobs also skew heavily toward workers without a high school degree or those with a high school degree but who have not attended college. Despite having less education on average, the workers' wages are actually concentrated in the middle of the overall wage distribution, with relatively few high-paying jobs (top fifth) but also relatively few low-paying jobs (bottom fifth).

The jobs are also about one-third more likely to be unionized, producing 16% union jobs versus the 12% characterizing the overall economy (see Table 3). Thus, a large-scale and permanent commitment to green infrastructure investment would help reverse the de-unionization trend

over the last few decades and in turn lead to rising median incomes and a reduction in inequality. Greater unionization will also result in more access to job training and mentorship programs that could prove key to expanding job opportunities to high-unemployment communities.

**Table 3** also shows how the jobs created through increased green investments stack up against a number of other benchmarks, including the total economy as well as the direct jobs created in the construction sector alone (the single largest recipient of green investment funds). The

**TABLE 3**

### How do green jobs stack up? Comparisons with other sectors

	Total economy	PERI Green Recovery, mid-scenario	Construction only	Rail operations	Rail manufacturing	FIRE
<b>Totals</b>	100%	1%	7%	1%	0.1%	6%
<b>Gender</b>						
<i>Male</i>	60%	75%	90%	70%	68%	80%
<i>Female</i>	40	25	10	30	32	20
<b>Race</b>						
<i>White</i>	67%	64%	63%	72%	70%	78%
<i>Black</i>	11	11	5	9	10v	5
<i>Hispanic</i>	15	20	29	13	13	11
<i>Asian</i>	4	3	1	3	4	1
<i>Other</i>	2	2	2	3	3	5
<b>Union status</b>						
<i>Covered</i>	12%	16%	14%	11%	13%	7%
<i>Non-covered</i>	88	84	86	90	87	93
<b>Education</b>						
<i>Less than high school</i>	11%	16%	25%	8%	5%	7%
<i>High school only</i>	31	39	41	36	40	35
<i>Some college</i>	30	27	24	29	27	32
<i>BA or greater</i>	28	18	10	27	28	27
<b>Wage quintiles</b>						
<i>First (lowest)</i>	19%	16%	13%	13%	16%	6%
<i>Second</i>	21	22	23	17	17	14
<i>Third</i>	20	23	24	17	21	8
<i>Fourth</i>	20	22	23	24	21	29
<i>Fifth (highest)</i>	20	17	16	29	24	44
<b>Region</b>						
<i>Northeast</i>	18%	20%	15%	11%	14%	2%
<i>Midwest</i>	23	21	18	20	7	26
<i>South</i>	35	36	41	48	53	56
<i>West</i>	23	23	26	21	25	16

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TABLE 3 (cont.)

### How do green jobs stack up? Comparisons with other sectors

	Total economy	PERI Green Recovery, mid-scenario	Construction only	Rail operations	Rail manufacturing	FIRE
<b>Totals</b>	100%	1%	7%	1%	0.1%	6%
<b>Occupations</b>						
<i>Mgt, business and finance</i>	15%	11%	10%	17%	20%	17%
<i>Professional</i>	14	7	2	13	8	16
<i>Service</i>	13	5	1	4	5	0
<i>Sales &amp; related</i>	8	6	1	4	6	1
<i>Office &amp; admin. support</i>	15	11	6	14	17	10
<i>Farm, fish, forest</i>	0	0	0	0	0	0
<i>Construction &amp; extraction</i>	7	28	70	4	0	10
<i>Install, maintain &amp; repair</i>	8	6	5	6	3	8
<i>Production</i>	10	7	2	16	3	21
<i>Transport</i>	10	20	3	21	38	16
<b>Central city status</b>						
<i>In central city of MSA</i>	28%	28%	27%	21%	21%	17%
<i>In MSA, not central city</i>	44	44	45	42	55	29
<i>Not in MSA</i>	14	14	14	22	12	36
<i>Not identified</i>	14	14	14	15	11	19

SOURCE: Authors' analysis of BLS and Census data. For more information on methodology, see Bivens, Irons, and Pollack (2009).

table also compares jobs created through green investments to those in the finance, insurance, and real estate sector. Going forward, it is extremely likely that the economic footprint of that sector will shrink considerably. If the jobs shed in this sector are made up for with new jobs created through green investments, then the swap sparked by these investments would help even more in pushing back against wage inequality.

All told, the jobs created by this package of green investments should be expected to raise the wages of non-college workers (both through the impact on relative demands as well as through the union channel) by approximately 0.25% to 0.75% each year that the increased commitment to green investments persist. **Table 4** summarizes the results associated with each of the three scenarios discussed.

These investments will not change the face of American wage inequality on its own, but it is encouraging that truly ambitious green investments would have a visible effect on a couple of the main trends that have reduced the demand for and bargaining power of non-college workers in the United States for decades.

Green investments, however, would not be unequivocally beneficial for the entire labor market: the jobs created by these investments skew heavily in favor of men, with only 26% of the direct and indirect jobs going toward women. (Although the full impact—which would include the jobs created by re-spending—would not be as skewed toward men.) Weighting jobs so heavily toward men could, among other things, exacerbate the gender pay gap, clearly a negative outcome. Furthermore, given that over half the individuals in poverty are in household

TABLE 4

## Effect of green investments on relative labor demands

	\$100 billion	\$200 billion	\$300 billion
<b>Total jobs</b>	746,102	1,492,204	2,238,306
<i>College degree +</i>	130,620	261,239	391,859
<i>High school grads</i>	290,032	580,064	870,096
<b>(% of U.S. labor force)</b>			
<b>Total jobs</b>	0.5%	1.1%	1.6%
<i>College degree +</i>	0.3	0.7	1.0
<i>High school grads</i>	0.7	1.3	2.0
<b>Green jobs replace "typical" jobs</b>			
<i>Relative demand change</i>			
<i>High school grads/college degree</i>	0.3%	0.7%	1.0%
<i>Relative wage change</i>			
<i>High school grads/college degree</i>	0.2%	0.5%	0.7%

**SOURCE:** Authors' analysis of BLS and Census data. For more information on methodology, see Bivens, Irons, and Pollack (2009).

lacking adult males, a jobs program like this would not be, by itself, an effective anti-poverty tool unless coupled with other policies so that it provides ample job opportunities to women.

A key part of the agenda for policy makers interested in long-run green investments should address this gender imbalance, perhaps by including provisions that set hiring goals or divert a portion of the investment toward job training programs for women.

However, it should also be noted that additional public investments will tighten the labor market more broadly, and the wage and employment gains will not be narrowly limited to just the construction sector. Given the competitive nature of the U.S. labor market, wage gains would likely spill over from the sectors most directly impacted to a broader range of sectors and occupations.

## Conclusion

Moving the U.S. economy to a lower-carbon future is one of the highest priorities facing the country in coming

decades. This transformation will be made much easier if investments are undertaken to give all American households opportunities to substitute spending away from high-carbon activities toward lower-carbon ones—for example, by providing reasonable public transportation alternatives to single-car commuting.

These green investments are vital, first and foremost because they will help us meet the challenge of global climate change without great loss in living standards. However, if the green investment agenda is ambitious enough to meet its primary goals, it will also change spending flows in the U.S. economy in a significant enough way to have visible impacts on the American job market.

In the short run, any investment that can be done quickly to help meet the challenges of undertaking serious carbon emissions abatement will have welcome near-term macroeconomic impacts. And over the longer-term, these investments will provide a payoff in the form of climate change mitigation, energy independence, and economic gains from energy efficiency.<sup>4</sup>

In the longer run, dedicating more resources to ameliorating global climate change will actually lead to a mix of industry employment that nudges back against the forces that have generated ever-greater wage inequality for most of the past 30 years. As long as this investment

comes with a policy commitment for ensuring that the groups historically left out of these industries get a fairer shake going forward, green investment has the opportunity to be a success for all stakeholders—a rarity in public policy debates.

# HIGH ROAD OR LOW ROAD?

## JOB QUALITY IN THE NEW GREEN ECONOMY

A report by Good Jobs First

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# Introduction

Over the past few years, proponents of far-reaching action to halt climate change have redefined the relationship between jobs and the environment by presenting the challenge of reducing carbon emissions as an opportunity to birth a clean-energy economy. The new paradigm has taken the country by storm. The phrase “green jobs” has been transformed from a vocational option for a small number of ecological specialists to a vision for the future of virtually the entire economy. It can now be argued that nearly every job has the potential to become a green job or at least be transformed through the rise of the clean energy economy.

Green job advocates have put forward a host of policy and spending proposals designed to stimulate markets for energy efficiency, renewable energy, and other climate-friendly technologies and practices. These measures have been promoted as the solution not only to climate change and our nation’s dependence on foreign oil, but also to the scarcity of family-supporting jobs in struggling sectors such as manufacturing and construction. More recently, green investments have also been proposed as an antidote to a deepening economic recession.

For example:

- The Apollo Alliance’s New Apollo Program proposes an investment of \$500 billion over ten years to create five million green-collar jobs in a range of industries including renewable energy, energy efficiency, transit and transportation, and research, development and deployment of cutting-edge clean energy technologies.<sup>1</sup>
- The Center for American Progress and the Political Economy Research Institute, with the support of the Blue Green Alliance and the Green Jobs for America Campaign, call for spending \$100 billion over two years to create two million jobs in building retrofitting, expansion of the transit and freight rail grids, construction of a “smart” electrical grid, wind and solar power, and next-generation biofuels.<sup>2</sup>
- A report prepared by Global Insight for the United States Conference of Mayors forecasts that renewable power generation, building retrofitting and renewable transportation fuels will together generate 1.7 million new jobs by 2018 and another 846,000 related engineering, legal, research and consulting positions. That total would jump to 3.5 million by 2028 and 4.2 million by 2038.<sup>3</sup>

The election of a new president who has committed to tackle climate change; the strengthening of Democratic majorities in the House and Senate; and a bipartisan consensus on the need for immediate economic stimulus—these factors all but guarantee a massive infusion of Federal dollars into the emerging green economy. The new administration and congressional leaders promise that such public investments will translate into hundreds of thousands (if not millions) of new green jobs over the coming years.

## Green job quality control

The public discussion of green jobs has focused almost entirely on the number or type of employment opportunities that could be created by a clean energy revolution. The question of whether these new jobs will offer wages, benefits, and working conditions needed to sustain families and communities has received much less attention.

A report prepared for the United Nations Environment Programme defines a green job as one that serves an environmental purpose, but it does not address the impact of green jobs on workers:

*We define green jobs as work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution.<sup>4</sup>*

Others have incorporated labor standards into their definition of a green job. For example, *Green-Collar Jobs in America's Cities*—a report issued in 2008 by the Apollo Alliance and Green for All with the Center for American Progress and the Center on Wisconsin Strategy—defines green jobs as “well-paid, career-track jobs that contribute directly to preserving or enhancing environmental quality.”<sup>5</sup>

The inclusion of labor standards in the definition of a green job represents a commitment on the part of at least some climate advocates to take the employment high road. But it also begs the question: how many green jobs will meet that standard? A review of recent published reports on green jobs and the economics of climate change turns up surprisingly little information on the wages and working conditions of current green-collar workers, and ultimately prompted the compilation of this report.

The guiding assumption of this report is that the quality of the jobs created by public investments in the green economy is every bit as important as their numbers—perhaps more so. The short-term impact of green investments on the U.S. economy will depend not on how many jobs they create but how much *income* that they generate. Creating a job that pays \$18 an hour provides roughly twice the economic stimulus of a new job that pays just \$9 an hour. Over the long term, meanwhile, the economic success of the clean tech revolution will depend on whether it can create the stable, family-supporting jobs needed to shore up the American middle class.

The question of green job quality is relevant not only to the future of the American economy but also to the fortunes of efforts to halt global climate change. At the most basic level, low-paid workers will not be able to afford high-efficiency houses or hybrid cars. And if working Americans struggling to make ends meet discover that green jobs offer more of the same—low wages, few benefits, little respect—the political support needed for carbon emission curbs may be in short supply. As our case study of port trucking makes clear, environmental sustainability will be difficult or impossible to achieve if it does not go in hand with economic sustainability for workers and their families.

Our report takes a critical look at *existing* jobs in industrial sectors that will play major roles in the greening of our economy: manufacturing, construction, waste management, and freight transportation. The assembled case studies cover green jobs and green employers whose work includes manufacturing of components for wind and solar energy generation; green construction and weatherization; recycling; and port trucking. We offer contrasting examples of employers that provide good green jobs and others that arguably do not meet that standard. The case studies are supplemented with analysis of available data on labor standards in the industries that will generate the largest share of new green jobs.

Many of the companies in the green economy benefit directly or indirectly from taxpayer dollars in the form of economic development incentives, government contracts, and other subsidies provided by local, state and federal governments. These public expenditures provide means to ensure that more green employers take the employment “high road.” A large number of state and local governments, for example, already apply job quality standards to their economic development subsidy programs. The federal government attaches Davis-Bacon prevailing wage requirements to construction projects that receiving funding through many federal programs to ensure that the government does not undercut local market wage rates.<sup>6</sup>

All this is a good beginning, but more comprehensive job quality policies will be needed to maximize the public return on what will likely be large investments in green industries. We discuss these and other accountability measures at the end of the report. Finally, in order to ensure that green-collar workers have access to middle-class wages, benefits, and a voice at work, public officials will need to be vigilant in protecting workers’ right to organize and bargain collectively.

Achieving effective regulations will require a combination of political leadership from the top and grassroots pressure from the bottom. Below we discuss a recent case in which labor, community and ecological activism came together to support a plan promoted by Los Angeles Mayor Antonio Villaraigosa that will improve working conditions and environmental quality in freight transportation.

Green jobs are not automatically good jobs. We have to make them so. This report begins to show how.

## Labor and environmentalists find common ground

The promise of green jobs has forged alliances between environmentalists and labor unions—two constituencies that have not always seen eye-to-eye. In 1982 Richard Kazis and Richard Grossman published a book called *Fear at Work: Job Blackmail, Labor and the Environment*. They described a backlash by corporate executives and conservative public officials against the environmental laws that had been passed in the 1970s: “Charging that people must choose between jobs and environmental quality, they have played on fears of unemployment to alienate members of organized labor from their counterparts in the environmental movement.”<sup>7</sup>

The effort to drive a wedge between labor and environmentalists was largely (if not entirely) successful. For two decades, many union leaders accepted the notion that environmental regulations were job-killers, and many environmental advocates saw labor as an ally to polluters.

A handful of unions, however, took a different approach. Building on the pioneering work of the late Oil, Chemical and Atomic Workers Secretary-Treasurer, Tony Mazzocchi, a number continued to support environmental legislation that was good for both workers and their communities. Such efforts included the establishment of lead standards in the 1980’s which protected both workers and their communities; and the strong campaign by the United Steelworkers in support of the 1990 Amendments to the Clean Air Act, which reduced exposure to carcinogens in the coke industry.

In the mid-1990’s, after the U.N. Kyoto climate conference, a group of unions began meeting regularly with environmental organizations as the Blue Green Working Group to design a climate change policy that was good for both jobs and the environment. *Clean Energy and Jobs—A Comprehensive Approach to Climate Change and Energy Policy*, released in 2002, presented a series of policies developed by the working group that would allow the U.S. to meet the green house gas reduction targets set by the Kyoto Treaty and grow the economy by 1.4 million jobs by 2020.<sup>8</sup> The sponsors of the report, which was authored by the Economic Policy Institute and the Center for a Sustainable Economy, included the United Steelworkers, Service Employees International Union, and UNITE along with the Sierra Club, Union of Concerned Scientists and the Natural Resources Defense Council.<sup>9</sup>

In 2004, Joel Rogers from the Center on Wisconsin Strategy, Bob Borosage from the Institute for America’s Future, and environmental visionary Dan Carol approached Steelworkers President Leo Gerard and SEIU President Andy Stern, among others, to propose a new alliance of labor, environmental groups, business and social justice leaders called the Apollo Alliance. The Alliance, which soon included over 200 supporting organizations, released a report that year arguing for a ten-year program of investment in a “clean energy, good jobs” economy.<sup>10</sup>

Two years later, the Steelworkers led the reorganization of the Blue Green Working Group into the current Blue Green Alliance, composed of four major unions (United Steelworkers, Communication Workers of America, Service Employees International Union, and Laborers International Union of North America) and two national environmental organizations (Sierra Club and the Natural Resources Defense Council.) Many unions have now embraced the call for green jobs and are working with environmental groups and others to bring about the clean energy revolution.

# I. MANUFACTURING



**Over the past three decades, the United States lost roughly six million manufacturing jobs—a third of the manufacturing workforce.<sup>11</sup> This deindustrialization has had profound consequences for workers. Manufacturing employment has long been a pathway from poverty to a secure livelihood—an entrée to the middle class for those without four-year college degrees.**

The disappearance of millions of middle-class jobs has created significant hardships, not only for factory workers, but also for local economies that depended on manufacturing wages and benefits. To make matters worse, those workers lucky enough to land or retain manufacturing employment have seen their living standard erode. The average inflation-adjusted weekly earnings of a production worker were *down* five percent in 2007 compared to 1973.<sup>12</sup>

## Green job growth

Emerging clean-energy markets could help to reverse the decline in manufacturing employment, and perhaps even wage stagnation. The generation and distribution of renewable energy—along with a major push to realize gains in energy efficiency—will require an array of new products and components that could be manufactured in the United States.

Domestic markets for renewable energy and energy efficiency products and services are relatively small and will likely remain so until Congress enacts a comprehensive framework for regulating carbon emissions. But the number of players engaged in the sector is growing rapidly as both major corporations and green entrepreneurs try to figure out how to get ahead of the curve.

The emergence of a new green economy can be seen in the production of the components and materials used in the generation of wind and solar energy. Several dozen companies have recently opened plants around the United States to make the turbines, blades and towers needed for large-scale wind energy facilities; as well as the photovoltaic cells and panels required for solar power installations. The firms, which together have invested several billion dollars, range from startups such as Heliovolt and Xunlight to units of industrial giants such as Siemens and Sanyo. Others are U.S. outposts of established European renewable energy companies, including Denmark's Vestas, Germany's SolarWorld and Spain's Gamesa.

These companies are setting up shop in locations that range from New England and the rustbelt Midwest to the Mountain States and the Pacific Coast. There are now clusters of wind and solar manufacturing operations in Colorado, Iowa, Michigan, Oregon and Pennsylvania. Vestas, a world leader in wind energy, is investing about \$600 million at three Colorado locations that together are expected to employ more than 2,000 workers. SolarWorld recently opened a \$440 million, 480,000-square-foot plant in Hillsboro, Oregon. The plant, said to be the largest solar-cell producer in North America, is projected to have a payroll of 1,000 within three years.

LM Glasfiber, a Danish producer, has become the largest private employer in Grand Forks, North Dakota, where more than 900 people were hired to make wind turbine blades. The company hopes to create a workforce of comparable size at its operation in Little Rock, Arkansas. The weakness of the overall economy has forced some renewable manufacturers to temporarily scale back, but the long term trend clearly points toward growth.

## Getting by with a little help from the taxpayer

Green manufacturers derive significant benefits from federal, state and local subsidy programs established either to promote efficiency and the use of clean energy or to spur job creation (or both). These programs include direct subsidies to manufacturers to offset the cost of investments in facilities, equipment and payroll. They also include indirect subsidies that increase demand for manufactured products and components through provision of tax credits, grants, or loan guarantees to developers and owners of renewable energy generation capacity, high-efficiency buildings, or high-efficiency vehicles.

Federal incentives such as the renewable energy production and investment tax credits have contributed to the rapid growth of the renewable sector. The size of both programs is likely to expand as the Obama Administration and Congressional leaders move to address the twin threats posed by climate change and a deepening recession. The American Recovery and Reinvestment bill would add billions of dollars in grants and loan guarantees for renewables or other clean energy projects.

But states and localities have led the way when it comes to providing millions of dollars in direct subsidies—including tax breaks, infrastructure improvements and other economic development incentives—to green manufacturers. Although no comprehensive list is available, Good Jobs First contacted dozens of economic development officials to identify wind and solar component manufacturing facilities that have been granted state and local subsidies. This enabled us to assemble a list of more than two dozen examples (see Table 1). For instance:

- A United Solar Ovonic plant being built in Battle Creek, Michigan is receiving a state and local subsidy package worth some \$97 million, most of it deriving from the 15 years of generous tax benefits made possible when the site was given Renaissance Zone status (Michigan's name for its enterprise zones).
- Massachusetts put together \$44 million in subsidies for the recently opened Evergreen Solar plant in Devens consisting of \$23 million in grants to the company and to its host community, \$17.5 million in low-interest loans from public and private entities and \$3 million in savings from a low-cost 30-year lease of state-owned land.
- The state of Arkansas and the city of Little Rock rolled out the financial red carpet for the LM Glasfiber wind blade plant that opened in October. The state legislature passed a tailor-made bill that will exempt the company from state income taxes for 27 years if it meets certain hiring criteria. In the meantime, LM Glasfiber is getting \$6.9 million from the state's Quick Action Closing Fund, \$8 million in Economic Infrastructure Funds, free land valued at \$5.4 million from the Little Rock Port Authority and \$3.5 million in job training funds. Little Rock issued \$150 million in industrial revenue bonds on behalf of the company, which will use the proceeds to help pay for its facility. The plant is technically owned by the city and leased to the company, which makes it exempt from property taxes. Instead, LM Glasfiber makes payments in lieu of taxes equal to only 35 percent of what its tax bill would have been. In January 2009 the company announced that 150 workers in Little Rock would be laid off because of weak market conditions.<sup>13</sup>

**TABLE 1:**

**Examples of subsidized wind and solar manufacturing plants**

Company	City	State	Workers	Investment	Subsidies
Acciona Windpower	West Branch	IA	130	\$23,000,000	\$4,850,000
AE Polysilicon	Fairless Hills	PA	145*	\$70,000,000	\$8,200,000
Clipper Windpower	Cedar Rapids	IA	250	\$50,000,000	\$3,150,000
Evergreen Solar	Devens	MA	700	\$165,000,000	\$44,000,000
Evergreen Solar	Midland	MI	100*	\$55,000,000	\$5,700,000
First Solar	Perrysburg	OH	834	\$71,500,000	\$20,960,000
Flabeg Solar	Findlay	PA	300*	\$30,000,000	\$9,000,000
Gamesa	Ebensburg	PA	298	\$50,000,000	\$11,310,000
Gamesa	Fairless Hills	PA	509	\$34,000,000	\$3,930,000
Heliovolt	Austin	TX	168*	\$80,400,000	\$1,600,000
LM Glasfiber	Little Rock	AR	350 <sup>14</sup>	\$95,000,000	\$33,800,000
LM Glasfiber	Grand Forks	ND	900	\$2,650,000 <sup>15</sup>	\$7,800,000
OptiSolar	Sacramento	CA	1,000*	\$500,000,000	\$20,000,000
Sanyo Solar	Salem	OR	200*	\$80,000,000	\$26,985,000
Schott Solar	Albuquerque	NM	360*	\$105,000,000	\$17,000,000
Siemens Power Generation	Fort Madison	IA	380	\$43,000,000	\$12,500,000
Solaicx	Portland	OR	66	\$56,000,000	\$21,500,000
Solar World	Hillsboro	OR	1,000*	\$440,000,000	\$41,000,000
Suniva	Norcross	GA	100	\$75,000,000	\$10,000,000
TPI Composites	Newton	IA	330	\$56,000,000	\$6,600,000
Trinity Structural Towers	Clinton	IL	140	\$15,000,000	\$2,000,000
Trinity Structural Towers	Newton	IA	140	\$21,000,000	\$1,280,000
United Solar Ovonic	Battle Creek	MI	350*	\$260,000,000	\$96,900,000
United Solar Ovonic	Greenville	MI	400	\$126,000,000	\$37,000,000
Vestas Americas	Brighton	CO	1,350*	\$290,000,000	\$8,500,000
Vestas Americas	Pueblo	CO	450*	\$240,000,000	\$23,800,000
Vestas Americas	Windsor	CO	420	\$60,000,000	\$1,100,000
Xunlight	Toledo	OH	160*	\$52,000,000	\$14,900,000

\*Projected employment levels for plants not yet open or fully operational. Some investment figures include future projections.

Most of the subsidies being granted to the wind and solar companies are long-standing conventional incentives available to other sorts of manufacturing firms as well as service-sector facilities such as office buildings, distribution centers, laboratories and sometimes even shopping malls. In a few cases, the subsidies are targeted for renewable energy operations. For instance, Oregon has provided a total of more than \$75 million in Business Energy Tax Credits to Sanyo Solar, Solaicx and SolarWorld. Yet even these incentives are not new. The credits are from a program created in 1979 to encourage property owners to install renewable-energy and energy-efficient systems. It was modified in 2007 to allow renewable-energy manufacturers to participate.

On a per job basis, most of the subsidies range from \$10,000 to \$60,000, which is not out of line with common economic development practices. There are some outliers. United Solar Ovonic's deal in Battle Creek is not only the largest in absolute terms but its \$277,000 per projected job is the second highest on the list by that measure. Even more generous in that respect is the deal Solaicx is getting in Portland, Oregon, which works out to \$326,000 for each worker currently employed at the plant. The company says it has plans to expand the workforce but has not announced a projected level.

## **Green manufacturing wages: From solidly middle-class to just scraping by**

Given the growing consensus about the need to spend taxpayer money to stimulate the economy and to promote solutions to the climate crisis, there will probably be strong support for the use of subsidies to create green jobs. But one important question remains unanswered: Will we invest public dollars in the creation of family-supporting jobs that provide good wages, benefits and long-term economic security? Or will we allow recipients of subsidies to take the employment low road?

Good Jobs First knows from long experience that subsidized employment is not automatically well-paid and secure. (The name of our organization is an exhortation to activists and policymakers to make it so.) We have, for instance, documented more than \$1.2 billion in subsidies that have gone to Wal-Mart Stores, whose retail outlets provide jobs with low wages and inadequate benefits in an environment that has been marked by discrimination, wage and hour violations, and anti-union animus.<sup>16</sup>

In researching the firms on our list, we sought information on their pay rates. The companies were not willing to supply this information, so we tried to obtain it from local economic development officials, public documents and local media reports. We found figures for 20 of the 28 locations listed above. They are not all from the same precise time period, and there may be variations in exactly which employees are included, but they provide some general measure of compensation levels at the subsidized facilities.

Our survey results suggest that wind and solar manufacturing workers earn more than the typical employee at a Wal-Mart store, but it would be a stretch to say that all of them have good jobs.

According to the U.S. Bureau of Labor Statistics, the average wage rate for production workers on manufacturing payrolls in durable goods industries in late 2008 was \$18.88 an hour.<sup>17</sup> Yet, as shown in Table 2, a large majority of companies on our list apparently pay less than that amount—in some cases, much less. Moreover, only one of the facilities—the Sanyo Solar plant in Salem, Oregon—is paying enough to meet a basic budget for a family of four (two parents and two children), according to local estimates of family income needs prepared by the Economic Policy Institute.<sup>18</sup> More than one-quarter of the plants do not pay enough to meet the estimated budget for a single adult with one child.<sup>19</sup>

## **Strong standards and strict enforcement deliver high wages**

The facilities where wages meet or exceed the industry average are not distinguished by generous local management or costly labor markets. Instead, high wages are closely associated with the strict wage requirement attached to economic development subsidies. For instance, the pay rate at Sanyo Solar's plant in Salem, Oregon—the highest we found—is based on a requirement linked to the company's receipt of enterprise zone benefits. Sanyo is required to pay its workers at least 150 percent of the county average annual wage, which comes out to about \$45,000 (or roughly \$22 an hour). The company also agreed to spend an average of at least \$50,000 per worker on wages and benefits combined.

TABLE 2:

Average hourly wage rates of production workers at subsidized wind and solar manufacturing plants

Company	City	State	Wages	Subject to Job Quality Wage Standard?
Acciona Windpower	West Branch	IA	\$15 <sup>20</sup>	Yes
Clipper Windpower	Cedar Rapids	IA	\$20 <sup>21</sup>	Yes
Evergreen Solar	Midland	MI	\$16 <sup>22</sup>	Yes
First Solar	Perrysburg	OH	\$17 <sup>23</sup>	Yes
Gamesa	Ebensburg	PA	\$13-20 <sup>24</sup>	Yes
Gamesa	Fairless Hills	PA	\$14-20 <sup>25</sup>	Yes
LM Glasfiber	Little Rock	AR	\$14-17 <sup>26</sup>	No
LM Glasfiber	Grand Forks	ND	\$11-15 <sup>27</sup>	No
Sanyo Solar	Salem	OR	\$22 <sup>28</sup>	Yes
Schott Solar	Albuquerque	NM	\$16 <sup>29</sup>	Yes
Siemens Power Generation	Fort Madison	IA	\$19 <sup>30</sup>	Yes
Solaicx	Portland	OR	\$13 <sup>31</sup>	Yes
TPI Composites	Newton	IA	\$13-14 <sup>32</sup>	Yes
Trinity Structural Towers	Newton	IA	\$18 <sup>33</sup>	Yes
United Solar Ovonic	Battle Creek	MI	\$14 <sup>34</sup>	Yes
United Solar Ovonic	Greenville	MI	\$13.50 <sup>35</sup>	Yes
Vestas Americas	Brighton	CO	\$18 <sup>36</sup>	Yes
Vestas Americas	Pueblo	CO	\$17.50 <sup>37</sup>	Yes
Vestas Americas	Windsor	CO	\$18 <sup>38</sup>	No
Xunlight	Toledo	OH	\$15.50 <sup>39</sup>	No

Note: Where averages are not available, ranges are given.

The mere existence of a job quality standard does not guarantee good wages: the required wage must be adequate, and the rules must be enforced. Wind blade maker TPI Composites recently took over a former Maytag appliance factory in Newton, Iowa where workers had been paid about \$19 an hour.<sup>40</sup> In 2007, TPI was given \$2 million by the state with a requirement that it pay its workers only \$13.47 an hour.<sup>41</sup> The company sought additional public funds in 2008 from the Iowa Economic Development Board, which agreed to waive pay requirements that would have raised wages closer to Maytag rates.<sup>42</sup>

Another example of diluting labor protections occurred recently in Battle Creek, Michigan. Because it was receiving subsidies, United Solar Ovonic was subject to the city's prevailing wage rule in connection with both the construction workers building the plant and the permanent employees hired to work there. Despite receiving a generous (some

would say too generous) subsidy of \$277,000 per job created, the company refused to pay the required hourly wage of \$16. City officials eventually gave in to threats that the company would take its investment elsewhere and allowed United Solar to pay just \$14 an hour—which represents just 70 percent of what it would take to reach a basic budget for a family of four, or just less than 100 percent for a one parent-one child family.<sup>43</sup>

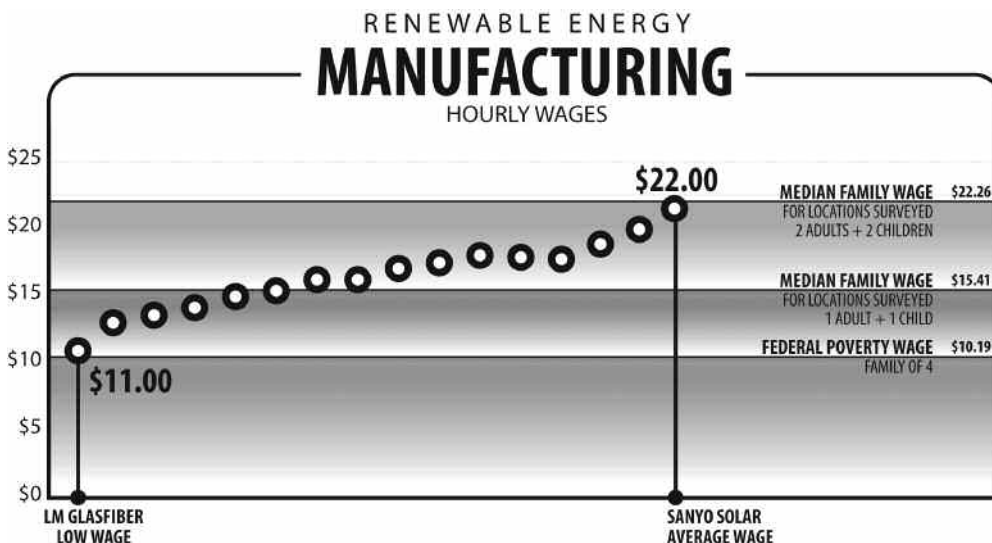
## The role of unions in raising labor standards

Manufacturing jobs have not always been good jobs. Before the emergence of a powerful organized labor movement in the manufacturing sector, factory workers labored in dangerous, sweatshop conditions for poverty wages. Manufacturing unions such as the United Steelworkers and the United Auto Workers helped to create the American middle class by demanding and winning standards that allowed blue-collar workers to afford homes, cars, and eventually college educations for their children. Union contracts benefited not only union members but also nonunion workers whose employers were forced to keep pace with rising wages and expectations.

Since the 1970s, job losses and an aggressive push-back by many employers have eroded the membership and the power of manufacturing unions. But unionized manufacturing workers still fare better than their nonunion counterparts when it comes to wages and benefits. In 2007 manufacturing workers covered by union contracts had median weekly earnings of \$779, which is 10 percent higher than the level for those without union representation.<sup>44</sup>

We were not able to compare the health coverage, retirement and other benefits provided to union and nonunion workers in the renewable manufacturing sector. But studies that compare the benefits provided to union and nonunion workers across all industries typically find that the union benefit premium exceeds the union wage premium. Union workers receive, on average, 14 percent higher wages than nonunion counterparts, but they are 28 percent more likely to have health insurance and 54 percent more likely to have a pension.<sup>45</sup>

Unions are particularly well suited to the challenge of raising labor standards in an emerging industry such as renewable manufacturing. A union is a market-based tool for matching labor standards with economic realities, offering much more flexibility than a fixed wage requirement. When business is good, unions bargain to ensure that workers benefit alongside owners and managers; when business is bad, unions may negotiate concessions and help to rationalize job cuts. Furthermore, unions can help companies identify and address workplace problems ranging from discrimination to safety violations more quickly and cost-effectively than either a regulatory agency or a court of law. It is no surprise that more than half of workers say that they would vote for union representation in their workplace if given the chance.<sup>46</sup>



The chart shows how average hourly wages at wind and solar energy manufacturing facilities profiled in this report measure up against two benchmarks: the hourly pay of a full-time worker with a family of four with an income at the federal poverty level; and the median wage required for a full-time worker to meet basic family needs among the renewable manufacturing locations cited in the report. Estimates of basic family needs budgets were provided by the Economic Policy Institute.

## Clipper Windpower and DMI Industries: Green union-busters?

Some employers see benefit in working with unions to set wages and resolve workplace problems. Others go to great lengths to quash organizing efforts. Our survey of green employers suggests that they run the gamut—from companies that voluntarily recognize unions based on majority sign-up to companies that engage union-busting consultants to keep unions out. The latter group includes: Clipper Windpower, which received subsidies of more than \$3 million to locate a facility in Cedar Rapids, Iowa; and DMI Industries in West Fargo, North Dakota.

Concerns over safety and the administration of health insurance prompted some workers at the Clipper Windpower turbine plant in Cedar Rapids to contact a labor union in early 2008. Brian Heins, a Lead Organizer for the International Brotherhood of Electrical Workers (IBEW), reports that the Clipper workers who contacted him were worried about dangerous conditions on the job and frustrated by the company's failure to use seniority in making job assignments and by long reimbursement delays on health insurance claims.<sup>47</sup>

A large majority of the workers – over 70 percent – signed union cards at the beginning of the drive, according to Heins. But the tide turned when Clipper mounted what Heins calls an aggressive response to the organizing drive that included the hiring of a union-busting consulting firm and mandatory “captive audience” meetings during which employees were regularly exposed to anti-union messages. In the end, a majority of the workers ended up voting against the union.

Six months later, it appears the workers are having second thoughts. Morale is low at the plant, according to Heins, and there is interest in a new organizing effort. The company did not respond to a request for comment.

Safety was also a key issue in an organizing drive conducted by Teamsters Local 120 at a wind tower plant run by DMI Industries in West Fargo, North Dakota. Rhys Ledger, the Strategic Organizing Director of the Local, says that dangerous working conditions motivated some of the workers to contact the union.<sup>48</sup> Corey Kresse, who used to work at the plant applying metal coatings, confirms that. “At one point I discovered a crack in my respirator,” he says. “It took more than six months to get it replaced.”<sup>49</sup>

As at Clipper, DMI's management strongly opposed the organizing effort. According to Ledger and Kresse, the company brought in a law firm that conducted an anti-union campaign that chilled support for the union. During that campaign Kresse was fired by the company for violating a safety rule, but he charges that the real reason was his support for the union. DMI insists that it has a “strong safety record” and denies that it coerced workers to vote against the union.

Although three-quarters of the workers had initially signed union cards, in April 2007 the shop voted against union representation. About six months later, an employee at the plant was killed in an accident involving an overhead bridge crane. The Occupational Safety and Health Administration initially fined the company \$5,000 but after negotiations with the company the amount was reduced to \$3,750.<sup>50</sup> In January 2009 DMI announced plans to cut its workforce by 20 percent because of a drop-off in demand.<sup>51</sup>

The resistance of companies such as Clipper Windpower and DMI Industries is one of the reasons union presence among companies involved in manufacturing for the green energy sector remains low. Apart from the case of Gamesa profiled in this report, the only other unionized wind or solar manufacturing facility we were able to find in the United States is the IBEW-represented unit at the Sharp Electronics photovoltaic panel plant in Memphis, Tennessee. This could soon change. Various unions are planning new organizing initiatives for the green sector.

## Gamesa: A green labor partner

One bright spot amid the industrial decline of Pennsylvania has been the emergence in the past few years of a renewable energy manufacturing sector. At the forefront of this development is the Spanish company Gamesa Corporación Tecnológica, one of the world's leaders in wind power. Gamesa not only invested in a rustbelt state but then adopted a union-friendly posture in its workplace policies. As a result, the company is widely regarded as a model employer for the emerging U.S. green economy.

Gamesa entered the U.S. market in a significant way in September 2004, when Pennsylvania Governor Edward Rendell announced that the company would establish offices in Philadelphia and open a manufacturing facility somewhere in the state to produce turbine blades. Among the factors cited by Gamesa for choosing Pennsylvania were the state's manufacturing heritage and its skilled labor force as well as the enthusiasm for renewable energy development expressed by officials in the state, including their work to create a renewable portfolio standard for electricity producers.

In early 2005 Gamesa announced that its blade plant would be built from scratch in the town of Ebensburg in Cambria County in the central part of the state. To assist the \$50 million project, the state put together an \$11.31 million incentive package, including a \$2 million loan from the Pennsylvania Industrial Development Authority; a \$1.25 million grant from the Industrial Development Program; \$1.17 million in Job Creation Tax Credits; a \$650,000 grant from the Opportunity Grant Program; a \$390,000 Customized Job Training Grant; and a \$5.85 million loan from the public-private Citizens Job Bank program. The plant created about 300 jobs.

Gamesa expanded its involvement in Pennsylvania in March 2006, when it announced plans for a \$34 million plant in the eastern part of the state to produce nacelles (structures that house the electricity-generating components of wind turbines) as well as wind blades and towers. In a step that symbolized industrial rebirth, the plant was sited at the Fairless Hills Works abandoned by U.S. Steel in 2001. The facility, located north of Philadelphia, hired about 500 workers.

Here, too, Gamesa received government assistance: a \$3.93 million package including a \$2.25 million loan from the Pennsylvania Industrial Development Authority; an \$875,000 loan and a \$25,000 grant from the Industrial Sites Reuse Program; a \$500,000 loan from the Machinery & Equipment Loan Fund; \$130,000 in Job Creation Tax Credits; and a \$150,000 Customized Job Training grant. Other benefits stemming from the location of the plant in a Keystone Opportunity Improvement Zone bring the total value of the subsidies to about \$10 million.

In fall 2006, the United Steelworkers union (USW) informed Gamesa that a majority of employees at both facilities had signed pledge cards. Unlike most U.S. employers, which respond to such a notification by launching an anti-union campaign in preparation for a representation election, Gamesa voluntarily recognized the union and agreed to negotiate a contract for the two locations.

The first contract, which was ratified in June 2007, included agreements on raises of 4 percent in 2007 and 3 percent in 2008 and 2009, as well as bonuses and benefits with a provision that a skill-based incentive program be introduced. Agreement on the incentive program was reached in May 2008. Tom Conway, USW international vice president, commented on the agreement: "Our union is proud to partner with Gamesa to further grow their domestic manufacturing base and promote wind energy as a source of clean, renewable energy and good jobs."<sup>52</sup>

At the Ebensburg plant, blade production workers start at \$12.73 per hour. Blade maintenance workers make \$20.09. At Fairless Hills, blade production workers make \$13.65 per hour; in the nacelles unit they make \$14.94, and tower welders make \$20.00 per hour.<sup>53</sup> Under the skills-based incentive system workers can earn up to \$2.50 additional per hour.

Benefits at Gamesa's plants are good, a union spokesperson said. Workers with individual health coverage pay 12 percent of the premium while those with family coverage pay 25 percent. There is a 401(k) plan with a 50-percent match up to a total of 3 percent of the worker's total pay. Workers start off with 15 paid days off annually.

Over the past few years, the union's relationship with Gamesa has had its ups and downs, but on the whole the parties get along well. "Management is more transparent in terms of providing information than most U.S. companies," a Steelworkers official said. Union and company officials meet monthly in joint committees to inspect and discuss issues pertaining to safety, health, and the environment.<sup>54</sup>

"We voluntarily recognized the Steelworkers union," says Julius Steiner, CEO of Gamesa Energy USA. "There is no downside. There simply isn't."<sup>55</sup> Steiner also noted that the contract allows workers to remain on the job and production to continue while any disputes are settled. In early 2009 the company announced plans to shift all blade production to Ebensburg but said it would try to avoid layoffs by shifting the blade workers in Fairless Hills to other parts of that operation.

Last year, American Rights at Work named Gamesa to its list of employers with the best labor relations policies. The group wrote that “Gamesa proves that companies can be successful while advancing a socially responsible approach to workers’ rights and our environment.”<sup>56</sup>

## Offshoring green manufacturing jobs

A frequent argument made in favor of green jobs is that they cannot be moved offshore by employers seeking lower labor costs. While that is true for service-sector work such as weatherizing buildings or installing solar panels, it does not necessarily apply to green manufacturing jobs. In the course of researching companies involved in producing components for wind and solar energy generation, we found that offshore outsourcing is already occurring. Here are some examples of U.S.-based firms that are carrying out wind and solar manufacturing activities in low-wage havens abroad:

- First Solar, headquartered in Tempe, Arizona, located its largest solar module manufacturing operation in Malaysia. It is more than ten times the size of the company’s facilities in Perrysburg, Ohio.<sup>57</sup>
- In addition to its plant in Newton, Iowa, TPI Composites, headquartered in Scottsdale, Arizona, has wind-blade manufacturing operations in China and in Mexico. The Chinese operation was set up to supply GE Energy, while the Mexican one is a joint venture with Mitsubishi Power Systems called VienTek.<sup>58</sup>
- United Solar Ovonic, based in Rochester Hills, Michigan, has a plant in Mexico that produces laminates for the photovoltaic cells that are assembled at the company’s plant in Greenville, Michigan.<sup>59</sup>
- SunPower, a solar panel company not on our list of subsidized firms, is headquartered in San Jose, California, but it does most of its manufacturing in the Philippines; the rest is done by a third-party subcontractor in China.<sup>60</sup>

While some of this production is intended for foreign markets, companies are also using offshore facilities to produce for the United States. For example, TPI Composites has acknowledged that its Chinese production of wind blades, which are often assumed to be too large to ship long distances, is in part intended for the export market, reportedly including the western United States.<sup>61</sup> Its joint venture in Mexico with Mitsubishi brags of shipping thousands of blades to U.S. and international wind farm sites.<sup>62</sup>

Offshore outsourcing can also occur with other kinds of green products. Last year, Policy Matters Ohio published a report showing that many of the energy-saving compact fluorescent light bulbs sold in the United States by General Electric were produced at a notorious sweatshop in China. The plant, a joint venture of GE and Xiamen Topstar Lighting Co. Ltd., was found to be violating Chinese laws on maximum hours and overtime pay as well as other labor regulations.<sup>63</sup>

Currently U.S. law requires domestic sourcing by a wide variety of agencies and programs, including the Federal Highway Administration, Federal Transit Administration, Federal Aviation Administration, Federal Railroad Administration, Clean Water Act Grants for Water Treatment Projects, and the Energy Policy Act of 1992, to name a few. There is, however, no domestic sourcing requirement attached to federal subsidies such as the renewable energy investment and production tax credits, raising concerns about whether U.S. workers will reap most of the benefits from the investment of U.S. tax dollars in renewable energy.

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## II. CONSTRUCTION

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**The emerging green economy is as much about efficiency as it is about the replacement of fossil fuels with renewable energy. Thus a great deal of attention is being paid to the built environment, which in the United States accounts for about 40 percent of energy use and the same portion of greenhouse gas emissions.<sup>64</sup> The appeal of raising the energy efficiency of buildings as a strategy for reducing carbon emissions derives from its cost-effectiveness—unlike most climate stabilization strategies, efficiency measures produce net savings over a short time period.**

The implementation of building energy efficiency has two components. On one hand, the energy consumption of existing residential, commercial and industrial spaces can be cut significantly at a relatively low up-front cost. On the other hand, new structures can be built using design elements and technologies that sharply reduce consumption of energy, clean water, and non-renewable building materials. A growing number of architects, contractors and developers have embraced such green building techniques. These techniques seek not only to cut energy consumption but also to reduce indoor air pollution through the use of non-toxic materials and to conserve natural resources by reusing and recycling construction materials.

### **Green construction job opportunities and challenges**

The movement to “green” the built environment creates an opportunity for the seven million workers employed in the construction industry, which has been especially hard hit by the current economic downturn. President Barack Obama’s pledge to weatherize one million homes each year will require a workforce numbering in the tens of thousands, and that is just the tip of the iceberg. Energy efficiency measures could be applied cost-effectively to most of the nation’s building stock—including factories, hospitals, schools, and commercial office buildings. Skilled construction workers could be in particularly high demand as the industry tries to adapt to a new set of demands and integrate a new set of technologies.

Construction has historically provided opportunities for many of blue-collar workers to earn middle-class wages. The typical construction trades union member, for example, earned a weekly wage of \$993 in 2007 according to the U.S. Bureau of Labor Statistics (BLS).<sup>65</sup> The picture looks different, however, for nonunion construction workers whose weekly average was just \$624. Put another way, a nonunion construction worker who manages to stay employed year-round would still earn only \$32,448, on average.

At the very bottom end of the construction industry are nonunion laborers, carpenters, painters, roofers, and other workers whose trades do not require special licensure. The Economic Policy Institute analyzed BLS data for the period 2005-2007 and determined that half of the 3.5 million construction workers in this group earned less than \$12.50 an hour. A full third—over a million workers—earned less than the federal poverty wage for a family of four (\$10.19 per hour).<sup>66</sup> Of course, low wages are but one of the many challenges facing the worst-paid construction workers. Refusal to provide health benefits, misclassification as independent contractors, and safety problems have all been cited as problems with low-road construction outfits. This group of workers derives the greatest benefit from union membership.

To show some of the variations in the existing green building sector, this chapter offers two case studies. We first review the track record of Comfort Systems, a large heating, ventilation and air-conditioning contractor that endorses green principles but also has a history of conflict with unions. Then we look at Gerding Edlen, a Portland, Oregon-based developer that is committed not only to sustainable construction practices but also to working with building trade unions to create good, high-wage jobs.

## **LEED: Setting the platinum standard (except for workers)**

The idea of green building has been around for some time; the premier organization in the field, the U.S. Green Building Council (USGBC), was founded in 1993.<sup>67</sup> Yet the concept did not enter the mainstream until the USGBC introduced its Leadership in Energy and Environmental Design (LEED) rating system in 2000. Since then, and especially in the past couple of years, LEED has received enormous support in the construction world. More than 2,000 buildings have received LEED certification—including many facilities owned by large corporations—and thousands more have been registered and are awaiting certification reviews. The USGBC now has about 18,000 organizational members and the organization registered nearly 30,000 attendees at its most recent conference.

LEED is actually a series of rating systems for different types of structures: new construction, existing buildings, schools, healthcare facilities, homes, etc. For each there is a set of criteria covering issues such as energy consumption, water efficiency, use of recycled materials and indoor air quality. Points are awarded for meeting the various standards, and the total number of points determines whether the structure is given certification. Those with high scores may be certified as LEED Silver, Gold or Platinum (the highest).

LEED standards are now being embraced by the federal government as well and state and local governments across the United States. A tally by the USGBC cites 172 localities, 31 state governments and 12 federal agencies or departments.<sup>68</sup> This means that more and more public buildings are being constructed according to LEED criteria. In addition, about three dozen localities and a dozen states are providing incentives to developers and builders to follow LEED principles in private construction. These include expedited permitting, fee reductions or waivers, density bonuses and even property tax abatements.

Unfortunately, LEED standards are silent on construction labor practices and job quality. A structure that meets the physical requirements may be certified, whether it was built by well-paid craftspeople or by exploited workers toiling off the books.

Given the rapid pace at which green building techniques are being adopted, job quality issues cannot be ignored. To the extent that such construction is being subsidized—either in connection with the adoption of LEED standards or through conventional economic development incentives (such as tax-increment financing) available to developers—job standards are all the more justified.

Protecting job quality in green construction is also vital because the new techniques are not being adopted by only a small number of specialists. Instead, they increasingly involve changes in the way all the existing building trades do their work. What is at stake, in other words, is the future of working conditions in the entire construction industry.

## Comfort Systems: Putting a leash on worker organizing?

Associated Builders and Contractors (ABC), the largest trade association of anti-union construction companies, has a long record of promoting public policies to weaken building trade unions and thereby reduce wage rates. The ABC's official history boasts that the group "has been instrumental in pushing legislation through Congress that revised the Taft-Hartley Act, prohibited secondary boycotts, addressed salting and job targeting, protected right-to-work laws, eased state approval for open shop apprenticeship/training programs, attacked prevailing wage laws and put more leashes around the unions."<sup>69</sup>

In August 2008 ABC formed a National Green Building Committee, and shortly thereafter launched a pilot Green Contractor Certification program.<sup>70</sup> It is unclear whether ABC sees its green initiatives as another way to leash unions. Yet we may infer something from the fact that the person named to head the ABC's National Green Building Committee is W. Brewster Earle, president of Comfort Systems USA Energy Services, a unit of Comfort Systems USA Inc., a large national contractor specializing in heating, ventilation and air conditioning (HVAC) services for commercial and industrial customers.<sup>71</sup>

Comfort Systems has had a controversial relationship with construction unions throughout its short history. Since coming into existence in 1997, the company has pursued a strategy of acquiring many of the modest-sized local contractors that dominate the fragmented HVAC sector. By 2001 it had taken over about 125 such companies<sup>72</sup> to become the third-largest mechanical specialty contractor in the United States, with annual revenues of more than \$1.6 billion.<sup>73</sup> Since HVAC in general—and the energy services business in particular—is concerned with energy efficiency, Comfort Systems was becoming a major employer of what would later be called a green-collar workforce.

Apparently preoccupied with its aggressive acquisition strategy, the original management of Comfort Systems did not focus on maintaining good relations with the workers at the companies it took over, especially those which had previously been organized by locals of the Sheet Metal Workers International Association (SMWIA). Before long, unfair labor practice charges began to mount, and the SMWIA launched a national campaign to protect its members and promote unionization at the unorganized units of the company.<sup>74</sup>

During this time there was management shake-up at Comfort Systems that resulted in the installation of a group of top managers who were openly antagonistic toward the union. Among these was Gary E. Hess, who became president of the firm. Hess had served as president of ABC in 1996 and was the trade association's Contractor of the Year in 1997.<sup>75</sup>

Comfort Systems found a solution to its labor problem—as well as financial difficulties that had arisen—in 2002, when it purged its organized units by selling off 19 subsidiaries to a competitor, EMCOR Group, that was predominantly union. As a result of the deal, the number of unionized workers at the Comfort Systems dropped from nearly 3,000 to only about 100.<sup>76</sup> It later shed most of those as well. The company's latest 10-K annual report states that among its 6,461 employees only 6, or one-tenth of one percent, are covered by a collective bargaining agreement.<sup>77</sup>

Comfort Systems apparently intends to remain non-union. In the Investor Presentation on its website, the company describes its target acquisitions as "Best non-union HVAC oriented mechanical in new area."<sup>78</sup> However, when asked directly, the company denied that it has a deliberate policy of avoiding unions.

The company continues to have labor problems, but these days they tend to get addressed through lawsuits rather than organizing drives. For example, in 2008 two employees of subsidiary company Atlas Comfort Systems filed a lawsuit charging that they had been dismissed for complaining about the company's alleged use of undocumented immigrant workers in Florida.<sup>79</sup> The case was settled out of court.

In a recent case involving another Florida subsidiary, a former employee has accused the company of failing to pay overtime to him and other workers. The case, which is seeking class action status, was still pending as of early January 2009.<sup>80</sup> Comfort Systems declined to comment on the pending case and said that its subsidiary had denied the allegations in the case that was settled out of court.

And, of course, companies such as Comfort Systems can use their non-union status to pay workers substantially less

than the going rate in union shops. When Brewster Earle and ABC talk green, it means more greenbacks in management's pockets and less for the workers.

## Gerding Edlen: Leading by example

Portland, Oregon is famous for local efforts to build a green and livable city. Since the 1970s, public officials, with the support of the electorate, have enacted policies promoting increased density, limitations on sprawl, more mass transit, environmental standards for new buildings and rehabs of older structures, and a commitment to renewable energy. Recently, the Portland Bureau of Planning has advanced the idea of 20-minute neighborhoods, where residents can reach home, work, school and most shopping within a relatively short walk.

Since 1996, Gerding Edlen Development Co. has contributed to Portland's green reputation with a series of innovative and environmentally sustainable developments. Among these are:

- South Waterfront Redevelopment Project. A 38-acre, mixed-use riverfront development in Portland will include 250,000 to 300,000 square feet of storefront retail space, more than 2,700 housing units in residential towers, and a university health center.
- The Brewery Blocks. A historic brewery transformed into a five-block, urban mixed-use development in downtown Portland, with one million square feet of urban retail, office space and housing, as well as a performing arts center and underground parking. In six years, the development transformed a brewery that supported 250 workers into a mixed-use neighborhood with over 2,700 residents.
- Bellevue Towers. Twin 43-story condominium towers in downtown Bellevue, Washington, across Lake Washington from Seattle. When completed, the towers will have 550 residential units on 1,250,000 square feet, plus 16,000 square feet of ground-floor retail space and underground parking.
- South Park. A 1.5 million-square-foot residential and commercial space in downtown Los Angeles. South Park, in a formerly underused section of the city, will contain nearly 1,500 residential units, plus commercial, arts and gathering space.

The company was formed when developer Mark Edlen merged with the Gerding Investment Company. From its formation, Gerding Edlen has taken risks to use innovative building practices. Co-founder Bob Gerding told the environmental coalition Oregon Natural Step Network in 2004: "If you're trying to build something at the lowest cost to maximize profits, you can't lead. Like all the greatest companies, you have to reinvest in R&D. But I'd rather lead than follow. Being a leader is a marketing advantage."<sup>81</sup>

Equally importantly, Gerding Edlen decided to work with labor unions and to undertake joint projects with union pension funds to create both environmentally sound architecture and good green jobs. On both fronts, they seem to have largely succeeded.

According to Gerding Edlen Vice Managing Principal Kelly Saito, the company has used union pension funding on some of its largest projects. For instance, Gerding used the Multi-Employer Property Trust on Block Two at its Brewery Blocks development and at the Ardea apartment building in South Waterfront; Union Labor Life Insurance Company at the Henry Condominium at Brewery Blocks; and the National Electrical Benefit Fund for condos in Los Angeles. Each of these funds mandates that union labor be used in the funded projects, which means that the construction workers enjoy good jobs at good wages.

Yet Gerding Edlen also uses union labor in projects not involving labor-related funding; in fact, some 90 percent of its work is done union. "In the West Coast cities," Saito says, "it's 98 percent union. The exceptions are in rural areas where we don't have access to union labor."<sup>82</sup> Very little of the company's work receives direct public economic development funding—10 to 15 percent—so few projects are governed by job quality standards, but union contracts equal or exceed those levels.

According to the company, a typical Gerding Edlen project is a 20-story commercial building with a total cost of about \$100 million. This provides some 200 to 300 full-time jobs at any one time in the project. Equally important, though, Gerding Edlen is at the cutting edge of green design and new techniques and technology. “Besides providing decent jobs,” said Saito, “we help workers get skilled in green construction, which provides a competitive advantage for these union workers.”

The unions hold Gerding Edlen in high regard. John Endicott of Plumbers and Steamfitters Local 290 in metro Portland says: “Our involvement with Gerding Edlen is excellent. On a typical high-rise project, we place 25 to 35 plumbers and 20 to 30 steamfitters. They pay union wages on every job and are right at the forefront of green technology. In truth, I wish we had 10 more employers like Gerding Edlen.”<sup>83</sup> According to the Columbia Pacific Building Trades, the union plumber/fitter wage in the area is \$35.69 plus \$17.19 in fringes. Sheet metal workers get the union package of \$49.95 an hour, which includes health care, retirement benefits and training.<sup>84</sup>

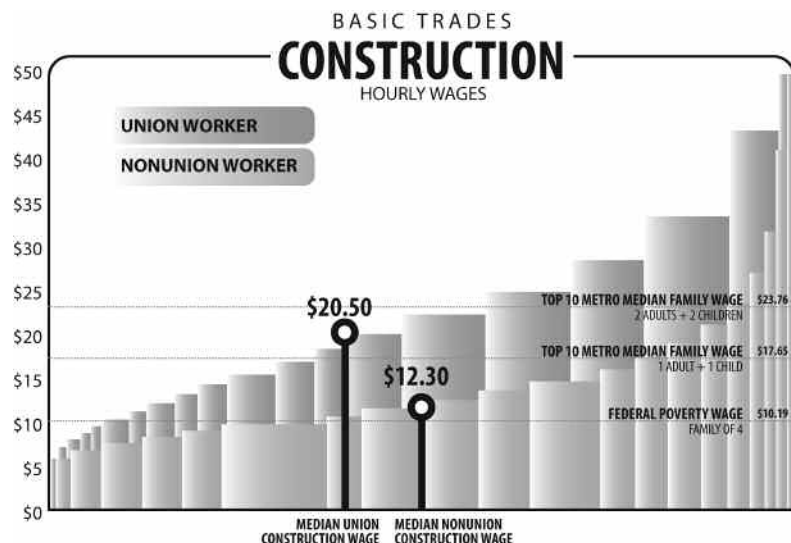
Gerding Edlen has developed a specialty in deconstruction, or breaking down buildings marked for demolition into recyclable parts. Deconstruction adds significantly to labor requirements compared to demolition, but those costs can be recovered by selling or reusing salvaged components and materials. “In the Brewery Blocks, we dismantled and sold 30,000-gallon tanks for use as bridge pontoons,” said Saito. “In addition, we re-mill old lumber for flooring and stair treads. We even crush the concrete and use it as backfill.” The main beneficiary of this recycling has been the Laborers union, which now has members skilled in this new field.

One of the reasons Gerding Edlen has achieved both success and a reputation for integrity is that it has involved the broader community in its projects. According to company website:

We start every project with an all-day eco-session to focus on our objectives for environmental sustainability, inviting many collaborators in addition to the design and construction teams, in addition to other collaborators. In the case of the Brewery Blocks, this included the general contractor, key subcontractors, the Portland Office of Sustainable Development, representatives from the State Energy Office, Northwest Energy Efficiency Alliance and other participants who provided critical input.<sup>85</sup>

One of the advantages the company has is its consistently high Leadership in Energy and Environmental Design (LEED) ratings, which in some cases enable it to obtain tax abatements. In Portland, Gerding Edlen projects have also received tax abatements for building along transit lines.

Gerding Edlen, like most developers, has been affected by the current recession. But it has found ways to meet the challenge. Its newly opened Cyan/PDX project, a 16-story, 356-unit project in Portland, was converted from condominiums to apartments. At the same time, projects like South Park in Los Angeles are proceeding. When the economy rebounds and energy prices resume their long-term rise, Gerding Edlen will remain well-positioned to thrive. For its scrupulous attention to labor and environmental concerns, the firm certainly deserves to succeed.



The chart shows how hourly wages of union and nonunion workers in basic construction trades (laborers, carpenters, painters, roofers, etc.) measure up against two benchmarks: the hourly pay of a full-time worker with a family of four with an income at the federal poverty level; and the median wage required for a full-time worker to meet basic family needs in one of the nation’s 10 largest metropolitan areas. Estimates of basic family needs budgets were provided by the Economic Policy Institute.”

## Weatherization: Creating jobs while cutting energy bills

The average low-income family spends 14% of gross income on energy bills and in many cases energy costs can exceed 20% of the family budget. Unanticipated energy bills are the second-leading cause of foreclosures among low income homeowners.<sup>86</sup>

President Obama has promised to ease the burden of rising energy costs on low-income residents by weatherizing a million homes each year as part of his New Energy for America plan. The implementation of cost-effective energy efficiency measures such as adding insulation, sealing leaks, and replacing inefficient appliances can reduce home energy consumption by 15 to 30 percent and generate savings of \$360 a year on the typical residential energy bill.<sup>87</sup>

U.S. Census data indicate that nearly 30 million low-income households may be eligible for Federal weatherization assistance.<sup>88</sup> But in 2006 the Department of Energy's Weatherization Assistance Program (WAP) funded the weatherization of just 104,149 homes – meeting just a third of one percent of the estimated need.<sup>89</sup> The stimulus package currently before Congress would add \$6.2 billion to the WAP budget, creating tens of thousands of jobs and bringing the goal of weatherizing a million homes within reach.<sup>90</sup>

But a number of hurdles must be overcome before American workers can count on finding good jobs in a thriving weatherization industry. In order to meet the President's stimulus objectives, the residential energy efficiency sector must find ways to train thousands of workers and raise standards in what is currently a low-wage industry.

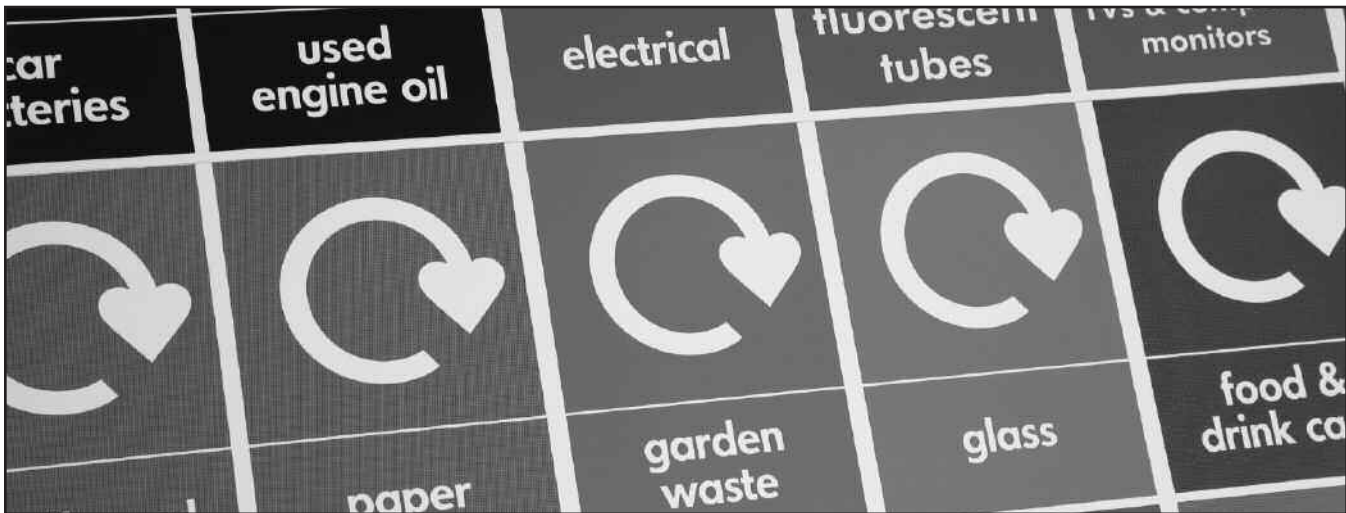
Creating tens of thousands of good, green weatherization jobs will require changes to the existing system, including imposing labor and responsibility standards to raise job quality, and eliminating state requirements that agencies select the lowest (rather than the best) bidder when issuing contracts. Weatherization programs need to be measured not only by the number of homes served but also by the number of good jobs created, total energy savings realized, and total carbon emissions avoided.

Newark Mayor Cory Booker and a group of determined activists from the Laborer's Local 55, in conjunction with community partners, are moving forward on a high-road weatherization partnership. The program aims to weatherize thousands more homes, at the same time creating high-quality job opportunities for Newark residents.<sup>91</sup>

The work is being completed by volunteers from the Local and by a group of Newark residents who are being paid union rates by a locally-based contractor, Renaissance Church Construction Company. Some of these workers will go on to be part of the first class of 25 Newark residents to attend a six-week course in green construction techniques offered by the Laborers' construction training school.

The Mayor, the Laborers, and the Garden State Alliance for A New Economy hope the initiative can serve as a model for future state and federal home energy efficiency programs. Their goal is to create family-supporting green-collar jobs with benefits for Newark residents who are trained through a certified program and offered employment with contractors doing weatherization or other residential construction work. At the same time, the initiative could reduce the city's carbon footprint and lower household energy costs for thousands of Newark families.<sup>92</sup>

### III. WASTE MANAGEMENT



**“Reduce, reuse, recycle.” This has long been a fundamental principle of the environmental movement, and it takes on new importance with the growing climate crisis. While the calls for reducing consumption and reusing products focus mostly on consumer behavior, recycling is also a business and thus a source of job creation. In fact, the processing of recycled materials can be considered one of the first green occupations.**

While industrial recycling such as the scrap metal business has been around for many decades, the emphasis on consumer recycling of paper, plastic, glass, metal and other household materials dates back to the late 1980s. At that time, there was talk of a “landfill crisis”—the idea that cities and towns were running out of places to dump the trash generated by their residents. To address the perceived problem, hundreds of localities instituted curbside recycling programs to divert materials from the waste stream. Governments also hoped to earn some revenue by selling the materials for industrial reuse.

Consumer recycling has had a mixed record during these past two decades. Research done for the U.S. Environmental Protection Agency estimates that 49 percent of aluminum beverage cans and 64 percent of steel food containers (“tin cans”) are recovered and reused as raw material.<sup>93</sup> Newsprint and wastepaper recycling rates have varied greatly, reflecting swings in demand and commodity prices. Plastics recycling is hampered by technical limitations.

Overall, the EPA estimates, one-third of consumer waste is now recovered for recycling or composting. According to the National Recycling Coalition, this results in an annual reduction in greenhouse gas emissions equivalent to 50 million metric tons of carbon.<sup>94</sup>

Recycling has become a significant portion of what is known as the municipal solid waste industry, which in total has annual revenues of about \$40 billion. That industry is dominated by two huge corporations—Waste Management Inc. and Republic Services Inc., which recently acquired another giant, Allied Waste. Combined, the two firms have about 40 percent of the market, but there are also thousands of small operators. Waste Management and Republic alone operate more than 190 recycling facilities.

By all accounts, there are wide variations in the quality of the jobs at these facilities. In this chapter, we look one recycler that has taken the low road all the way to Beverly Hills and another that has turned one of the dirtiest jobs into one of the best.

## Community Recycling and Resource Recovery Inc.: Taking the recycling low road

Community Recycling and Resource Recovery Inc. (CRRR), a privately held recycling operation that serves the Los Angeles area, and its sister hauling company Crown Disposal profess a commitment to green principles. Their website declares that the companies are working toward “a goal of higher recycling rates and a ZERO WASTE future.”<sup>95</sup> They were early adopters of environment-friendly practices such as composting and recycling of construction debris.<sup>96</sup>

Drivers employed in the hauling operations of Crown Disposal are covered by a contract with Teamsters Local 396, but that bargaining unit does not include the workforce at CRRR’s recycling operation in Sun Valley (formerly known as the DeGarmo Street Dump).

The predominantly immigrant labor force at the Sun Valley facility has no union representation. According to an informal survey done by the Teamsters, the current pay rate at CRRR is \$8.25 an hour, only 25 cents above California’s minimum wage. Workers who have been at the facility for several years report that they have not received any pay increases and are not offered health insurance coverage.

Some workers say they are not given proper safety equipment, and some say they do not feel free to complain to their supervisors about this and other problems. The pace of the work is also an issue. When asked to summarize how he felt about the job, one worker said: “Too much pressure and not enough money.” The company did not respond to a request to comment on its labor practices.

Even apart from labor practices, the track records of Crown and CRRR are not unblemished. In 2004, following complaints from neighbors of the DeGarmo facility about foul odors, the city attorney of Los Angeles sued the companies for licensing violations.<sup>97</sup> The companies settled the suit by agreeing to build new enclosures around its debris piles to reduce dust and odors.<sup>98</sup>

In 2007 CRRR’s composting operation, located in the Bakersfield suburb of Lamont, was the subject of complaints that the manure it was producing had large amount of plastic and glass in it. After the problem began to get attention in the local media and the company was fined by local officials, CRRR agreed to clean up its operation.<sup>99</sup> In May 2008 the California Air Resources Board also imposed fines of \$88,000 on Crown Disposal for a two-year failure to inspect its diesel trucks for compliance with the state’s emission standards.<sup>100</sup>

One of Crown and CRRR’s largest customers is the City of Beverly Hills.<sup>101</sup> At a city council meeting last May, Mayor Bruce Brucker cited recycling as a component of his administration’s effort to make Beverly Hills “one of the greenest cities on the planet.”<sup>102</sup> The processing of recycled materials from households in one of the wealthiest communities in America by some of the least powerful and lowest paid workers is not the kind of green economy we should be creating.

## Norcal: Where hard, dirty work pays

It is one of the worst injustices of our economy: the hardest, dirtiest jobs usually pay the least. So, it’s both surprising and gratifying to learn of one worksite where hard, dirty work pays very well: Norcal Waste Systems’ Recycle Central in San Francisco.

Norcal has evolved into one of the most advanced recyclers in the country and offers some of the highest wages and benefits in the industry. As maintenance worker John Walker says, “They’re really, really fair and really good to work for.”<sup>103</sup>

According to the company, “Norcal is the largest employee-owned company in the solid waste industry, providing waste management services to more than 570,000 residential and 55,000 commercial customers.”<sup>104</sup> Operating through two-dozen subsidiaries, Norcal collects and processes garbage in over 50 California communities. It’s currently the 13th largest waste management firm in the United States.

With a mandate to collect all of San Francisco's trash, Norcal invested heavily in advanced recycling ranging from composting of food to construction debris recycling. Norcal understood that recycling isn't simply technology plus labor; it also requires incentives and popular education. For instance, Norcal provides San Francisco residents with color-coded, wheelie plastic bins called the Fantastic Three. There's a blue cart for paper, glass, plastics, and metal, a green one for food and yard waste, and a black cart for the unredeemable garbage.

But then you have to get people to actually use the carts. So, in 2007 the company distributed door-hanger graphic reminders which it attached to its 200,000 carts. The blue side of the design depicts cardboard, aluminum cans and other hard recyclables while the green sides shows food and other compostable wastes.

The company believes in setting an example, and in 2007 it switched its entire fleet of 400 trucks to B20 biodiesel fuel. In fact, Norcal is so devoted to wooing the community that, since 1990, the company has sponsored an artist-in-residence program. During their four-month residency, local artists receive a stipend and access to a well-equipped studio to create works out of trash and display them in a gallery at the recycling facility.

Norcal took a major step toward green and worker-friendly industry five years ago when it opened a new state-of-the-art recycling center capable of sorting and baling single-stream and co-mingled materials. Since Norcal's Recycle Central opened, San Francisco has achieved a recycling rate of nearly 70 percent, the highest in the nation. The \$38 million facility recycles an average of 750 tons of paper, plastic and other hard materials a day.

Adjoining Recycle Central is another Norcal operation which processes 350 daily tons of yard and food waste. Said *Waste News*, "Dubbed the Organics Annex, the facility receives material from about 2,100 restaurants and food-related businesses as well as about 75,000 homes in San Francisco. The material is then transferred to long-haul vehicles that travel to one of two composting facilities the company runs in California."<sup>105</sup>

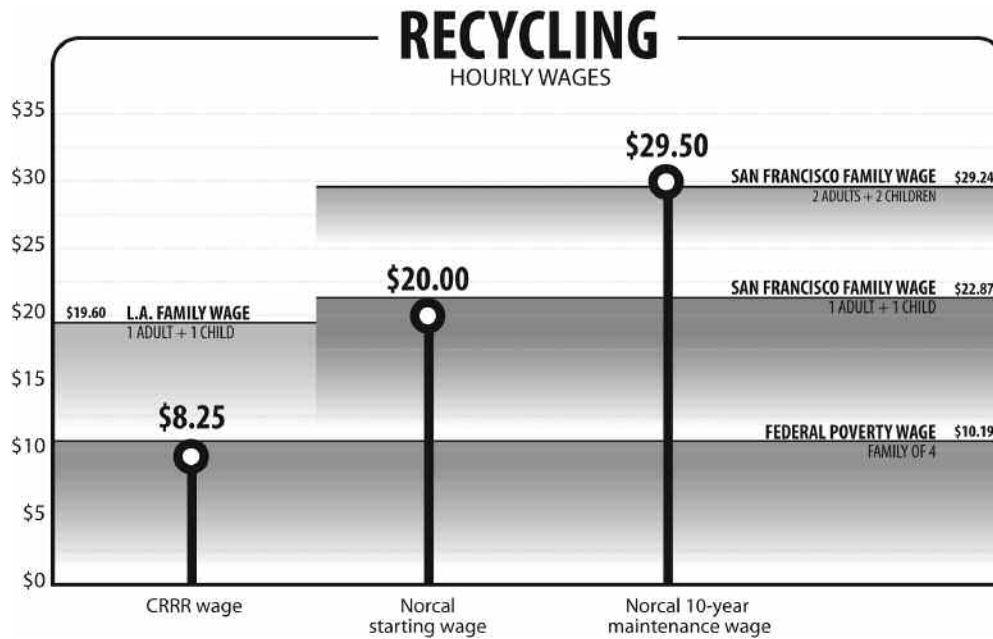
But the facility has been more than an operational success. The city of San Francisco worked to ensure that both employees and residents were well-served by the new facility. The city donated the land for the center and required that any company bidding for the site recognize a union that signed up a majority of the workers. The winning company also needed to hire residents from three of the city's most economically challenged neighborhoods.

Teamster Local 350 organized the workers and negotiated one of the best labor contracts in the industry with Norcal. The starting wage is \$20 an hour, and maintenance worker John Andrews and others at his pay grade make \$29.50 an hour, with \$42.81 per hour for overtime. Andrews, who began with Norcal in 1999, started work on the sorting line, handling garbage. Andrews admitted that the work is "not clean," but says that for a guy who started out poor in the nearby Hunters Point-Bayview neighborhood, this is a big step up.

The Norcal operation is considered superior to most other recycling operations. Local 350 business agent Larry Daugherty was quoted in the *Teamster magazine* as saying that Recycle Central is "definitely a state of the art facility—especially in comparison to many nonunion facilities I've seen. It is fully automated. The materials are presorted by machinery and it all goes up on belts, which makes it much safer because the workers can see everything that goes up instead of just reaching blindly into a pile."<sup>106</sup> And unlike many other recycling sites, Teamster workers at Norcal get superior protective gear.

Norcal itself has a long relationship with the Teamsters. Company President and CEO Michael Sangiacomo says: "To ensure that we have the quality labor force needed to implement these programs and achieve our goals of service and environmental protection, we partner with labor organizations like the Teamsters to provide adequately trained and motivated people who will perform a very difficult but critical job in an exemplary manner."<sup>107</sup>

Bringing working conditions at other recycling facilities up to the level of Norcal is now a priority of the Teamsters. Bob Morales, secretary-treasurer of Local 350, was appointed national director of the union's new Solid Waste, Recycling and Related Industries Division. Says Morales, "It's a key industry and a lot of exciting things are going to happen."<sup>108</sup>



The chart shows how hourly wages at a nonunion recycling processing facility (CRRR) and a union facility (Norcal) profiled in this report measure up against two benchmarks: the hourly pay of a full-time worker with a family of four with an income at the federal poverty level; and the wage required for a full-time worker to meet basic family needs in a given locality, using estimates provided by the Economic Policy Institute.

## Green jobs behind bars

Green jobs are meant to be liberating, but in some cases they are being created under the most unfree circumstances: prison labor. Taking its lead from Executive Order 13423 issued by President Bush in 2007, Federal Prison Industries (also known as UNICOR) has put more emphasis on energy efficiency, renewable energy and avoidance of toxic substances in the work activities made available to federal prisoners. For example, UNICOR says it is using environmentally safe finishes and glues in the office furniture it produces; recycled paper and vegetable-based ink in its printing services; and biodegradable cleansers in its vehicle maintenance programs.<sup>109</sup> In April 2008 the agency announced plans to begin manufacturing solar panels behind bars.<sup>110</sup>

These practices, however laudable, do not tell the whole story about UNICOR's environmental record. For years, UNICOR has run a program to recycle discarded computers and other electronic equipment that activists say has endangered the health of the participants. In 2003 the Silicon Valley Toxics Coalition (SVTC) and the Computer TakeBack Campaign published a report highlighting the dangerous working conditions at a UNICOR recycling operation at the Atwater federal penitentiary in California which operated in partnership with computer maker Dell.<sup>111</sup> The prisoners were manually smashing cathode ray tubes, exposing themselves to large quantities of dust contaminated with lead and other heavy metals. Their pay ranged from 20 cents to \$1.26 an hour.

Following the publication of the report and related protest activities, Dell announced it would no longer use prison labor for its recycling operations.<sup>112</sup> Yet the problems at UNICOR continued. In 2006 SVTC put out another report along with several other organizations charging that the federal program was still exposing inmates to dangerous conditions and was undercutting the development of responsible private recycling businesses employing non-captive labor.<sup>113</sup> Today UNICOR'S website continues to list electronics recycling as one of its green initiatives.<sup>114</sup>

## IV. FREIGHT TRANSPORTATION



**The transportation sector accounts for one-third of greenhouse gas emissions.<sup>115</sup> Exhaust from diesel equipment used for freight movement (i.e., ships, trucks, cranes, and trains) contributes to dramatic spikes in severe asthma cases near freight hubs, particularly among children and other at-risk groups. Studies conducted by California’s Air Resource Board have concluded that freight movement is associated with 3,700 premature deaths annually in the state.<sup>116</sup> For example, areas of California’s Riverside and San Bernardino counties (known locally as the Inland Empire) contain the largest concentration of warehouse facilities in the country and have air quality that is among the worst in the world.**

The renewed focus on national transportation infrastructure provides an excellent opportunity to establish standards that empower transportation companies, consumers, communities, and workers to meet challenges to increase efficiency and productivity as well as respond to climate change, dangers to public health and safety, and our nation’s dependence on oil.

For decades the conventional wisdom held that environmental gains could only be achieved at the expense of workers, and that prosperity could only be achieved by sacrificing the environment. In the past few years, the conventional wisdom changed as it became clear that solutions to climate change could encompass the interests of workers *and* the environment by retooling industry to meet new challenges. Finally, a landmark campaign by southern California environmental, labor, health and community organizations has taken the final step by proving that in some sectors of our carbon economy, environmental progress can only be achieved when it goes hand-in-hand with economic progress for exploited workers.

### **Making the connection between driver status and diesel emissions**

The Ports of Los Angeles and Long Beach, which together handle 40 percent of all international container traffic into the United States, have long been the leading source of toxic diesel emissions in Southern California due to the heavy volume of old and dirty trucks carrying cargo to and from the port.

Under the old system in place at both ports, almost 90 percent of the roughly 16,800 port drivers are treated as independent contractors rather than direct employees of the some 1,300 trucking companies that move goods for the giant retail shippers. This labor structure evolved following trucking deregulation in 1980 and is the dominant model in the freight carriage industry today. It means that drivers are paid by the trip rather than by the hour and have no ability to organize since they are technically self-employed. According to some estimates, drivers spend as much as 50 percent of their time waiting to pick up or drop off freight within the ports themselves.

Trucking companies use the independent contractor arrangement to avoid paying the costs of fuel and vehicle insurance as well as workers compensation and health insurance costs (which few drivers can afford). Port drivers are also responsible for owning and maintaining their trucks. But with median net incomes that range from \$29,000 to \$36,000 a year, many drivers cannot afford to keep their vehicles in good condition, let alone replace them with more expensive alternative fuel vehicles to meet emissions standards.

Since trucking companies have not been responsible for the costs of fuel, insurance, maintenance, or delays, they have had no incentive to innovate – for instance through better logistics systems that could reduce drivers’ wait times at ports, thus cutting fuel costs and emissions. While the drivers struggled under this arrangement, the companies were also in a bind. The lack of standards forced them to compete with one another to offer the lowest rates. Thus the real beneficiaries of this “low-road” system were actually their customers, especially big retailers such as Wal-Mart and Target.

## **Port of Los Angeles Clean Trucks Program**

The solution to the problem of dirty trucks and exploited drivers was the Port of Los Angeles Clean Trucks Program. Thanks to a campaign mounted by the Coalition for Clean & Safe Ports, an alliance of nearly 40 environmental, public health, labor and community organizations, the Los Angeles Harbor Commission enacted tough new rules on truck emissions in March 2008. Upgrading or replacing as many as 17,000 trucks that serve the nation’s largest port complex is expected to reduce diesel pollution on corridor freeways, in nearby communities and in the ports by 80 percent within five years.

In addition to new emissions rules, the agreement adopted by the Port of Los Angeles contains two crucial provisions that will ensure the long term sustainability and effectiveness of the program. First, the LA plan requires that trucking companies actually own the trucks that they operate. The provision ensures that the liability, cost and risk of operations will rest on the shoulders of the motor carrier and not be pushed down onto the individual driver. This requirement dramatically increases the likelihood that the ports’ proposed \$2 billion investment in truck replacement will successfully transition the port trucking industry to one that can purchase new equipment without the need for any public subsidies.

The LA plan requires that motor carriers begin a transition at the end of this year from reliance on independent contractor drivers to 100 percent use of employee drivers by the end of 2013. For the first time, these drivers will become eligible for workers compensation and have the opportunity to bargain collectively for higher wages and health care benefits should they choose to form a union. The employee requirement ensures that there is no “back-door” for trucking concessionaires to evade responsibility for purchasing, maintaining and periodically replacing their trucks.

Although Long Beach decided not to adopt the employee provision that environmentalists argued was critical to the program’s sustainability, advocates of the ports reform argue that the changes will eliminate low-cost competition and attract more established, better paying carriers not only to Los Angeles but to Long Beach as well.

## A coalition for environmental and worker justice

By the time of its initial policy victory, the coalition to “green” the ports of Los Angeles and Long Beach had grown to include about 35 groups, including the Sierra Club, Natural Resources Defense Council, International Brotherhood of Teamsters, Change to Win, Communities for Clean Ports, LA County Federation of Labor, East Yard Communities for Environmental Justice, Los Angeles Alliance for a New Economy, Coalition for Clean Air, Long Beach Alliance for Children with Asthma, and American Lung Association of California. Ultimately, this effort was embraced and led by Los Angeles Mayor Antonio Villaraigosa, who appoints the Port of LA’s Harbor Commissioners.<sup>117</sup>

How did the state’s push to reduce diesel pollution from freight carriage snowball into a full-fledged campaign for social and environmental justice? According to Sierra Club activist Tom Politeo, co-chair of the organization’s Harbor Vision Task Force, the trucking industry came to the Sierra Club’s attention in the late 1990s in relation to the health of San Pedro Bay, where both ports are located. In 2002 the task force decided it needed an alliance with labor and reached out to the local Teamsters union. That same year, a group of southern California cities, the Gateway Cities Council of Governments, obtained federal funding for a six-year pilot program of grants to diesel truck owners to exchange their older trucks for new ones.<sup>118</sup>

According to Politeo, the Sierra Club concluded early on that the key to improving environmental conditions around the ports was for trucks to be managed as a fleet, not individually, which in turn meant that the drivers needed to employees of well-capitalized companies. The synergy with the Sierra Club “got a lot of people’s attention,” according to Nick Weiner, Change to Win’s national political coordinator for the campaign.<sup>119</sup>

By early 2006, the environmental-labor alliance was in place, and the coalition grew still larger with the addition of community groups from along the freight corridor into the ports. With regular monthly coalition meetings now taking place, the campaign was thoroughly transformed. The goal of reducing diesel emissions evolved into an effort to “green” the ports and completely remake the goods movement industry so that it contributed positively to the quality of life for workers and nearby communities.

While the coalition members worked on their shared bottom-line demands, the industry waged a full-scale public relations war against the coalition. Editorials in both the *Los Angeles Times* and the *Long Beach Press Telegram* attacked the environmental-labor partnership as jeopardizing new air-quality goals. Over a six-month period between summer and fall of 2007, in particular, “it was bare knuckles politics,” according to Weiner. Almost every week, one or the other of the ports commissions had meetings, and for three months, regardless of the agenda, the meeting rooms were filled with drivers and members of the coalition.

Los Angeles Mayor Villaraigosa remained steadfast in his support of the employee provisions, but Long Beach eventually backed away from them in an effort to avoid a lawsuit by the American Trucking Association (ATA), according to port spokesman Art Wong. Instead, Long Beach officials decided that so long as the trucks meet gradually tighter emissions requirements, the port can obtain the same air-quality benefits whether the drivers are contracted or employed.<sup>120</sup>

Industry representatives—both within the trucking and retail industries—have taken up battle against the rules, although trucking companies large and small eventually lined up to participate. Despite Long Beach’s decision to drop the employment provisions of its port agreement, the American Trucking Association (ATA) sued both ports. ATA’s lawsuit was joined by the federal Department of Transportation, but the organization was not able to win a temporary restraining order to block implementation of the program. The Federal Maritime Commission has separately sued in federal court in Washington, DC.

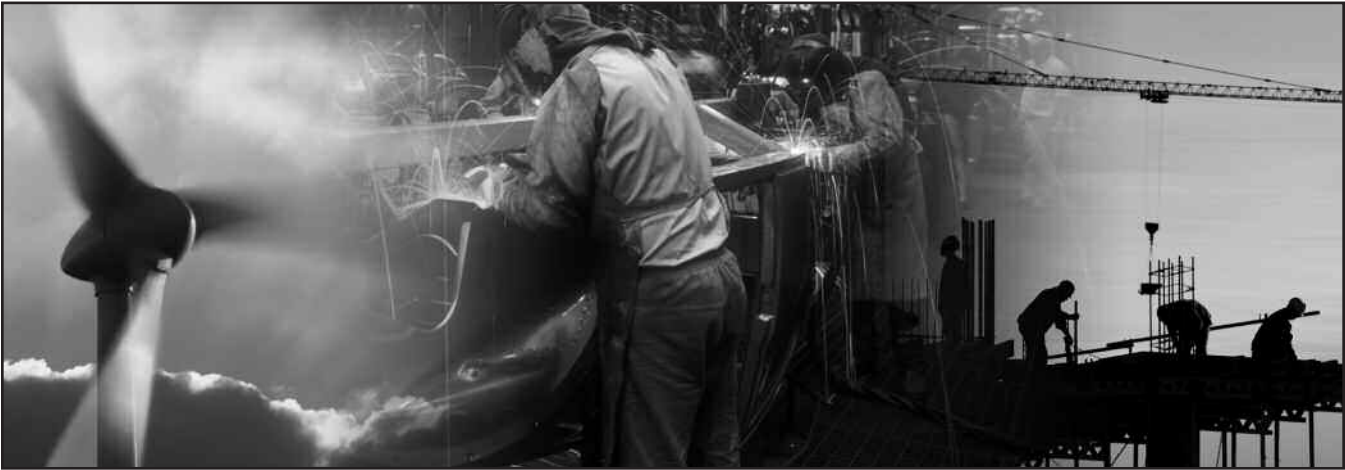
The port agreements will benefit thousands of largely Latino and low-income families and truck drivers who live in the neighborhoods surrounding the ports. As of October 1, all trucks built before 1989—up to 2,000 out of a total of roughly 17,000 vehicles—were banned from the ports, and 15,000 trucks were for the first time individually registered with port authorities. By the start of 2010, all trucks built before 1994 will be banned, and by 2012 all trucks must meet 2007 emissions standards (when U.S. diesel engine standards improved).

Supporters of the agreements hope that President Obama, who endorsed the LA program, will make it a priority for his administration to change the federal government's legal position. In the meantime, advocates have already built coalitions to extend the campaign to other major ports and inland facilities. As Politeo says: "Today, the market value of moving goods doesn't reflect the costs. Each piece of the industry must carry its own weight—and pay workers fairly."

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## V. CONCLUSIONS AND POLICY OPTIONS

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**Our review of working conditions in three core sectors of the emerging green economy—wind and solar component manufacturing; green construction; and recycling—suggests one basic conclusion: The fact that an employer is engaged in a business that benefits the environment does not necessarily mean that the employees of that enterprise are going to be treated well. While some green companies are model employers, others pay their workers too little and offer them inadequate benefits. Purportedly green firms have in some cases resorted to union-busting and the exploitation of undocumented immigrants. In short, the green economy is not always a humane economy.**

Hence we cannot depend solely on the benevolence of green employers or the mechanisms of the labor market to provide the kind of quality green jobs the clean energy revolution should be creating. Intervention on the part of government, stimulated by the kind of public pressure seen in the Los Angeles-area ports campaign, will be necessary to make sure green jobs are good jobs.

Green employers are not relying entirely on the free market in seeking commercial success; many have turned to government for assistance of a different sort. As we saw in the review of wind and solar manufacturing firms, the green sector is a frequent recipient of tax breaks and other types of economic development subsidies from state and local government. It has also pressed for federal help in the form of the renewable energy production and investment tax credits and is seeking additional concessions from the Obama Administration and the new Congress.

This dependence of green industries on government aid creates a sterling opportunity to raise employment standards in the clean-energy economy. The very existence of economic development subsidies is based on the principle that taxpayer funds can justifiably be used to benefit private parties only if the result is job creation and rising living standards.

Over the past decade or so, there has been a growing recognition among state and local officials that the mere creation of jobs is not adequate: those positions have to be of high enough quality to be a true boon to the economy. For years, Good Jobs First has been monitoring the growing practice of attaching job quality standards to subsidies. In our most recent tally, compiled in late 2003, we found that such standards could be found in 89 jurisdictions, including 43 states, 41 cities and 5 counties.<sup>121</sup> Overall, some 116 state subsidy programs were found to contain job standards. The city and county standards are in many cases linked to living wage laws. Clearly, job quality standards are becoming a widely accepted best practice in the economic development field and deserve to be even more widely adopted, including at the federal level.

## **Attach self-sufficiency wage requirements to subsidies**

The most common type of job quality standard that state and local governments attach to subsidies is the requirement that workers employed by a recipient company be paid at a certain rate. These rules are usually based on one of three main formula types: rates based on official benchmarks such as the federal poverty line or state or federal minimum wage rates; static dollar amounts set by the jurisdiction; or market rates such as the average wage of a state, region, county or industry. An increasing number of jurisdictions also mandate that subsidized companies provide health insurance benefits to their employees or pay a wage supplement if coverage is not provided.

Market-based rates, which are the most common formula used by state subsidy programs, are more desirable than the other approaches as a way to ensure decent wages. In the recent past, minimum wage levels have remained unchanged for long periods, so any wage standards based on them could also be stagnant. The same tends to be the case with static dollar amounts that legislators fail to adjust. Poverty levels are revised annually by the federal government, but they are so low that standards based on them tend to result in subpar pay levels.

Yet even market-based wage standards can be inadequate in certain circumstances, such as low-wage service-sector industries or an economically depressed area. Therefore, we recommend that state and local governments backstop the market-based wage rates with a living wage floor that assures a worker will be paid enough to meet basic needs and attain self-sufficiency. A good example of such self-sufficiency levels are those produced by the organization Wider Opportunities for Women.<sup>122</sup>

Requiring that green-sector companies receiving economic development subsidies provide wages and benefits high enough to allow workers to achieve self-sufficiency standards will help realize the promise of the clean-energy revolution.

## **Apply wage standards to government contractors**

Subsidies are not the only way green-sector companies are assisted by government. Some of these firms, such as those involved in recycling, owe their existence to taxpayer money in the form of government contracts.

In 1994 a coalition of community groups, religious organizations and unions succeeded in getting the city of Baltimore to adopt a policy requiring municipal contractors to pay their employees a living wage. Since then, more than 140 cities and counties around the country have followed suit. In 2007 Maryland became the first state to adopt a living wage policy for contractors.

Although living wage levels vary greatly among jurisdictions, the concept is a broadly accepted way to raise living standards among those employed by firms doing business with government agencies. It deserves to be applied even more widely.

## **Strengthen prevailing wage requirements**

For the past century, many state and local governments have required private contractors on public works projects to pay construction workers at a level consistent with market rates in the area for each occupation. In 1931 the federal government adopted a similar prevailing wage policy with the passage of the Davis-Bacon Act. Because of attacks by conservative groups, nine states have repealed their prevailing wage laws. On the other hand, some states have extended prevailing wage requirements from public works to any project receiving government financial assistance, including private sector developments getting economic development subsidies.

Given the emphasis on infrastructure investments in the economic recovery program being debated by Congress, it is likely that increasing amounts of public money will be spent on construction projects and that substantial portions of this will involve renewable energy and energy efficiency. This is a time to push for comprehensive application and rigorous enforcement of prevailing wage rules for projects using federal assistance. To ensure that there is transparency in the use of economic recovery funds, contractors working federal projects must also be required to report payrolls to the federal agency overseeing the project.

## Adopt best value contracting

Government contracts were traditionally awarded to the lowest bidder, which often meant that companies which cut corners and underpaid their workers got the work. Best Value Contracting (BVC) is an alternative approach that recognizes the need for public agencies to consider performance as well as cost. BVC systems take into account the qualifications of bidders, awarding contracts based in part on criteria such as their staffing levels, training procedures, and safety record. These systems favor “high-road” companies whose employees are more skilled and more productive, so they help raise compensation levels. This is another tool that can be applied both to projects that may emerge from federal stimulus spending as well as ongoing green government functions such as recycling.

## Expand the use of project labor agreements

Project Labor Agreements (PLAs) are comprehensive agreements between contractors and unions in connection with major public construction projects and less often for private projects. They establish wage rates, benefits and other conditions of employment (such as no strikes by workers and no lockouts by the contractors) for all workers (including those not in unions) for the duration of the project.

By fostering fair wages and labor peace, PLAs increase the chances a project will be completed on time and on budget. Exemplary PLAs also include provisions for apprenticeship programs and local hiring. PLAs usually include prevailing wage requirements and promote the use of union labor. In one of his earliest acts after taking office in 2001, President Bush Administration signed an executive order barring the use of PLAs on federally funded projects. Now would be a good time to reconsider that policy, especially for clean-energy projects.

## Add labor criteria to LEED standards

As we noted in the construction chapter, environmentally-friendly construction techniques are being adopted at a rapid pace. For commercial and government entities, this most often means building in accordance with the LEED standards devised by the U.S. Green Building Council. Currently, LEED rating systems do not take labor practices into account. This is problematic, given that working conditions can affect the quality of construction, and real environmental sustainability cannot exist without sustainable jobs. We thus urge the U.S. Green Building Council to consider adding labor criteria to the LEED system.

A fallback approach would be for governments to apply labor criteria to the growing list of public policies that encourage the use of LEED standards. Most of these policies concern the construction of public buildings, but some jurisdictions also provide financial and administrative incentives to developers adhering to LEED on private projects. Bringing job quality standards into the picture would be consistent with their frequent use in other types of subsidy programs.

## Build community campaigns

As our case study of the Los Angeles ports shows, reforming regulatory systems so that they promote good jobs may require broad-based public pressure. Building a truly green economy will require other instances in which community organizations, environmental groups and labor unions act in concert to seek changes that simultaneously improve labor standards and public health.

## Promote community benefit agreements

The ports victory is an extension of a series of campaigns around the country that have used public pressure to get developers of subsidized projects to sign Community Benefits Agreements. Coordinated by the Partnership for Working Families, CBAs promote high-quality jobs, job training, affordable housing, environmental health and other measures that improve the living standards of workers and their communities.<sup>123</sup>

Los Angeles activists, led by LAANE and the County Federation of Labor, have taken the approach one step further. They have persuaded the city’s Community Redevelopment Agency to adopt a Construction Careers Policy that incorporates PLA, apprenticeship, and local hire requirements into all CRA-funded projects. The policy creates not only good union jobs but also pathways for residents of low-income neighborhoods to build careers in the construction trades.

## Use clawbacks to enforce job quality standards

Once job quality standards and related measures are in place, they will do no good unless they are rigorously enforced. In the case of subsidies, state and local governments have found that the most effective safeguard is the clawback: requiring recipient companies that fail to live up to their commitments to repay all or part of the tax breaks and other financial assistance they have received. These are essentially money-back guarantees that put pressure on companies to perform as promised. Widely accepted in the economic development profession as both a best practice and a political necessity (at least for large projects), clawbacks belong in subsidy contracts with green companies as well as firms of all other hues.<sup>124</sup>

## Use web-based disclosure

One of the most effective ways to assure accountability in subsidies, public contracts and the other forms of government assistance received by companies (whether they are in the green sector or not) is to make them fully transparent. Once details of these transactions are in the public domain—which today means ready availability on the Web—it is easier for journalists, competing companies, taxpayer watchdog groups and even individual citizens to keep an eye out for abuses and to blow the whistle when something suspicious is happening.

Currently, all state governments disclose some information about the contracts they award, and half the states (with more each year) are also disclosing information about the recipients of economic development subsidies. However, much of the disclosure is incomplete, especially when it comes to outcomes. The public has a right to know not only the costs of subsidies and contracts but also the level of compliance by recipients in terms of job creation, job quality and other criteria.<sup>125</sup>

## Use domestic sourcing to buy American

Currently U.S. law requires domestic sourcing by a wide variety of agencies and programs, including the Federal Highway Administration, Federal Transit Administration, Federal Aviation Administration, Federal Railroad Administration, Clean Water Act—Grants for Water Treatment Projects, and the Energy Policy Act of 1992, to name a few. Current green jobs and renewable energy investments and programs should include similar domestic sourcing provisions which would require federal dollars allocated to such purposes to be used for purchasing products manufactured in the United States unless specific federal waivers are granted or domestic supplies are demonstrably inadequate.

## Pass the Employee Free Choice Act

Most workers recognize that unions are their best hope of a fair wage and a voice on the job – it’s why more than half say that they would vote for union representation if given the chance.<sup>126</sup> The Employee Free Choice Act would correct a system that currently makes it all-but-impossible for most workers to win unions. It would provide them a fair and direct path to union recognition via majority sign-up; encourage employers to bargain in good faith; and strengthen penalties for violations of workers’ rights. Expanding access to union representation for green-collar workers would help to ensure that the benefits of the clean technology revolution are shared with low- and middle-income workers and their families.

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*The job quality and accountability measures discussed here may not by themselves guarantee that every worker employed by a purportedly green employer will receive top-level wages, gold-plated benefits and rock-solid job security. But they are proven ways to prevent workplace abuses. We recommend them as strategy cornerstones for a green prosperity that is shared by all.*

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**EPA's State Climate and Energy Technical Forum**  
**Clean Energy Workforce Development:**  
**Growing Green Jobs to Achieve Climate and Energy Goals**  
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**Clean Energy Workforce Development Resources for States**

**Example State Programs / Activities**

<b>Iowa</b>	
Workforce Training and Economic Development Fund (H.F. 927)	<a href="http://coolice.legis.state.ia.us/Cool-ICE/default.asp?Category=billinfo&amp;Service=Billbook&amp;frame=1&amp;GA=82&amp;hbill=HF927">http://coolice.legis.state.ia.us/Cool-ICE/default.asp?Category=billinfo&amp;Service=Billbook&amp;frame=1&amp;GA=82&amp;hbill=HF927</a>
New Jobs Training Program	<a href="http://iwcc.cc.ia.us/ewd/260e.asp">http://iwcc.cc.ia.us/ewd/260e.asp</a>
<b>New Mexico</b>	
Green Jobs Cabinet	<a href="http://www.governor.state.nm.us/press.php?id=1042">http://www.governor.state.nm.us/press.php?id=1042</a>
<b>New York</b>	
NYSERDA Workforce Training Initiative	<a href="http://www.powernaturally.org/">http://www.powernaturally.org/</a>
<b>North Carolina</b>	
Green Business Fund (H.B. 1473)	<a href="http://www.ncleg.net/gascripts/BillLookUp/BillLookUp.pl?Session=2007&amp;BillID=H1473">http://www.ncleg.net/gascripts/BillLookUp/BillLookUp.pl?Session=2007&amp;BillID=H1473</a>
	<a href="http://www.ncscienceandtechnology.com/gbf/index.htm">http://www.ncscienceandtechnology.com/gbf/index.htm</a>
<b>Oregon</b>	
Sustainable Workforce Initiative	<a href="http://www.3estrategies.org/BASE/SustainableOregonWorkforce.asp">http://www.3estrategies.org/BASE/SustainableOregonWorkforce.asp</a>
<b>Vermont</b>	
Sustainable Jobs Fund	<a href="http://www.vsjf.org/">http://www.vsjf.org/</a>
<b>Washington</b>	
Renewable Energy Apprenticeship	<a href="http://www.secstate.wa.gov/elections/initiatives/text/I937.pdf">http://www.secstate.wa.gov/elections/initiatives/text/I937.pdf</a>
<b>Multiple States</b>	
State-reported activities, collected by NARUC (January 2009)	<a href="http://www.naruc.org/Publications/Energy%20Efficiency%20Training%20-%20NARUC%20Survey%20Results.pdf">http://www.naruc.org/Publications/Energy%20Efficiency%20Training%20-%20NARUC%20Survey%20Results.pdf</a>
Article providing examples of programs around the country (January 2009)	<a href="http://www.dallasnews.com/sharedcontent/dws/bus/stories/010409dnnatgreenjobs.2124064.html">http://www.dallasnews.com/sharedcontent/dws/bus/stories/010409dnnatgreenjobs.2124064.html</a>
Article providing a snapshot of initiatives to develop and train solar installers in the Northeast (Spring 2008)	<a href="http://www.nesea.org/uploads/textWidget/876.00010/documents/nesea-sun_sp08_Building_Workforce.pdf">http://www.nesea.org/uploads/textWidget/876.00010/documents/nesea-sun_sp08_Building_Workforce.pdf</a>
<i>Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy</i> (2008)	<a href="http://www.cows.org/pdf/rp-greenerpathways.pdf">http://www.cows.org/pdf/rp-greenerpathways.pdf</a>



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**Example Local Government Programs/Activities**

<b>Boston</b>	
“Green Collar” Jobs Program	<a href="http://www.cityofboston.gov/news/default.aspx?dept=55">http://www.cityofboston.gov/news/default.aspx?dept=55</a>
<b>Chicago</b>	
Chicagoland Green-Collar Jobs Initiative	<a href="http://www.greencollarchicago.org/">http://www.greencollarchicago.org/</a>
<b>Los Angeles</b>	
The LA Infrastructure and Sustainable Jobs Collaborative	<a href="http://www.lattc.edu/dept/lattc/REDI/Utility.html">http://www.lattc.edu/dept/lattc/REDI/Utility.html</a>
Green Jobs: Los Angeles Apollo Alliance	<a href="http://www.scopela.org/">http://www.scopela.org/</a>
<b>Oakland</b>	
Oakland Green Jobs Corps	<a href="http://www.ellabakercenter.org/index.php?p=gcjc_green_jobs_corps_gre_enlight">http://www.ellabakercenter.org/index.php?p=gcjc_green_jobs_corps_gre_enlight</a>
<b>Richmond</b>	
Richmond BUILD Pre-Apprenticeship Construction Skills & Solar Installation Training	<a href="http://www.ci.richmond.ca.us/index.asp?NID=1243">http://www.ci.richmond.ca.us/index.asp?NID=1243</a>
<b>Multiple Cities</b>	
<i>Green-Collar Jobs in America's Cities: Building Pathways Out of Poverty and Careers in the Clean Energy Economy</i> (2008)	<a href="http://www.apolloalliance.org/downloads/greencollarjobs.pdf">http://www.apolloalliance.org/downloads/greencollarjobs.pdf</a>

**Examples of Recent State Legislation**

<b>Colorado</b>	
Green Jobs Legislation (HB 1025)	<a href="http://www.leg.state.co.us/CLICS/CLICS2008A/csl.nsf/fsbillcont3/7DCA9D63A44957D08725737F00732CD3?Open&amp;file=1025_enr.pdf">http://www.leg.state.co.us/CLICS/CLICS2008A/csl.nsf/fsbillcont3/7DCA9D63A44957D08725737F00732CD3?Open&amp;file=1025_enr.pdf</a>
<b>Kentucky</b>	
Energy Technology Career Track Program (H.B. 2)	<a href="http://www.lrc.ky.gov/RECORD/08RS/HB2.htm">http://www.lrc.ky.gov/RECORD/08RS/HB2.htm</a>
<b>Maryland</b>	
Maryland Strategic Energy Investment Fund (H.B. 368)	<a href="http://mlis.state.md.us/2008rs/bills/hb/hb0368e.pdf">http://mlis.state.md.us/2008rs/bills/hb/hb0368e.pdf</a>
<b>Massachusetts</b>	
Green Jobs Act (H.B. 5018)	<a href="http://www.mass.gov/legis/bills/house/185/ht05pdf/ht05018.pdf">http://www.mass.gov/legis/bills/house/185/ht05pdf/ht05018.pdf</a>
<b>Michigan</b>	
Centers of Energy Excellence Program (S.B. 1380)	<a href="http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0175.pdf">http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0175.pdf</a>



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<b>Minnesota</b>	
Green Jobs Task Force (S.F. 3096)	<a href="https://www.revisor.leg.state.mn.us/bin/bldbill.php?bill=S3096.3.html&amp;session=ls85">https://www.revisor.leg.state.mn.us/bin/bldbill.php?bill=S3096.3.html&amp;session=ls85</a>
<b>Ohio</b>	
Edison Technology Centers (S.B. 221)	<a href="http://www.legislature.state.oh.us/bills.cfm?ID=127_SB_221">http://www.legislature.state.oh.us/bills.cfm?ID=127_SB_221</a>
<b>Vermont</b>	
Green Job Legislation (H.B. 885)	<a href="http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2008/acts/ACT182.HTM">http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2008/acts/ACT182.HTM</a>
<b>Washington</b>	
Green Job Legislation (S.B. 6516)	<a href="http://apps.leg.wa.gov/billinfo/summary.aspx?bill=6516&amp;year=2007">http://apps.leg.wa.gov/billinfo/summary.aspx?bill=6516&amp;year=2007</a>

**State Assessments of Green Jobs Potential**

<b>Minnesota</b>	
<i>MN Green Jobs Task Force Draft Action Plan</i> (January 2009)	<a href="http://www.mngreenjobs.com/">http://www.mngreenjobs.com/</a>
<b>New York</b>	
<i>Working Group VII – Workforce Training and Development Scope, Task, and Schedule</i> (August 2008)	<a href="http://www.dps.state.ny.us/07M0548_Working_groups_phase2.htm">http://www.dps.state.ny.us/07M0548_Working_groups_phase2.htm</a>
<b>Oregon</b>	
<i>An Analysis of Clean Energy Workforce Needs and Programs in Oregon</i> (May 2008)	<a href="http://www.worksourceoregon.org/index.php/component/docman/doc_details/734-analysis-of-clean-energy-workforce-needs-and-programs-in-oregon">http://www.worksourceoregon.org/index.php/component/docman/doc_details/734-analysis-of-clean-energy-workforce-needs-and-programs-in-oregon</a>
<b>Tennessee</b>	
<i>Growing Green: The Potential for Green Job Growth in Tennessee</i> (November 2008)	<a href="http://www.state.tn.us/labor-wfd/Publications/EmploymentSecurity/GrowingGreenInTN2008.pdf">http://www.state.tn.us/labor-wfd/Publications/EmploymentSecurity/GrowingGreenInTN2008.pdf</a>
<b>Washington State</b>	
<i>2008 Washington State Green Economy Jobs</i> (February 2009)	<a href="http://energy.wsu.edu/documents/Green_Jobs_Report_2008.pdf">http://energy.wsu.edu/documents/Green_Jobs_Report_2008.pdf</a>

**National Assessments of Green Jobs Potential**

<b>EESI Summary of Green Jobs Potential Studies</b>	
<i>Jobs from Renewable Energy and Energy Efficiency</i> (October 2008)	Factsheet that catalogs numerous studies of the number of jobs that could be created through energy efficiency and renewable energy policies by location, scope, and technology: <a href="http://www.eesi.org/files/green_jobs_factsheet_102208.pdf">http://www.eesi.org/files/green_jobs_factsheet_102208.pdf</a>



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<b>American Solar Energy Society (ASES)</b>	
<i>Green Collar Jobs Report</i> (January 2009)	Report that describes results from a study that attempted to comprehensively estimate the size and scope of the renewable energy and energy efficiency industries and their potential for growth: <a href="http://www.ases.org/greenjobs">www.ases.org/greenjobs</a>
<b>Center for American Progress</b>	
<i>Green Recovery</i> (September 2008)	Report demonstrates how a green recovery program that spends \$100 billion over two years would create 2 million new jobs. <b><i>Includes state-by-state fact sheets and tables</i></b> listing types of jobs that would be needed in each sector: <a href="http://www.americanprogress.org/issues/2008/09/green_recovery.html">http://www.americanprogress.org/issues/2008/09/green_recovery.html</a>

**Federal Resources for States**

<b>Basic Workforce Development Information and Resources</b>	
U.S. DOL Workforce Professionals Home Page	First stop for numerous resources, tools, updates, and links intended to assist the nation's workforce professionals in serving the needs of workers and business: <a href="http://www.doleta.gov/USWORKFORCE/">http://www.doleta.gov/USWORKFORCE/</a>
U.S. DOL Industry/Employers Workforce Home Page	First stop for understanding the public workforce system; how it can help meet business/economic development objectives; how to get involved in one's own region: <a href="http://www.doleta.gov/business/">http://www.doleta.gov/business/</a>
National Registered Apprenticeship Program	<a href="http://www.doleta.gov/OA/">http://www.doleta.gov/OA/</a>
<b>Select Department of Labor Grant Programs</b>	
Community-Based Job Training Grants	The primary purpose of Community-Based Job Training Grants is to build the capacity of community colleges to train workers in the skills required to succeed in high growth, high demand industries. This competitive grant program builds on the High Growth Job Training Initiative, a national model for demand-driven workforce development implemented by strategic partnerships among the workforce investment system, employers, and community colleges: <a href="http://www.doleta.gov/Business/Community-BasedJobTrainingGrants.cfm">http://www.doleta.gov/Business/Community-BasedJobTrainingGrants.cfm</a>
WIRED Grants	WIRED goes beyond traditional strategies for worker preparation by bringing together state, local and federal entities; academic institutions (including K-12, community colleges and universities); investment groups; foundations; and business and industry to address the challenges associated with building a globally competitive and prepared workforce: <a href="http://www.doleta.gov/wired/">http://www.doleta.gov/wired/</a>
<b>Technical Resources</b>	
Industry and Labor Market Statistics	<a href="http://www.doleta.gov/programs/sources.cfm">www.doleta.gov/programs/sources.cfm</a>
Occupational competency models	Competency models (industry-verified knowledge, skills, and experience) for various sectors/skills by occupation: <a href="http://www.careeronestop.org/competencymodel/">http://www.careeronestop.org/competencymodel/</a>



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Standard Occupational Classification (SOC) system codes	SOC is used by federal and state agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data: <a href="http://www.bls.gov/SOC/">http://www.bls.gov/SOC/</a>
Home Performance with ENERGY STAR	Home Performance with ENERGY STAR, a national program from the U.S. EPA and U.S. DOE, offers a comprehensive, whole-house approach to improving energy efficiency and comfort at home, while helping to protect the environment: <a href="http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes">http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes</a>
<b>The Green Jobs Act of 2007</b>	
See Title X	<a href="http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&amp;docid=f:h6enr.txt.pdf">http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&amp;docid=f:h6enr.txt.pdf</a>
<b>The American Recovery and Reinvestment Act of 2009</b>	
See Title VIII	<a href="http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.1.enr:">http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.1.enr:</a>

**Non-Governmental Resources for States**

<b>Technical Resources</b>	
<i>Inspector Guidelines for PV Systems</i> (March 2006)	Renewable Energy Technology Analysis Project of the Pace University Law School Energy Project: <a href="http://www.irecusa.org/fileadmin/user_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf">http://www.irecusa.org/fileadmin/user_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf</a>
Building Performance Institute (BPI)	Certifies building contractors: <a href="http://www.bpi.org">http://www.bpi.org</a>
Residential Energy Services Network (RESNET®)	Certifies building raters: <a href="http://www.natresnet.org">http://www.natresnet.org</a>
North American Board of Certified Energy Practitioners (NABCEP)	Certifies renewable energy professionals: <a href="http://www.nabcep.org">http://www.nabcep.org</a>
<b>Education / Training Resources</b>	
<i>Going Green: The Vital Role of Community Colleges in Building a Sustainable Future and Green Workforce</i> (February 2009)	<a href="http://www.aed.org/News/Releases/going_green.cfm">http://www.aed.org/News/Releases/going_green.cfm</a>
Interstate Renewable Energy Council's (IREC's) <i>Renewable Energy Training Best Practices &amp; Recommended Guidelines</i> (September 2008)	<a href="http://www.irecusa.org/fileadmin/user_upload/WorkforceDevelopmentDocs/Training-BestPractices_Sept_2008_FINAL.pdf">http://www.irecusa.org/fileadmin/user_upload/WorkforceDevelopmentDocs/Training-BestPractices_Sept_2008_FINAL.pdf</a>
Conference: <i>New Ideas in Educating a Workforce in Renewable Energy and Energy Efficiency</i> (March 2008)	Sessions dealt with market trends, economic drivers, instructional strategies, curricula development, and best practices for training in the renewable energy and energy efficiency fields. Conference presentations: <a href="http://www.irecusa.org/index.php?id=117">http://www.irecusa.org/index.php?id=117</a>



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American National Standards Institute (ANSI) / International Organization of Standardization (ISO)	Accredits training providers: <a href="http://www.ansi.org/conformity_assessment/personnel_certification/overview.aspx">http://www.ansi.org/conformity_assessment/personnel_certification/overview.aspx</a>
Institute for Sustainable Power Quality (ISPQ)	Accredits training providers: <a href="http://www.ispqusa.org">http://www.ispqusa.org</a>