

# Are Green Jobs for Real?

by Joe P. Hasler

**From pure optimism** to extreme skepticism, few contemporary buzzwords elicit such polarizing emotions as "green jobs." Proponents say these jobs will ease not only unemployment but also climate change and the nation's dependence on foreign oil. Skeptics question the sustainability of green jobs and the government's ability to identify game-changing technologies. By some counts, we can look forward to 5 million green jobs; by others, any surplus will be far outweighed by a net loss of jobs in other fields.

The first step in cutting through the hype surrounding green jobs is simply to define them. Some workers, such as energy auditors and solar-panel installers, have plied their trades for decades. But even jobs in emerging fields, such as smart-grid and electric vehicle development, repurpose age-old professions such as electrician, mechanic and engineer. If

Students in Texas State Technical College's Wind Energy Technology program learn the basics of electricity, mechanics and hydraulics, director Dan Templeton says. And, of course, safety.



**All states have green jobs.** But the Clean Energy Economy report, released by the Pew Center on the States in June, attempts to determine how they are distributed across the country and where they demonstrate the greatest growth. This map shows eight states in which the percentage of green jobs exceeds the national average. Some are long-time clean-tech bastions, while others are green upstarts seizing on abundant renewable-energy resources.

## OR

- 19,300 green jobs
- 1% of total jobs
- 4.77% annual growth

Oregon's Employment Department projects green jobs will increase 14 percent from 2008 to 2010, largely from organic farming and forestry. Wind giant Vestas is in Portland, as is the Bonneville Power Administration, which is developing ways to handle mass quantities of wind power.

## CA

- 125,000 green jobs
- 0.71% of total jobs
- 0.88% annual growth

Between 2006 and 2008, \$6.6 billion of venture capital poured into the state's clean-tech startups. Home-appliance efficiency standards spurred manufacturing jobs. And a renewable portfolio standard requiring 33 percent renewable power by 2020 has encouraged growth in wind and solar.

## ID

- 4500 green jobs
- 0.63% of total jobs
- 10.11% annual growth

Turbine manufacturer Nordic Windpower recently received a DOE loan guarantee to expand its plant at Pocatello, which is also home to Hoku Materials—a solar materials manufacturer. In eastern Idaho, wind farms operated by Exergy and Ridgeline produce energy not only for Idaho, but also for California, Oregon and Washington.

## CO

- 17,000 green jobs
- 0.64% of total jobs
- 1.98% annual growth

Solix Biofuels, Abound Solar and Ascent Solar are all located in Denver. The National Renewable Energy Laboratory in Golden, Colorado State University in Fort Collins and the University of Colorado in Boulder lead in research and development of clean-energy technologies.

## MN

- 20,000 green jobs
- 0.64% of total jobs
- 1.38% annual growth

A growing number of small, eco-friendly manufacturers based in the Twin Cities produce items as varied as nontoxic cleaning supplies, sustainably sourced cabinetry and high-efficiency HVAC systems. The state is home to Mortenson Construction, the nation's largest builder of wind farms. And Xcel Energy, motivated by Gov. Tim Pawlenty's pledge to reach 25 percent renewable power by 2025, continues to develop wind farms across the state.

## OH

- 35,200 green jobs
- 0.56% of total jobs
- 0.85% annual growth

In 2002, Ohio's Department of Development launched a grants program to rapidly expand the state's fuel cell industry. Rolls-Royce, based in North Canton, is one of the 70-plus members of Ohio's Fuel Cell Coalition. Once the glass capital of America, Toledo has emerged as a global center for solar manufacturing; 5000 jobs have been added over the past five years.

## ME

- 6000 green jobs
- 0.85% of total jobs
- 2.34% annual growth

An aged housing stock means jobs in weatherization and energy auditing. Maine's western ridge is home to four large wind farms, including Stetson Wind, which received \$40 million in stimulus money. Plus, a University of Maine professor says the state's 3500 miles of windy coastline could generate 5000 megawatts and 15,000 jobs.

## MA

- 26,700 green jobs
- 0.69% of total jobs
- 0.52% annual growth

Gov. Deval Patrick called for the state to up its solar capacity to 250 megawatts by 2017—and from 2007 to 2008 solar jobs doubled. Construction recently began in Boston on the largest wind-turbine testing facility in the U.S., which will likely attract manufacturers to the state.

you count all the people working in clean energy, environmentally friendly production, energy efficiency and pollution mitigation—as the Pew Center on the States recently did—and discount the people indirectly linked to those fields, such as accountants, there were 770,000 green jobs in the U.S. in 2007. (Nuclear energy also wasn't counted.) In contrast, there were 1.3 million people working in fossil-fuel sectors.

If measured against every job out there, green jobs account for just 0.49 percent of employment. But Kil Huh, a project director at Pew, says the sector grew rapidly from 1998 to 2007.



A technician makes solar panels at HelioVolt's new factory in Texas. The company took advantage of a workforce trained in the semiconductor industry.

mainly by private investment. Ernst & Young, a firm that provides strategic guidance for clean technology companies, found that as of June 2008, 301 companies in the sector had attracted \$7.3 billion in venture capital. Although the recession caused funding to drop nearly 50 percent in the first three months of 2009 from the same period in 2008—overall venture capital decreased 61 percent, according to Pew—that early boost may help green companies better weather the downturn. "The clean energy economy was one of the few sectors that was better insulated," Huh says. "Because of the increased spending at the federal level, its recovery should be a lot faster."

Roughly \$84 billion of the \$787 billion American Recovery and Reinvestment Act of 2009 has been allocated to initiatives, such as weatherization and battery research, aimed at stimulating green jobs. Already clean tech is showing signs of revival. Ernst & Young found second-quarter venture capital in the sector was up 73 percent from the first quarter, thanks, in part, to confidence stemming from increased government support. Jen Stutsman, a representative for the Department of Energy, which is responsible for disbursing nearly \$37 billion in stimulus money, says a major goal of the Recovery Act was to "catalyze private investors to make investments in projects

During that period the overall economy grew 3.7 percent, while green jobs grew 9.1 percent. And according to the Economic Policy Institute's Ethan Pollack, green jobs tend to be durable and better-paying. "Green investment results in a higher mix of production jobs," Pollack says, "and pushes against a decades-long trend of manufacturing jobs disappearing and low-paying service jobs taking their place."

This initial robust growth was fueled primarily by private investment. Ernst & Young, a firm that provides strategic guidance for clean technology companies, found that as of June 2008, 301 companies in the sector had attracted \$7.3 billion in venture capital. Although the recession caused funding to drop nearly 50 percent in the first three months of 2009 from the same period in 2008—overall venture capital decreased 61 percent, according to Pew—that early boost may help green companies better weather the downturn. "The clean energy economy was one of the few sectors that was better insulated," Huh says. "Because of the increased spending at the federal level, its recovery should be a lot faster."

Roughly \$84 billion of the \$787 billion American Recovery and Reinvestment Act of 2009 has been allocated to initiatives, such as weatherization and battery research, aimed at stimulating green jobs. Already clean tech is showing signs of revival. Ernst & Young found second-quarter venture capital in the sector was up 73 percent from the first quarter, thanks, in part, to confidence stemming from increased government support. Jen Stutsman, a representative for the Department of Energy, which is responsible for disbursing nearly \$37 billion in stimulus money, says a major goal of the Recovery Act was to "catalyze private investors to make investments in projects

Green  
Jobs  
Case  
Study

## Wisconsin Weatherizer

The new hires in the weatherization unit of the Central Wisconsin Community Action Council (CWCAC) are a motley assemblage of recession refugees. A list of their former professions reads like a who's who of manly labors: auto mechanic, carpenter, roofer, plumber. Adam Faul installed floors for 13 years. But in 2008 projects started drying up and by 2009 he was forced to look for other work. "When the economy nose-dived, I kind of went along with it," he says.

This spring, Faul came across a job listing for the CWCAC, which was hiring six new technicians to help low-income residents reduce their energy costs. The technicians are dispatched to homes, where, acting on recommendations from energy auditors, they install insulation, clean furnaces, seal air leaks, change light bulbs and replace inefficient appliances and windows. With his background in home renovation and experience with power tools, Faul thought it seemed like an ideal new career.

"Most of the guys who transitioned here from other jobs had construction skills, and they wanted to stay in that field because they enjoyed the work," says Brian Bauer, who once installed gutters but now supervises the CWCAC's four three-man weatherization crews. "There was no work left for them. Now they've got stable jobs."

Faul, who started in June, appreciates the stability, but finds the work rewarding in another way too. "It seems like we're really making a difference, like we're part of a bigger picture," he says. "What we do is hard, physical work, but to me it seems different. I don't consider it just another job."

Green  
Jobs  
Growing  
Fast



### Fuel Cell Engineer

**Description:** Focus on improving the efficiency of fuel cells, which generate electricity from hydrogen and oxygen, for both automotive and stationary applications like emergency power. **Training:** Bachelor's degree (minimum) or master's degree (preferred) in chemical, electrical or mechanical engineering for research, design, fabrication and testing. **Salary:** \$50,000 to \$85,000

### Smart-Grid Engineer

**Description:** Develop electrical grids that can effectively distribute power from intermittent sources such as wind and solar, charge a fleet of electric vehicles and communicate through technology that enables homeowners to manage energy costs and utility providers to avoid service disruptions. **Training:** Bachelor's degree (minimum) in systems, electrical or software engineering. **Salary:** \$50,000 to \$100,000

### Wind Turbine Machinist

**Description:** Use machine tools—lathes, milling machines and machining centers—to make gearboxes, shafts, yaw drives and other precisely cut or drilled durable turbine parts. **Training:** Vocational schools, technical colleges and apprenticeships; an easy transition for workers in traditional manufacturing jobs. **Salary:** \$13 to \$25 per hour

### Green Architects/Builders

**Description:** Design and construct buildings that utilize sustainable materials, renewable energy sources and efficient plumbing, lighting and heating/cooling systems. **Training:** The Green Building Certification Institute offers Leadership in Energy and Environmental Design (LEED) accreditation. Various cities and the National Association of Home Builders have unique standards and certification as well. **Salary:** \$50,000 to \$105,000 (architects); \$10 to \$30 per hour (builders)

### Energy Auditor

**Description:** Conduct room-by-room visual examination of structures, examine utility bills, locate air leaks with blower-door tests or infrared imaging, and then prescribe measures to prevent energy waste. **Training:** To audit existing structures, certification from the Building Performance Institute. To assess new construction, certification through the Residential Energy Services Network. **Salary:** \$12 to \$14 per hour

### Photovoltaic Installer

**Description:** Mount solar panels on rooftop racks, configure DC-to-AC inverters and wire PV systems to feed electricity to the grid or to operate as stand-alone power plants. **Training:** Private companies and technical schools offer intensive courses for newcomers. The gold standard for contractors, electricians and those already in the field: A stamp from the North American Board of Certified Energy Practitioners, which also certifies professionals for solar thermal installation. **Salary:** \$14 to \$28 per hour

**From high-tech research and development roles to blue-collar work in manufacturing and construction, green jobs run the gamut in pay, education and job description. Some require years of schooling and advanced degrees; many others require only minimum retraining, often provided on the job or in brief but intensive workshops. Community colleges are also rapidly retooling curricula to offer associate degrees in renewable energy systems.**

they might not otherwise make now."

Yet some question the government's prescience when it comes to selecting worthy projects. Kenneth Green, a fellow at the American Enterprise Institute, cites the failed attempt to supplant fossil fuels with corn-based ethanol as a prime example of a taxpayer-backed swing-and-miss. "The government is not good at picking winners," he says. Richard Sylla, an economic historian at New York University, points to the Carter administration's attempt to promote solar power. "The government subsidized people to put up solar panels," he says, and when the price of oil came down "a lot of government money was wasted."

But today, Sylla says, things might be different. "Even before the government came in, Wall Street and the venture capital crowd were interested," he says. "Maybe solar power in the 1970s was premature, but 40 years later, it might work." And Alex Klein, a research director at the consulting firm Emerging Energy Research, says the difference between etha-

nol and this round of government intervention is that funding is not confined to one nascent technology. Rather, the Recovery Act money—in the form of federal loan guarantees, grants and tax credits—is spread across a broad range of technologies and companies. "They seem to be conscious that if they're spending the taxpayers' money, they're not spending it on projects that aren't coming to fruition," Klein says.

To weed out duds, Stutsman says reviewers from within the DOE, academia and energy fields carefully scrutinize potential awardees. Just how many jobs those projects create—and how many will be long-term—remains to be seen. For now, the green workforce continues to be a tiny fraction of overall employment, making only a slight dent in unemployment. But with clean energy technologies advancing quickly, a genuine green-collar economy may not be far off.

PM