

GREENING WISCONSIN'S WORKFORCE

Training, Recovery, and the Clean Energy Economy

Escalating economic crisis and a bold federal response have intensified the regional promise of green jobs – that a green wave might lift all boats, rebuilding a prosperous industrial heartland on a sustainable bedrock of energy efficiency and renewable energy. Recession, climate change, and energy insecurity may not signal the end of the middle-American dream. A coordinated state response to these challenges could build a vibrant green economy based on clean energy and decent jobs for all.

The task is enormous, and urgent. Wisconsin lost nearly 73,000 jobs in the last twelve months, with more than half of that loss in the last four months. Precipitous job loss across all sectors follows years of anemic overall job growth and dramatic decline of the state's critical manufacturing sector, which lost over 14 percent of its job base between 2001-2004 and shed an additional 13,000 jobs even before last fall's economic collapse.¹

But the challenges in Wisconsin's labor market predate the recession and require long-term solutions. If green jobs are to begin restoring regional prosperity, any stimulus plan to create them must address larger underlying challenges facing the state's working families.

More than one in five Wisconsin workers hold poverty-wage jobs.² Those without post-secondary education can no longer earn their way out by dint of hard work, and social supports are inadequate to close the gap. Nearly a quarter of working families in Wisconsin are low income.³ Living below 200 percent of the federal poverty line – a bar that often serves as a proxy for self-sufficiency – these families face serious and increasing problems making ends meet. Factoring in race highlights further inequality: a breathtaking 47 percent of Wisconsin's minority working families are low income.⁴

Building a green economy offers one compelling solution, and the American Reinvestment and Recovery Act holds much promise to help the state do so. Additional injections of federal dollars may accompany climate and energy bills later this year. But money isn't enough.

The state and key stakeholders need to spend it on building a high-road recovery: creating and retaining high-quality jobs, developing appropriate training pathways, and providing broad access to both. To do this, workforce policy-makers and practitioners need to think smart, build partnerships, and deliver equity.

The state's technical colleges will play a key role here. This paper offers a brief overview of green-collar training programs already in place at campuses across the state, related Recovery Act resources, and some suggestions as to how the technical college system and its partners can most effectively move forward in greening Wisconsin's workforce.

About COWS

The Center on Wisconsin Strategy (COWS) is a nonprofit, nonpartisan "think-and-do tank" dedicated to improving economic performance and living standards in the state of Wisconsin and nationally. Based at the University of Wisconsin-Madison, COWS works to promote "high road" strategies that support living wages, environmental sustainability, strong communities, and public accountability. www.cows.org

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¹ January 2008 to January 2009, based on BLS Current Employment Statistics.

² We define poverty-wage jobs as those paying a wage that is insufficient to lift a full-time (40 hours a week), year-round (52 weeks a year) worker to the poverty line for a family of four with two children. In 2007 dollars, the "poverty wage" was \$10.11 an hour or less; if someone worked full-time for the entire year at this wage, his/her annual earnings would be \$21,029.

³ Working Poor Families Project analysis of 2006 ACS. *Still Working Hard, Still Falling Short* (October 2008). Available at www.workingpoorfamilies.org/pdfs/NatReport08.pdf.

⁴ Ibid.

WHAT IS A GREEN JOB?

The Obama Administration is succinct:

*"Green jobs involve some task associated with improving the environment, including reducing carbon emissions and creating and/or using energy more efficiently."*⁵

This broad definition – which accurately describes a green universe comprising portions of positions spread across a vast range of occupations and industries – quickly gives way to complexity.⁶ To employ "green jobs" as a meaningful category for economic and workforce development, state policy-makers must refine their definition through critical choices in five areas of policy and practice.

1. Job Quality

Green jobs can and should be good jobs.⁷

Good jobs pay more than a poverty-level wage. They also offer benefits, at least health care and ideally pensions, paid sick leave, safe working conditions, reasonable schedules, organizing rights, and a modicum of job security. And because low-road economic practice condemns a substantial number of Americans not only to short-term, low-wage jobs, but also to long-term poverty traps, a good job is one with an accessible pathway to advancement.

⁵ The White House Task Force on the Middle Class, *Green Jobs: A Pathway to a Strong Middle Class* (Staff Report, February 2009), available at www.whitehouse.gov/assets/documents/mctf_one_staff_report.pdf.

⁶ Thinking of jobs as positions or full-time equivalents (FTEs) addresses the problem of associating the concept of "green" with a particular occupation or industry, and relates it, instead, to the fraction of any job's activities that are dedicated to the green enterprise (environmental remediation or betterment, climate adaptation and mitigation, etc., including, but not limited to, clean energy).

⁷ The notion that a green job is by definition a good job was put forward last year by COWS, Apollo, and The Workforce Alliance in *Greener Pathways*; contemporaneously adopted by allied analysts, such as Cornell's Global Labor Institute and the United Nations Environmental Programme; espoused by movement leaders like Green for All; and recently adopted by the Vice President's Task Force on the Middle Class.

Unfortunately, there are no green-collar guarantees on job quality: both high and low roads can lead to a technically "green" economy. States interested in the high road will define and promote green jobs as family-supporting jobs that contribute significantly to preserving or enhancing environmental quality.⁸

2. Job Content

What do green collar workers do? While job quality is often a question of economic development policy and labor standards, training looks to skills and certification. And for those who focus on training, the most meaningful thing to know is that green jobs are not, for the most part, new jobs.

Where are the green jobs? Some are atop wind towers or green rooftops. But more are hiding in plain sight. The vast majority, in fact, will be found in traditional occupations and industries fortified, in some cases, with new green skills. Green-collar workers are machinists, assemblers, and truck drivers; pipefitters, insulators, and carpenters; technicians, mechanics, and maintenance workers; bookkeepers, receptionists, and customer service representatives. [see appendix on page 11]

3. Job Training

Most green-collar jobs are and will be middle skill jobs requiring more than high school, but less than a four-year degree.⁹

⁸ For an analysis of labor standards and employer practice in three clean energy sectors, see Philip Matera, *High Road or Low Road? Job Quality in the New Green Economy* (Good Jobs First, February 2009), available at www.goodjobsfirst.org/pdf/gjfgreenjobsrpt.pdf.

⁹ "Middle Skill" in this context refers to the level of education and training required by a particular job, not the actual technical proficiency of the worker. The term focuses policy attention on the sorts of critical workforce training provided by community and technical colleges, labor unions, and community organizations. This short-hand has become a key way to communicate with policy-makers in a time when most policy attention – and funding – is focused on K-12 and 4-year college programs. "Middle skill" should not be confused with the actual competence and capacity of workers and occupations – many "middle skill" occupations actually require highly skilled trade and technical workers.

Clearly many PhDs, architects, and engineers hold green jobs and directly contribute to the building of a green economy. But publically-funded workforce development projects should promote green jobs accessible to those with less than a four-year college degree. These jobs represent the bulk of employer demand and range from entry-level to highly-skilled work in a multitude of industries.¹⁰ In the renewable energy and energy efficiency sectors, for example, green-collar work includes manufacturing, assembly, transportation, construction, installation, operation, and maintenance. [see appendix on page 11]

4. Job Targets

If states, regions, and workforce intermediaries learn their labor markets, they can more effectively determine which green sectors make sense to focus on, build partnerships to align demand, and adjust training programs to mediate supply. The most promising clean energy sectors, most of which are supported through the Recovery Act, include energy efficiency building retrofits, mass transit, smart grids, wind power, solar power, and advanced biofuels.¹¹ Other growing green industries include environmental remediation, waste management, and urban agriculture.

Perhaps most exciting for Wisconsin, building a green economy could revitalize the manufacturing sector, both in and outside of clean energy industries.

¹⁰ See Harry J. Holzer & Robert I. Lerman, "America's Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond" (The Workforce Alliance, November 2007), available at www.skills2compete.org.

¹¹ For a discussion of green sectors and related occupations, including issues of scope and scale, see, e.g., Roger H. Bezdek, *Green Collar Jobs in the U.S. and Colorado: Economic Drivers for the 21st Century* (American Solar Energy Society, January 2009), available at www.ases.org/images/stories/ASES/pdfs/CO_Jobs_Rpt_Jan2009_summary.pdf; and Robert Pollin et al., *Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy* (Political Economy Research Institute and Center for American Progress, September 2008), available at www.peri.umass.edu/fileadmin/pdf/other_publication_types/peri_report.pdf.

5. Job Numbers

How many green jobs are there?

The better question, perhaps, is how many will there be? So much of the excitement about green jobs rests on a discussion of potential jobs, the creation of which is contingent on sustained investment, market growth, and economic development. For either question, the answer is the same: we simply don't know yet. Reliable models suggest tremendous opportunity. The Political Economy Research Institute, for example, estimates that a \$200 billion federal investment in renewable and energy efficiency sectors could generate 2 million American jobs – more than 37,000 of them in Wisconsin – and expand opportunities for the 300,000 Wisconsinites already employed in related sectors.¹² Ultimately, states, cities, or regions need to decide what counts as a green job, use the definition to measure a baseline, and track growth.¹³

Can Manufacturing Be Green?

1. Yes – in both product and process. As for the latter, all manufacturing will have to become more energy efficient, i.e. greener, in order to remain competitive in a carbon-constrained economy. When emissions are capped, as they will be, and carbon monetized – whether through cap and auction, trade, invest, dividend, or some other distributive structure – firms who have worked to green their production lines will have a clear advantage. The Manufacturing Extension Partnership can and should play a key role in implementing a sustainability and modernization agenda for Wisconsin factories.
2. Product matters too. The clean energy economy holds great promise for Midwest manufacturing.¹ Re-orienting industrial supply chains to produce component parts for wind turbines, solar panels, LED lights, high-performance windows, and other capital goods can potentially generate huge numbers of green-collar jobs.² And with appropriate state policies in place, these can be high-road jobs, with decent wages, decent benefits, and organizing rights.³
3. The Energy Independence Fund administered by the Department of Commerce – announced as a \$150 million, ten-year grant and loan program aimed at research, development and commercialization of renewable energy technology – includes provisions to modernize related manufacturing facilities.⁴ Commerce awarded \$7.8 million in 2008 grants, focused largely on bioindustry and energy storage development. These are excellent first steps. It will be important to see a future emphasis on industrial re-tooling if Wisconsin gets serious about supply chain re-organization for green manufacturing.
4. The Wisconsin Technical College System is working to promote training programs that can help low-income working adults with basic education and English language learning needs prepare for manufacturing careers. Five of the eight curriculum development grants awarded to local technical college partnerships by Wisconsin's Regional Industry Skills Education (RISE) initiative focus on bridge programs in welding, industrial maintenance, and CNC manufacturing.⁵

¹² Pollin et al., *Green Recovery*.

¹³ One good example of this is a recent study commissioned by the Washington state legislature in fulfillment of the labor market analysis provision in the state's landmark 2008 climate change and green jobs act. See Alan Hardcastle, *2008 Green Economy Jobs in Washington State* (Washington State University, Extension Energy Program, January 2009), available at www.workforceexplorer.com/admin/uploadedPublications/9463_Green_Jobs_Report_2008_WEXVersion.pdf.

¹ COWS' Center for State Innovation is working with the Governors of eight states on the Great Lakes Strategy Initiative, which includes a focus on revitalizing the industrial heartland by re-orienting supply chains and promoting next-generation manufacturing for the green economy. The Apollo Alliance has taken the national lead on this, organizing key stakeholders to map a green manufacturing strategy and federal legislative agenda: www.apolloalliance.org/wp-content/uploads/2009/03/greenmap_proposal0311091.pdf. And no clean energy manufacturing discussion can conclude without citing the Renewable Energy Policy Project, which produced a seminal series of state reports documenting the tremendous potential of renewable energy as a manufacturing jobs driver.

² Gary Gereffi, Kristen Dubai, and Marcy Lowe, *Manufacturing Climate Solutions: Carbon-Reducing Technologies and U.S. Jobs* (Duke University, 2008) available at www.cgcc.duke.edu/environment/climatesolutions/greeneconomy/Fullreport.pdf.

³ See, e.g., Daniel Luria and Joel Rogers, "Manufacturing, Regional Prosperity, and Public Policy," in Richard McGahey and Jennifer Vey, eds., *Retooling for Growth: Building a 21st Century Economy in America's Older Industrial Areas* (The American Assembly, Columbia University, and Brookings, 2008), available at www.cows.org/pdf/xrp-retooling.pdf.

⁴ For program details, see www.commerce.state.wi.us/BD/BD-WEIF.html; and <http://commerce.wi.gov/BDDocs/BD-2008WEIFAwards.pdf>. In a general scan of projects listed in the Wisconsin Energy Independence Fund grant awards announcement, only one seemed directly related to expanding manufacturing capacity – and that was a CDBG loan of up to \$640 million to Advanced Fiberglass Technologies in Wisconsin Rapids, which proposed building components for wind energy and methane digester systems in a project slated to create up to 128 jobs.

⁵ RISE is a partnership between the Wisconsin Technical College System and the Wisconsin Department of Workforce Development. Funded by the Joyce Foundation's Shifting Gears Initiative, RISE aims to build career pathways that help low-income working adults move up a ladder of skill training and work experience into family-supporting careers. For more information, see www.risepartnership.org/default.htm.

FUNDING A GREEN RECOVERY

The American Recovery and Reinvestment Act dispatches billions of dollars to multiple agencies and programs, many of which can be tapped to build a green and equitable recovery. While some funds are directed specifically to workforce development, through both formula and competitive channels, many more will be distributed programmatically to, e.g., energy efficiency, environmental remediation, and infrastructure (i.e. grid and transit) projects not explicitly linked to workforce training initiatives. One key task for Wisconsin agencies will be to make those linkages, ensuring that eligible monies in every pot are spent connecting folks to training for high-quality jobs in careers with a future, and that all projects, even those not explicitly green, are vetted for sustainability.

The \$787 billion Recovery Act aims to create or save 3.5 million jobs, and contains numerous opportunities for green economic and workforce development, including roughly

- \$48 billion in investments in job training and education
- \$100 billion in funding for transportation and infrastructure
- \$20 billion in tax incentives for renewable energy
- \$71 billion for energy-related programs.

The Recovery Act and its workforce provisions, especially those that can help low-income working adults gain skills and move into family-supporting jobs, have been ably analyzed by many of COWS' partners and allies, with notable policy prescriptions from the Working Poor Families Project, the Center on Law and Social Policy, and The Workforce Alliance.¹⁴ But the best navigator through ARRA's emerald maze, with an eye to both training and equity, is Green for All and Policy Link's *Bringing Home the Green Recovery*.¹⁵

The Recovery Act in Wisconsin

The Center for American Progress calculates Wisconsin's share of Recovery Act investments at more than \$9 billion, with less than half of that, according to Wisconsin's Office of Recovery and Reinvestment, in direct program funding; the White House estimates 70,000 Wisconsin jobs saved or created as a result.¹⁶

Specific information about federal dollars flowing into Wisconsin can be found through the Office of Recovery and Reinvestment (ORR), accessible online at www.recovery.wisconsin.gov.

What follows are some highlights for Wisconsin, in the context of training for a green recovery.

¹⁴ See, e.g., workingpoorfamilies.org/pdfs/ARRA_principles.pdf; http://www.workforcealliance.org/site/c.cjJNKiPJtH/b.5023077/k.628B/Recovery_Legislation.htm; <http://www.clasp.org/publications/preliminarysummaryofarrao21309.pdf>. The National Employment Law Project and the Center for Budget and Policy Priorities have similarly released excellent analyses of ARRA provisions affecting, respectively, unemployed and low-income individuals.

¹⁵ Radhika Fox, Jason Walsh and Shawn Fremstad, *Bringing Home the Green Recovery: A User's Guide to the 2009 American Recovery and Reinvestment Act* (Green for All and Policy Link, March 2009), available at: www.cepr.net/documents/publications/green-recovery-2009-03.pdf.

¹⁶ www.americanprogress.org/issues/2009/02/compromise_map.html; www.recovery.wisconsin.gov/docview.asp?docid=16002&locid=164; www.ncsl.org/print/statefed/ImpactofARRA.pdf

TRAINING

Of the \$4 billion of direct investment in workforce programs, some \$42 million will flow to Wisconsin's Department of Workforce Development through U.S. Department of Labor formula allotments. Seven million will support employment and reemployment services at Wisconsin job centers, where trained state staff can direct job-seekers to appropriate training resources, including green opportunities at the technical colleges. Four million is set aside for rapid response to workers affected by mass layoffs. Another five million lands in the governor's discretionary fund, which recently offered promising precedent in underwriting a Sector Strategies Initiative that supports regional industry partnerships and related training for low-skill, low-income adults (via Opportunity and Skills Jump Start grants).¹⁷ Perhaps most significant for technical college campuses, \$26 million of new Workforce Investment Act dollars will be distributed to the state's eleven Workforce Development Boards to support services and training for adult, youth, and dislocated workers.

GREEN-COLLAR TRAINING

The Recovery Act allocates \$500 million for competitively awarded worker training grants in industries targeted by the Green Jobs Act. While the funds will not flow according to statute but at the discretion of DOL guidance, advocates anticipate that Labor Secretary Hilda Solis, congressional co-sponsor of the 2007 Green Jobs Act, will hew to its principles in issuing the related Recovery Act RFP.

The Green Jobs Act, Title X of the 2007 Energy Independence and Security Act, authorized but never appropriated \$125 million per year for energy efficiency and renewable energy training. The legislation called for national and state energy training partnerships with broad participation – labor, industry, community, and technical colleges, local WIBs, and community groups. The Green Jobs Act also emphasized pathways out of poverty, targeting programs that serve individuals under 200 percent of poverty or a locally defined self-sufficiency standard.

ENERGY

Clean energy and potentially green infrastructure funding will flow into Wisconsin in many streams. A few of note: The weatherization program, administered in Wisconsin by the CAP agencies, will instantly double in size, growing to \$142 million – 20 percent of which can be spent on worker training. In addition, the Office on Energy Independence will be on the front lines of green job creation in administering \$57 million from the State Energy Program and the state portion – nearly \$12 million – of the Recovery Act's \$3.2 billion Energy Efficiency and Conservation Block Grants (EECBG). An additional \$25 million in EECBG resources will be distributed directly to 31 Wisconsin cities and counties.¹⁸ Green energy infrastructure programs also contain designated or allowable training targets: \$100 million of the \$4.5 billion federal allocation for modernizing the nation's electric grid, for example, is dedicated to training the energy workers who will update and maintain it. Technical colleges are eligible applicants for these DOE dollars.

¹⁷ The Initiative, announced March 5, 2009, is funded with existing WIA discretionary dollars, not those allotted through the Recovery Act. See Governor Doyle's announcement at: www.wisgov.state.wi.us/journal_media_detail.asp?locid=19&prid=4010.

¹⁸ For a detailed list and amounts, see the Department of Energy website: www.eecbg.energy.gov/GrantAlloc.htm.

GREEN TRAINING AT WISCONSIN'S TECHNICAL COLLEGES

Wisconsin's technical colleges are renewable energy leaders and will play a central role in training a green workforce. Over the last decade, many campuses have developed hands-on training and demonstration capacity by installing wind turbines and solar panels, while others have promoted online learning communities to share capital and students and ideas. Madison Area Technical College, for example, connects with other technical colleges and the University of Wisconsin through the Consortium for Education in Renewable Energy Technology (CERET).¹⁹

At least eight established programs offer certificates and associate degrees in renewable energy [see table below]. Some colleges offer either individual courses on clean energy technology or related skill modules within existing curricula, like the electrician training at Western, which includes a solar skill set. The WTCS Next Generation Workforce 2009-11 biennial budget initiative proposed seven distinct focus areas for clean energy and green technology program development.

Beyond renewable energy programs, programs like the Water Quality Technician diploma at Moraine Park, the Sustainable Design certificate at Northeast, and the Environmental and Pollution Control AAS at Milwaukee's Mequon campus are clearly part of a green jobs future. So are less obviously green curricula, like automotive tech training at a number of schools, which may include segments on biofuel or hybrid electric vehicles. The Center for Energy Conservation and Advanced Manufacturing (ECAM) at Milwaukee Area Technical College's Oak Creek campus offers HVAC programs leading to either a one-year technical diploma or an associate's degree, as well as shorter term technical diplomas in HVAC, CNC manufacturing, and power engineering programs, all of which may be critical to Wisconsin's green economy.

RENEWABLE ENERGY TRAINING AT WISCONSIN TECHNICAL COLLEGES

<i>Renewable Energy Focus</i>	<i>Technical College</i>	<i>Campus</i>	<i>Program</i>	<i>Credits & Length</i>	<i>Certificate or Degree</i>
Wind	Lakeshore Technical College	Cleveland	Wind Energy Technology	67 credits; 4 terms	AAS
Solar	Northeast Wisconsin Technical College	Green Bay	Renewable Energy – Solar	14 credits	Solar Energy Certificate
Biofuels	Northeast Wisconsin Technical College	Green Bay	Biofuels	18 credits	Biofuels Certificate
Biofuels	Mid-state Technical College	Wisconsin Rapids	Biorefinery Technology	68 credits; 4 semesters	AAS
Renewable Energy	Fond du Lac Tribal and Community College	Fond du Lac	Clean Energy Technician	22 credits; 2 semesters	Clean Energy Technology Certificate
Renewable energy	Madison Area Technical College	Madison	CERET	12 credits	Certificate in Renewable Energy Technology
Renewable energy	Mid-state Technical College	Wisconsin Rapids	Renewable Thermal Energy Technician	68 credits; 4 semesters	AAS
Renewable energy	Mid-state Technical College	Wisconsin Rapids	Renewable Electricity Technician	68 credits; 4 semesters	AAS

Note: Renewable Energy curricula typically address wind and solar technologies, and may also include biofuel, biomass, geothermal, and related topics.

¹⁹ Based at MATC, CERET is a National Science Foundation-funded consortium that offers a 12-credit renewable energy certificate, earned via online and in-person courses taught by industry veterans. Partners include Oakland Community College, Brevard Community College, Solar Energy International, and the Midwest Renewable Energy Association. For more information, see: www.ceret.us.

While this report focuses on technical college training, union and community education providers will also play a key role in greening the state's workforce. COWS is currently working with the Apollo Alliance to map such programs in Wisconsin, with particular attention to apprenticeship and apprenticeship preparation. We are also undertaking a study of skills standards, credentialing, and certification across the green economy. Results will be shared in subsequent green training reports later this year.

As the call for green jobs ramps up, there is increasing pressure for technical colleges to develop green programming.²⁰ But not every region needs a full program in wind or biofuel technology. In many cases greening the curriculum means adding green skill sets to existing programs that train Wisconsin's workers for traditional occupations and industries. It all depends on local economic opportunities as determined by regional industry clusters. A promising approach in this regard comes from Madison Area Technical College (MATC), a leader with the South Central Workforce Development Board in building demand-driven career pathways. In a proposed "Green Technology" initiative, MATC proposes a comprehensive solution – innovative, but not built from the ground up:

The emergence of "green" technologies is leading MATC to collaborate with regional employers to redesign existing curriculum, integrating green skills and technologies into current programs. The redesigned programs will allow MATC to produce the highly-skilled graduates valued by employers while developing its career pathway approach to workforce development. This initiative will accelerate MATC's integration of green skills and technologies into existing programs in Agriculture, Laboratory Sciences, Applied Engineering, Construction and Skilled Trades, Manufacturing Technologies, Transportation Technologies, Culinary Trades, Meeting and Event Planning, Tourism and Recreation, Business Management, Marketing and e-Business, Health Care, Human Services, and Protective Services.²¹

To achieve carbon reduction and energy security goals while putting Wisconsinites back to work, and helping still others advance out of low-wage labor market, we will need to bring green jobs programs to scale. Technical colleges will be critical here, particularly in building accessible career pathways for low-income working adults. Union and community training programs are also key players, along with independent certifiers and short-term program providers like the Midwest Renewable Energy Association.

The low-hanging fruit of a green economy, and the stimulus funds to pluck it, sit in energy efficiency – primarily retrofits of existing building stock. The bulk of related jobs will be in construction and the building trades [see appendix on page 11]. Beyond greening curricula and updating apprenticeships in these sectors, technical colleges have some heavy lifting to do in building accessible onramps. Drawing lessons from RISE work on welding and health care bridges, and the few national examples of successful construction bridge programs, such as Washington State's I-BEST roofers training, Wisconsin's technical colleges might focus on constructing workable "green" bridges that offer contextualized occupational training to adult learners in need of basic skills and English language instruction.

Through whichever channels its pathways emerge and connect, Wisconsin must be careful to train workers for jobs that exist. This is true even when integrating green skills into existing programs. But in a few new fields, particularly in renewable energy and biofuels, it is especially important to have some strategic coordination lest the state proliferate innovative programs to the point where program capacity exceeds labor market demand.

²⁰ A new report from National Council for Workforce Education and the Academy for Educational Development summarizes for community and technical colleges many of the green workforce training strategies first articulated in *Greener Pathways*, and points out program examples from around the country. See Mindy Feldbaum and Hollyce States, *Going Green: The Vital Role of Community Colleges in Building a Sustainable Future and Green Workforce* (National Council for Workforce Education and the Academy for Educational Development, January 2009), available at www.ncwe.org/documents/GoingGreen.pdf.

²¹ The MATC proposal, "Next Generation Workforce: Access to Opportunity," is part of the Wisconsin Technical College System 2009-11 Biennial Budget Initiative, *Next Generation Workforce: A Targeted Investment in Our Economic Future* (September 2008), available at www.wtcsystem.edu/legislative/state/pdf/next_gen_workforce.pdf.

BEST PRACTICES: LA TRADE-TECHNICAL COLLEGE

An earlier COWS report, *Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy*, held up Los Angeles Trade-Technical College (LATTC) and its LA Infrastructure and Sustainable Jobs Collaborative as a case study of successful green training partnerships.²² Marcy Drummond, Vice President for Workforce and Economic Development at LATTC, elaborated on that project and additional green initiatives in a recent presentation on building a green jobs pipeline.²³ She outlines four key challenges faced by the college in developing and implementing its green agenda.

1. **Challenge:** Green workforce development requires an extensive commitment of resources, including staff time, financial resources, facilities, and equipment.

Response: LATTC formally adopted a Green College Initiative in 2006 and then incorporated it in the College's five-year strategic plan in 2008.

2. **Challenge:** There is insufficient information available on the green economy and the requisite skills certifications, or standards for green occupations – particularly at a local or regional level.

Response: LATTC commissioned green labor market studies focused on energy and construction. The college then partnered with other institutions, developing a sustainable lighting curriculum together with four California community colleges, and convening a Sustainable Green Construction Education Task Force to develop and implement statewide standards for green construction curricula.

3. **Challenge:** Many “green jobs” are only a portion of an existing occupation embedded in an existing industry sector, and new skill sets are required only for the part of the position being greened.

Response: LATTC serves as an intermediary for sector-based workforce development initiatives, placing emphasis on those occupations necessary for “greening” the sector. The LA Infrastructure and Sustainable Jobs Collaborative, for example, brings together key stakeholders to plan and implement a seamless education, training, and workforce infrastructure for both traditional and “greened” occupations in the utility and construction sectors. Trade-Tech then greened its Carpentry program entirely by greening just a portion (e.g., materials and techniques) of its existing courses and adding only a few new ones.

4. **Challenge:** It's easy to become overwhelmed with the myriad possibilities for green workforce development and get sidetracked, losing focus and diverting scarce resources from a workable agenda.

Response: LATTC prepared (and follows) a priority list for developing education and training programs to address the most promising green-related occupations in the energy/utility, construction, and transportation sectors. The list is revisited regularly by program development teams, who report on progress, coordinate activities, and make periodic priority adjustments only as needed to accommodate a rapidly evolving field.

²² See *Greener Pathways*, pp.17-18, available at www.cows.org/pdf/rp-greenerpathways.pdf.

²³ Drummond's PowerPoint, *Workforce Training: Credentials, Pathways, and Pipelines to the Green Economy* (Presented at the Good Jobs Green Jobs National Conference, Washington DC, February 6, 2009) and related materials can be found online at: www.lattc.edu/dept/lattc/WED/GreenJobsWorkshop.html.

RECOMMENDATIONS FOR GREEN WORKFORCE DEVELOPMENT

Build green bridges and pathways — within existing programs

- Green jobs initiatives should be integrated into existing training systems. Part of creating a new energy economy will involve the creation of brand new industries and thus brand new jobs. But more of it will involve transforming the industries and jobs we already have. From a workforce development perspective this means that colleges should focus less on creating courses of study and curricula from scratch and more on embedding green curricula for green skills into existing and broader courses of study. **Wisconsin's technical colleges do not always have to develop new diploma and degree programs, just greener ones.**
- Training a green workforce can keep Wisconsin economically competitive and environmentally sustainable. But beyond skills training, green jobs initiatives must address access and upward mobility. To help workers advance from unemployment, disconnection, or dead-end, poverty-wage work into family-sustaining green jobs, **the state should work with local partners to develop green career pathways — and bridges onto them.** Critical first steps include Wisconsin's WIRED, RISE, and Sector Strategy initiatives, including the Governor's Skills Jump Start and Opportunity Grants programs.

Weatherization poses a key opportunity in this context. The federal Weatherization Assistance Program is perhaps the original green employment program, creating jobs and reducing energy costs for low income households. Twenty percent of weatherization funds — increased by the Recovery Act to \$5 billion nationally, \$145 million in Wisconsin — can be used for training. It is up to states, however, to determine if the dramatically expanded program will be redesigned to attract high-road contractors who pay family-supporting wages, and to figure out how to link short-term weatherization training to career pathways into better jobs in the often unionized and typically better paid commercial sector.

Improve strategic coordination on green(er) training

- **Stakeholders need to coordinate green training initiatives.** Green enthusiasm — and federal dollars, delivered with a mandate to spend quickly — can run ahead of careful thinking. To best serve Wisconsin workers, and the clean energy industries they hope to build, training providers need to talk to one another. The state should broker this conversation — at least among the technical colleges — to ensure both that system-wide information on green training programs is readily available and that program development does not outpace industry demand. More broadly, technical colleges, labor unions, community-based organizations and other training providers would do well to coordinate state and local efforts, share best practices, and invest scarce resources strategically.
- **Technical Colleges should continue to build partnerships with union apprenticeship programs, public workforce agencies, and local industries.** Green industry partnerships can effectively anchor a targeted regional approach to green-collar economic and workforce development and will align with Governor Doyle's Sector Strategy Initiative. What's more, these are precisely the sorts of partnerships called for in the Green Jobs Act. While the \$500 million allotted for worker training grants in industries targeted by that Act will not flow according to statute but at the discretion of DOL guidance, there is good reason to believe that Hilda Solis, co-sponsor of the Green Jobs Act in 2007, will hew to the principles of the act in determining parameters for the related RFP.

Align green education with economic and workforce development

- **Start with the jobs.** As local leaders step forward to champion green jobs and green economies, it is critical that the state develop concrete plans to connect the two. Worker training programs for renewable energy and energy efficiency industries must be explicitly linked to economic development and job-creation programs. The danger is that communities will rush to create green workforce development programs, producing skilled workers for jobs that do not yet exist in sufficient number or permanence. A green career pathway has a job at the end of the road.
- Mass lay-offs and recent declines in construction and manufacturing mask longer term labor market challenges: skills shortages and, if stimulus and other federal investments are spent wisely, growing demand in related occupations, particularly in the emerging green economy. One solution is to **use successful workforce intermediaries** like the Wisconsin Regional Training Partnership to align workforce supply and industry demand in green sectors.
- Smart training systems rely on comprehensive labor market studies to **define and target green sectors**. Good examples include LA Trade-Technical College and Washington state, whose legislature directed the state Department of Employment Security to establish a baseline number of green jobs by commissioning a statewide occupational survey that can be replicated at regular intervals.²⁴

²⁴ Alan Hardcastle, 2008 *Green Economy Jobs in Washington State* (Washington State University, Extension Energy Program, January 2009).

APPENDIX: SOME POTENTIALLY GREEN OCCUPATIONS

What do green jobs in clean energy look like – and how can people train for them?

They are, by and large, occupations that require journey or associate level training. In the near term, with the massive influx of federal stimulus dollars targeted toward energy efficiency and green infrastructure, green jobs will look like traditional jobs in construction and the building trades. In the longer term, if the economy recovers, renewables take off, and Wisconsin captures part of the domestic production supply chain, green jobs will look like advanced manufacturing jobs.

Some high-demand green jobs are relatively new or depend on the commercialization of new technology; we don't have good wage and employment data on these occupations because they are not yet tracked by the U.S. Bureau of Labor Statistics (BLS). These include, e.g., indoor air quality auditors, wind energy technicians (though these have a new SOC code this year), and green roof installers. More traditional jobs used to green ends are often difficult to aggregate because they are not recognized by BLS as part of a coherent industry. Regional research and industry partnerships are the most fruitful source of information about these sorts of emerging occupations and industries.

On the following pages, we have compiled state data for a representative cross-section of family-supporting occupations in a handful of green industry sectors.²⁵ Wages vary across industry and region, and “green jobs” don't fit neatly into federal statistical categories, but the information gives some sense of the breadth of the green economy – and the often surprising familiarity of “green-collar” jobs.

What do we mean by “middle skill” jobs?

Middle skill in this context refers to the level of education and training required by a particular job, not the actual technical proficiency of the worker. The term focuses policy attention on the sorts of critical workforce training provided by community and technical colleges, labor unions, and community organizations. This short-hand has become a key way to communicate with policy makers in a time when most policy attention – and funding – is focused on K-12 and 4-year college programs. “Middle skill” should not be confused with the actual competence and capacity of workers and occupations – many “middle skill” occupations actually require highly skilled trade and technical workers.

²⁵ For a more in-depth discussion of the economic and workforce development imperatives of these industries – energy efficiency, wind, and biofuel – see *Greener Pathways*. Unlike that report's national tables, the Wisconsin data included in this report's appendix do not delimit occupational wages by industry. See table notes for further explanation.

Energy Efficiency

Energy efficiency jobs in the construction and building trades – which look largely like traditional jobs in the construction and building trades – promise to take off as residential retrofitting models like COWS' Me2 in Milwaukee gather steam, and recovery money flows to public and potentially commercial and industrial retrofitting projects. But the benches are currently full. In the short term, then, recovery investments in energy efficiency will put skilled labor back to work, rather than driving demand for a new cohort of highly-trained tradespeople. One challenge will be filling apprenticeship pipelines in preparation for a longer term recovery.

MIDDLE SKILL OPPORTUNITIES IN WISCONSIN: OCCUPATIONS RELATED TO ENERGY EFFICIENCY RETROFITTING

SEE END NOTES RE: NUMERICAL REFERENCES IN TABLE HEADER

<i>Occupational Title</i>	<i>Avg Annual Openings¹</i>	<i>Typical Education and Training Path²</i>	<i>Avg Annual Salary³</i>	<i>Entry Level Wage⁴</i>	<i>Exper. Hourly Wage⁵</i>
Carpenters	700	Long-term on-the-job training, apprenticeship	\$38,760	\$12.54	\$21.68
Electricians	490	Long-term on-the-job training, apprenticeship	\$47,831	\$16.36	\$26.31
Plumbers, Pipefitters, and Steamfitters	340	Long-term on-the-job training, apprenticeship	\$54,268	\$17.86	\$30.21
Construction Laborers	250	Moderate-term on-the-job training	\$35,212	\$11.22	\$19.78
Operating Engineers and Other Construction Equipment Operators	240	Moderate-term on-the-job training	\$45,693	\$15.68	\$25.11
Maintenance and Repair Workers, General	240	Postsecondary vocational training, apprenticeship	\$35,045	\$11.62	\$19.46
Painters, Construction and Maintenance	200	Moderate-term on-the-job training	\$35,263	\$10.34	\$20.26
Cement Masons and Concrete Finishers	170	Moderate-term on-the-job training	\$38,223	\$12.27	\$21.43
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	150	Long-term on-the-job training, apprenticeship	\$42,513	\$13.26	\$24.03
Sheet Metal Workers	130	Long-term on-the-job training, apprenticeship	\$47,481	\$14.53	\$26.98

Wind Turbine Production

The Midwestern wind industry, slowed by recession, is nonetheless growing. Wisconsin ranks 15 in U.S. states for installed wind capacity, with 10 projects currently generating 395 MW. Butler Ridge Wind Farm in Dodge County will add an additional 54 MW, produced by 36 units, when complete.²⁶ While we don't have current employment figures, we do know that Wisconsin wind farms currently host 271 turbines, and the industry's back-of-the-envelope estimates call for one wind technician per 10 turbines. And while turbine installation can generate significant construction employment, the great promise of the wind industry lies in manufacturing.

²⁶ As of December 31, 2008. The American Wind Energy Association tracks wind projects by state; for a detailed grid of Wisconsin's wind farms, see www.awea.org/projects/Projects.aspx?s=Wisconsin.

But most of these jobs are potential, not actual. If federal and state policy, together with loosened credit markets, investor confidence, and economic recovery, can drive the continued expansion of the U.S. wind industry; if Wisconsin, through the Energy Independence Fund (WEIF), the MEP, industry partnerships, and other mechanisms, maps its renewable energy supply chains and supports their transformation; and if the nearly 500 Wisconsin manufacturers that could potentially retool to feed subsequent demand for component parts manage to do so, joining leaders like Manitowoc's Tower Tech Systems; then Wisconsin's wind production industry could generate an estimated 25,000 manufacturing jobs along a revitalized industrial supply chain.²⁷ That's a lot of ifs.

A growing wind industry presents tremendous opportunity, and regional groups like northeast Wisconsin's New North are moving to take advantage of it.²⁸ The administration promises to come along as well, through programs like the WEIF, and a chunk of the Recovery Act money is targeted to developing renewable industries. The energy bill may offer more. But the jobs aren't there yet – at scale. If and when they come, Wisconsin's technical college system will need to re-examine current curricula, and determine which, if any, segments of the advanced manufacturing skill set might be tailored to new production criteria.

²⁷ Estimates from Renewable Energy Policy Project, www.repp.org. New North has compiled a list of 75 suppliers in the Wisconsin Wind Works Supply Chain Directory (2008), available at www.thenewnorth.com/resources/newnorthwinddirectory02.pdf.

²⁸ New North, Inc., is an economic development agency representing eighteen counties of northeast Wisconsin, with a labor market dominated by manufacturing. On New North's wind initiative, including its collaboration with Lakeshore Technical College, see the organization's prospectus for wind energy industries, available at www.thenewnorth.com/resources/windproposal150.pdf.

MIDDLE SKILL OPPORTUNITIES IN WISCONSIN: OCCUPATIONS RELATED TO WIND MANUFACTURING

<i>Occupational Title</i>	<i>Avg Annual Openings¹</i>	<i>Typical Education and Training Path²</i>	<i>Avg Annual Salary³</i>	<i>Entry Level Wage⁴</i>	<i>Exper. Hourly Wage⁵</i>
Customer Service Representatives	2,100	Moderate-term on-the-job training	\$31,243	\$10.53	\$17.27
Welders, Cutters, Solderers, and Brazers	360	Postsecondary vocational training	\$33,933	\$12.56	\$18.19
Machinists	300	Postsecondary vocational training, apprenticeship	\$36,697	\$12.81	\$20.06
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	270	Moderate-term on-the-job training	\$29,377	\$10.20	\$16.08
Production, Planning, and Expediting Clerks	250	Moderate-term on-the-job training	\$40,119	\$13.89	\$21.99
Maintenance and Repair Workers, General	240	Postsecondary vocational training, apprenticeship	\$35,045	\$11.62	\$19.46
Computer-Controlled Machine Tool Operators, Metal and Plastic	170	Moderate-term on-the-job training	\$34,962	\$12.20	\$19.11
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	170	Postsecondary vocational training	\$34,923	\$12.34	\$19.02
Sheet Metal Workers	130	Long-term on-the-job training, apprenticeship	\$47,481	\$14.53	\$26.98
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	50	Moderate-term on-the-job training	\$31,639	\$11.25	\$17.19

Advanced Biofuels

Advanced biofuels may create some new production jobs, but not a lot of them. None of the state's nine ethanol and eight biodiesel plants employ more than 50 workers. And thanks to the industry's economies of scale, they probably never will. As in the wind industry, the greater employment potential for advanced biofuels may lie elsewhere – in manufacturing pipelines, tanks, rail cars, or in biomass aggregation and transport. The point, again, is to align current and planned training resources with industry demand.

MIDDLE SKILL OPPORTUNITIES IN WISCONSIN: OCCUPATIONS RELATED TO BIOFUEL PRODUCTION

<i>Occupational Title</i>	<i>Avg Annual Openings¹</i>	<i>Typical Education and Training Path²</i>	<i>Avg Annual Salary³</i>	<i>Entry Level Wage⁴</i>	<i>Exper. Hourly Wage⁵</i>
Customer Service Representatives	2,100	Moderate-term on-the-job training	\$31,243	\$10.53	\$17.27
Truck Drivers, Heavy and Tractor-Trailer	1,520	Moderate-term on-the-job training	\$38,070	\$12.82	\$21.04
Bookkeeping, Accounting, and Auditing Clerks	1,200	Moderate-term on-the-job training	\$29,988	\$10.17	\$16.54
Industrial Truck and Tractor Operators	390	Short-term on-the-job training	\$29,931	\$10.80	\$16.18
Industrial Machinery Mechanics	250	Postsecondary vocational training, apprenticeship	\$43,525	\$15.40	\$23.69
Maintenance and Repair Workers, General	240	Postsecondary vocational training, apprenticeship	\$35,045	\$11.62	\$19.46
Mixing and Blending Machine Setters, Operators, and Tenders	70	Moderate-term on-the-job training	\$33,307	\$11.41	\$18.31
Electrical and Electronics Repairers, Commercial and Industrial Equipment	60	Postsecondary vocational training	\$44,910	\$15.64	\$24.57
Chemical Technicians	50	Associate degree	\$38,445	\$12.61	\$21.42
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	50	Moderate-term on-the-job training	\$33,666	\$11.33	\$18.61

Notes to Tables

Tables are based on COWS analysis of DWD/BLS 2006-16 occupational projections and BLS occupational distributions for selected industries. These figures are for occupations across all industries, and are presented here to illustrate current trends for occupations typical of the renewable energy and efficiency sectors described. The projected openings do not take into account stimulus or other potential federal investments in green industry development, nor do they reflect the impact of the current recession.

(1) Total openings are the sum of new jobs and replacements, and indicate how many new people are needed to enter a given occupation.

Replacements are an estimate of the number of job openings expected because people have permanently left a given occupation. Permanent exits occur if someone dies, retires, or otherwise leaves the labor force. Openings resulting from people changing employers, but staying in the same occupation, are not included. Permanent exits also include openings resulting from someone permanently changing occupations. For example, a person leaves his/her job as a cashier and becomes a truck driver.

(2) Typical Education and Training Path gives a general indication of the education or training typically needed in a given occupation. There may be other pathways into the occupation, as well as additional educational, training, or licensing requirements. In those set off by italics, the Wisconsin case differs from the standard BLS description by including post-secondary vocational training and/or apprenticeship.

Short-Term On-the-Job Training: These occupations require no more than one month of on-the-job training and the training usually happens at the workplace.

Moderate-Term On-the-Job Training: Training for these occupations usually occurs at the workplace and lasts from one to twelve months.

Long-Term On-the-Job Training: These occupations require more than one year of on-the-job training, or combined work experience and classroom instruction.

Postsecondary Vocational Training: These formal training programs last from a few weeks to more than a year, and are offered at vocational or technical schools.

Associate Degree: This degree requires two years of full-time academic work beyond high school.

(3) Average Annual Salary: An occupation's average hourly wage is calculated by summing the wages of all employees in a given occupation and then dividing by the total number of employees in that occupation. In most cases, the annual average salary is equal to the average hourly wage multiplied by 2,080.

(4) Entry Level Hourly Wage is the average of the lower third of wages that are paid in a given occupation.

(5) Experienced Hourly Wage is the average of the upper two-thirds of wages that are paid in a given occupation.