Wisconsin Green Jobs Report 2010

Employment, Investment, and Progress in Wisconsin's Green Economy

A project of:

The Wisconsin Sustainable Business Council
The Green Tier Porgram
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October, 2010

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WISCONSIN SCHOOL of BUSINESS

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General Introduction

The green economy can be one of the engines that help the State (and more broadly, the country) recover from the current recession. The jobs that will arise from a green economy will expand the middle class, lift those that are unemployed (or under-employed), and benefit the environment.

The green jobs discussion rose to the national forefront in 2008 when concern about high energy costs and climate change were heightened by the economic crisis. Since then, the focus on green jobs has only intensified.

Wisconsin is already well positioned to be a leader in the green economy. We hope that this report jump-starts that recognition process. This report will look at how we identify green jobs, how we categorize them, and how we count green jobs in Wisconsin. We also make some broad projections of the economic impact of green jobs and the industries that will lead the new green economy. Finally, we will offer some of the most up to date information about initiatives for creating green jobs and the training programs necessary to fill them.

Green jobs are a major focus of the current generation and the current administration in Washington. In preparing this report, existing federal and state reports were analyzed and incorporated where appropriate. This report builds upon this previous work but is tailored for the unique circumstances facing Wisconsin.

This report also examines how both state and federal governments are working with the private sector to make wise investments to help speed an economic recovery and position Wisconsin as the green economic leader it should be. Most of the data available on green jobs is presented at the national level, but most jobs are created at the local level. In order for investment in green industries to successfully transform the U.S. economy, investments must be made in communities from Manitowoc to Hudson, and from Ashland to Beloit.

As you will see, the economic crisis does have a silver lining, and can be used as an opportunity to transition to a green economy by creating millions of new jobs. According to Jeffrey Immelt, CEO of GE, “the global financial meltdown doesn’t just represent the low point in the economic cycle; it represents a “reset.” As a result, government, business and society must all play a role in recharging our economies, solving societal problems and creating jobs.” We hope that our report will be of interest to those interested in job growth and those who will be affected as the transition to a green economy accelerates.

What is a green job?

Green jobs are the kind of family- supporting jobs that once anchored the American middle class, but in the industries of the future; industries like wind turbine manufacturing, solar panel installation, energy efficiency retrofits, and green building (2008 Apollo Alliance). "Green jobs" "green-collar jobs" or "cleantech jobs" are notoriously ambiguous terms. Defined more by industry than occupation, these jobs reside primarily in the sectors that make up the green economy. For the purposes of this report, green jobs are jobs related to energy efficiency (including green building), renewable energy (including transportation fuels), alternative transportation (including electric cars and mass transit), water use, and recycling and waste minimization. Even then, just like any newly introduced word, the definition is subject to the perspective of the individual referencing the term.

In 2007, more than 22 different sectors of the U.S. economy were providing workers with green jobs and, except for the construction sector, which has been hit disproportionally hard during the recession, every one of these sectors was expected to continue to grow (2007 The City of Berkeley Office of Energy and Sustainable Development).

Green jobs may also be referred to as cleantech jobs. Cleantech is short for Clean Technology. Clean Technology is a new term that covers a diverse range of innovative products and services that optimize the use of natural resources or reduce the negative environmental impact of their use while creating value by lowering costs, improving efficiency or providing superior performance. Businesses in the cleantech area are active in water, biomass, recycling, product life cycle, energy efficiency, alternative energy, green building and transportation. There is a substantial overlap between traditional definitions of green jobs and cleantech jobs, so for the balance of this report, our references to green jobs also include cleantech jobs. Many believe we are just at the beginning of the green job creation era, with cleantech offering the greatest opportunity for wealth and job creation (and global economic competitiveness) since the advent of the computer and the Internet (2009 Clean Edge).

In some cases, part of the problem of defining a green job is trying to define something that has yet to be created! However, while some green jobs are found in new occupations, most are jobs that already exist and simply demand skills specifically tailored to the green economy. They look like many of the jobs Wisconsinites have always held but with

For many, the term green job simply refers to a category of blue-collar jobs in green businesses or even "blue collar jobs with a green purpose" (2009 Blue Green Alliance). However, these jobs really do represent an important new category of work force opportunities because they are high quality jobs (with some possessing relatively low barriers to entry), in sectors of the economy that are related to minimizing our impact on the environment. For those that do have low barriers to entry, people who have been out of the labor market for an extended period of time, or who were formally incarcerated, or whom possess limited education or skills, may find a family supporting occupation (2008 Apollo Alliance).

According to Wisconsin Governor Jim Doyle, ""Clean energy technology and high-end manufacturing are Wisconsin's future... anyone who says there aren't jobs in the clean energy economy had better open their eyes." (2010 State of the State speech). Creating a green economy is perhaps one of the greatest challenges and opportunities the nation has faced in a generation. Creating jobs while reducing emissions, saving energy and preventing poverty in the time of a severe recession (and perhaps a double dip recession) is going to take political foresight and will.

Just about every plan to help revive the American economy has included talk about green jobs, helping to mainstream both the word and underlying concept. President Barack Obama helped popularize the use of the word by vowing to create five million "green jobs" during his first term in office (2009 Center on Wisconsin Strategy News). Therefore, a green jobs definition will evolve and take new meaning as time goes by and as the definition expands or contracts with mainstream usage (2008 Minnesota Green Jobs Task Force).

Green Jobs in Wisconsin

By 2007, 68,203 businesses in the United States had generated more than 770,000 jobs in the green economy (Pew Charitable Trust, 2009). Every state has a piece of America's green economy. The leading states include Oregon, Maine, California, Colorado, Massachusetts and Minnesota. Wisconsin is not currently among the leading states:

Green Jobs - Wisconsin	
Green jobs	15,089
Green businesses	1,294
Overall job growth 1998-2007	3.4%
Green job growth 1998-2007	-5.2%

SOURCE: PEW Charitable Trusts, 2009, based on the National Establishment Time Series 2007 Database; analysis by Pew Center on the States and Collaborative Economics

Green job growth in Wisconsin through the 2001 recession (where WI lost 100,000 manufacturing jobs that were never recovered) was anemic. Wisconsin has lost an additional 70,000 manufacturing jobs (through July, 2010) because of the recession of 2008 (Center on Wisconsin Strategy, 2010). While Wisconsin ranks either first or second in the nation in manufacturing jobs per capita, there is still a great deal of idle capacity in Wisconsin.

In 2007, jobs associated with the green economy accounted for 0.49 percent of all jobs nationally. WI was slightly below the national average with 3,150,000 total jobs and 0.48 percent of them being green.

A closer look at the data reveals that Wisconsin ranks as a top ten state in energy efficiency jobs (below). Energy efficiency is one of the five types of green jobs identified in the Pew report. Wisconsin ranked sixth in energy efficiency with 2,801 jobs. Midwestern states generally did well in all sectors, with Minnesota, Michigan, and Illinois appearing among the top 10 states in multiple sectors.

EXHIBIT 11

STATE LEADERS IN JOBS ACROSS THE CLEAN ENERGY ECONOMY BY CATEGORY

Although California leads in overall employment in each category, a closer look reveals other notable trends. Arizona makes the top 10 in Clean Energy but in no other category. Massachusetts, New York and Ohio are among the top 10 in all but one category.

While Arizona, Arkansas, Iowa, Maine, Nebraska, Wisconsin and the District of Columbia each have fewer than 15,106 jobs in the clean energy economy—the national average—they rank among the top 10 states in one of the five categories. In all, nearly half the states rank among at least the top 10 states in at least one category of the clean energy economy.

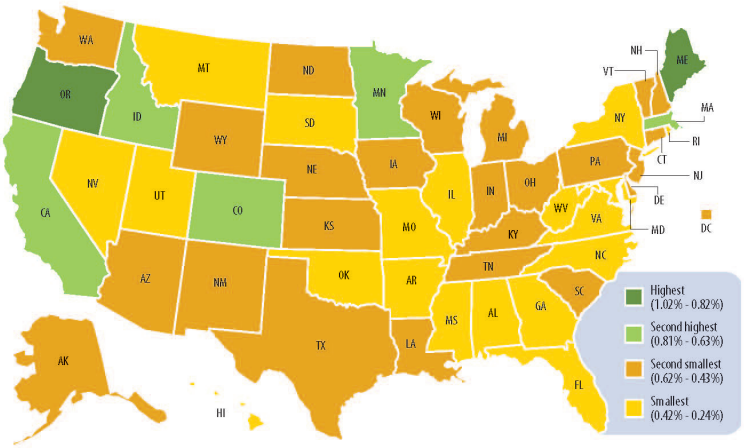
Clean Energy	JOBS 2007	Energy Efficiency	JOBS 2007	Environmentally Friendly Production	JOBS 2007	Conservation and Pollution Mitigation	JOBS 2007	Training and Support	JOBS 2007
California	27,672	California	10,510	California	13,666	California	64,799	California	8,743
Pennsylvania	10,099	Texas	6,353	Minnesota	3,815	Texas	40,617	New York	3,499
Minnesota	4,030	Ohio	5,367	Oregon	3,304	Pennsylvania	24,703	Illinois	3,216
Ohio	3,653	Oregon	4,893	Ohio	2,800	Florida	24,686	Massachusetts	3,155
Texas	3,479	New York	3,311	Iowa	2,237	New York	23,082	District of Columbia	3,130
New York	3,421	Wisconsin	2,801	Texas	2,223	Ohio	22,296	Texas	2,974
Michigan	2,941	Maine	2,560	Nebraska	2,162	New Jersey	20,060	Florida	2,249
Massachusetts	2,890	Massachusetts	2,553	Illinois	1,921	Illinois	19,631	Virginia	1,755
District of Columbia	2,728	Virginia	2,135	Colorado	1,361	Massachusetts	17,374	Pennsylvania	1,742
Colorado	2,639	Florida	2,071	Arkansas	1,303	Michigan	15,852	North Carolina	1,659

SOURCE: Pew Charitable Trusts, 2009, based on the National Establishment Time Series Database; analysis by Pew Center on the States and Collaborative Economics.

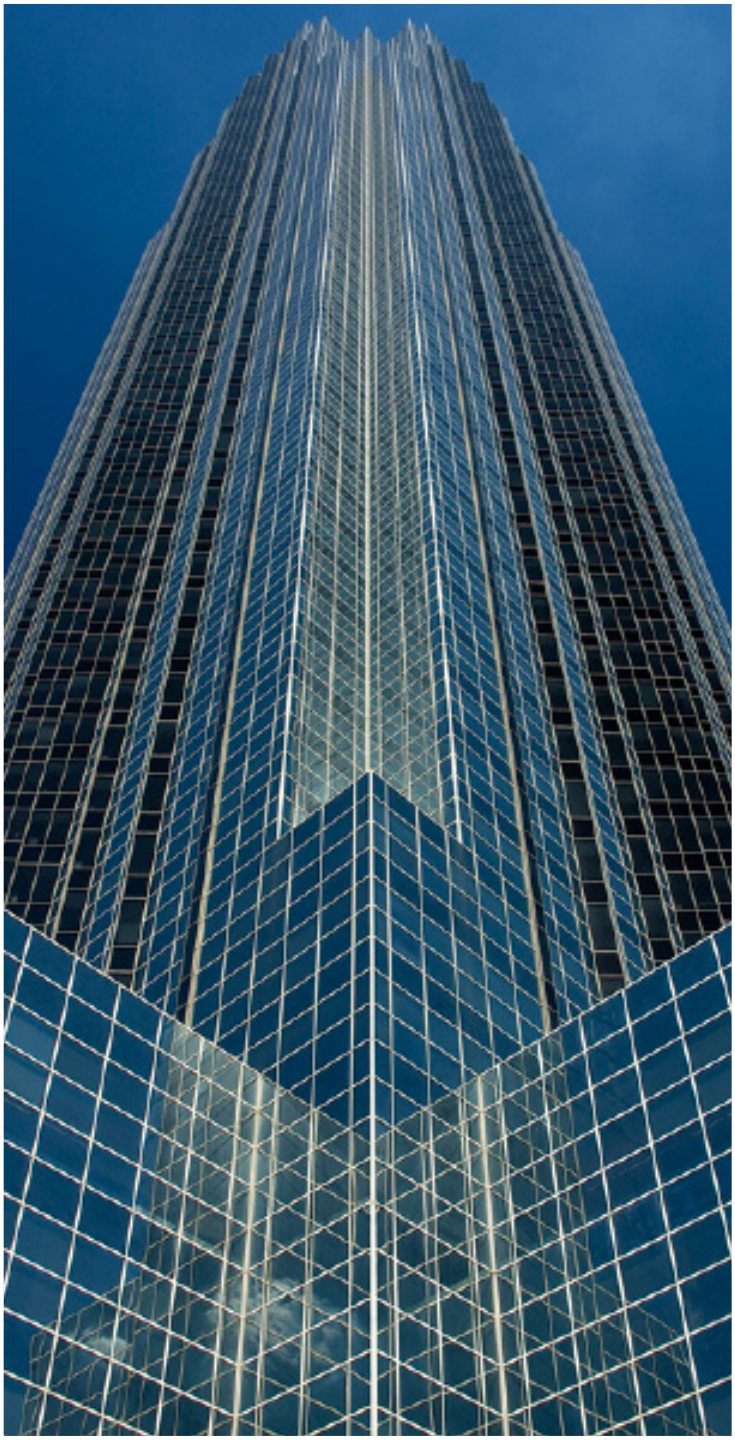
EXHIBIT 12

CLEAN ENERGY ECONOMIES AS A SHARE OF STATES' OVERALL ECONOMIES

It is important for states to know just how many of their total jobs fall within the clean energy economy. Nationally, jobs in the clean energy economy accounted for 0.49 percent of all jobs in 2007; 22 states exceeded that national average.



According to the State of Washington's Green Jobs 2010 report, the following occupations are "green-related" and employ substantial numbers of people in jobs that should be considered "green". The following table contains those occupations that are "green related" along with the current number of employees in those occupations in Wisconsin, and the percent of each of those occupations which was found to be doing a green job by the State of Washington. We then multiply the number of jobs in WI by the percent of people in those jobs that are doing green jobs (from the State of Washington's survey work) to get the number of green jobs in each occupation in WI as of May, 2009.



Green Related Occupations

Occupation	# employed in Wisconsin	% of Job is Green Job*	Number of WI Green Jobs using Wash %
Electricians	11,760	25.1%	2,952
Heating Air Cond and Refrigerator Mechanics and Installers	5,230	55.7%	2,913
Construction Laborers	11,590	19.3%	2,237
Carpenters	17,750	9.8%	1,740
Plumbers, Pipefitters, & Steamfitters	7,960	17.6%	1,401
Mechanical Engineers	6,740	17.7%	1,193
Truck Drivers, Heavy and Tractor-Trailer	45,050	2.6%	1,171
Production Workers all Other	5,560	19.9%	1,106
Architects, Except Landscape and Naval	1,380	54.4%	751
Civil Engineers	4,210	16.6%	699
Refuse and Recyclable Material Collectors	2,080	33.1%	688
Roofers	2,380	20.7%	493
Construction Managers	3,020	16.2%	489
Sheet Metal Workers	3,570	12.3%	439
Electrical Engineers	3,400	12.1%	411
First-Line supervisors mangers of Construction Trades and Extraction Workers	6,260	4.8%	300
Glaziers	480	45.8%	220
Insulation Workers, Floor, Ceiling, and Wall	400	47.8%	191
Environmental Scientists and Specialists, Including Health	1,010	10.7%	108
Hazardous Materials Removal Workers	530	16.8%	89
* based on WA State Survey Results			

SOURCE: 2009 Washington State Green Economy Jobs Report, March 2010 supplemented with May 2009 Wisconsin Occupational Employment Statistics (available from Robert Pope, robert.pope@wi.gov, Department of Workforce Development).

Wisconsin's Green Job Potential

According to a study done by the Renewable Energy Policy Project (REPP), tens of thousands of new green jobs would be created in Wisconsin to meet a 25 by 25 (25% of energy would be produced from renewable energy by 2025) Renewable Portfolio Standard (RPS). (This standard was included in the Governor's Clean Energy Jobs Bill which was not passed in early 2010.) Wisconsin ranks 8th in the nation in terms of potential renewable energy manufacturing jobs, with 35,133 jobs projected. Of those 35,133 jobs, it is estimated that 25,179 would be in the wind sector. Since the estimates assume only that existing firms will be used to meet new demand, and doesn't account for new entrants, there could be even more jobs created than suggested by the study.

Potential Job Creation Across All Renewable Sectors according to REPP

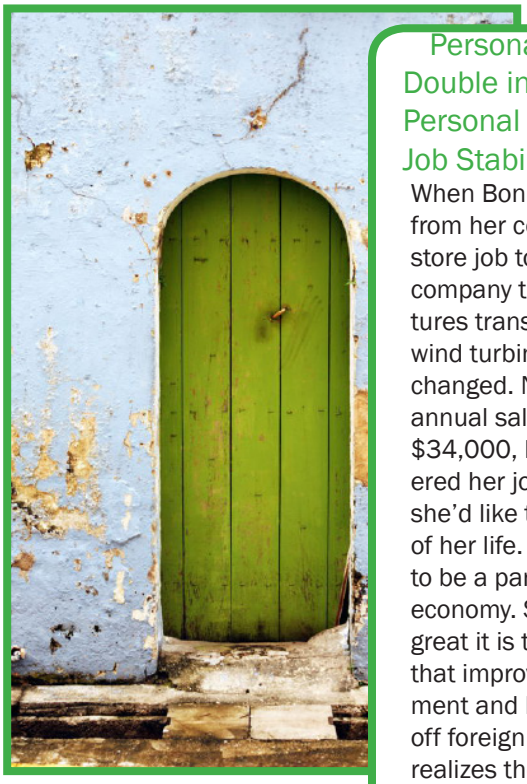
WISCONSIN	
# of firms:	1,331
New jobs: WIND	25,179
SOLAR	4,934
GEOTHERMAL	2,037
BIOMASS	2,974
Total Jobs Created:	**35,133**

SOURCE: How to Revitalize America's Middle Class with the Green Economy, 2009, Blue Green Alliance.

This Renewable Energy Policy Project report shows how renewable energy development would not only benefit the environment, but would also significantly benefit the state's economy. Nationally, the Renewable Energy Policy Project recommends $72 billion of manufacturing investment, which would result in more than 381,000 new jobs. Wisconsin is particularly well positioned to benefit from such an investment.

The New North, the regional economic development group representing 18 counties in north-eastern Wisconsin, has developed Wisconsin Wind Works, a consortium of manufacturers representing the wind manufacturing supply chain within Wisconsin. 360 companies have identified themselves as associated with the wind industry, and, according to the database, more than 7000 jobs may end up being associated with the wind energy industry.

The Clean Energy Economy report by the Pew Charitable Trusts (cited above) and the Renewable Energy Policy Project report (also cited above) were some of the outstanding efforts to understand the green jobs area. However, because of differences in definition and approach, it is not possible to compare numbers across various reports. In 2010, the federal government began a project to standardize and measure "green" jobs. The 2010 Consolidated Appropriations Act included funding to be used by the U.S. Bureau of Labor Statistics to work with the Labor Department and Environmental Protection Agency to identify green economic activity and produce data on green jobs. The project will be carried out with $8 million in stimulus funds and will take at least a year before the first data will be available. When available in 2012, the first data will include employment and wages by industry and occupation for businesses producing green goods and services and information on the geographic distribution of the jobs.



Personal Anecdote: Double in Salary, Personal Fulfillment, & Job Stability

When Bonita Bell switched from her convenience store job to work for a company that manufactures transformers for wind turbines, her life was changed. Not only was her annual salary doubled to $34,000, but she considered her job as something she'd like to do for the rest of her life. Bell was glad to be a part of the green economy. She realizes how great it is to "have a job that improves the environment and helps us get off foreign oil." She also realizes the importance of keeping jobs here in the U.S., where the products are of better quality because workers care about the quality of the products. (2009 Blue Green Alliance)

Green Job Wages

At a minimum, for green jobs to matter, they need to pay well. In 2009, according to the Oregon Employment Department, green jobs were slightly more likely to fall into the "high wage" category than non-green jobs. A survey was also conducted, which determined that the median salary and compensation package for a range of green jobs was slightly above the median (2009 Clean Edge).

In Oregon, the average wage for green jobs in 2008 was $22.61 per hour (2009 The Oregon Employment Department). On average in 2008, green jobs tended toward slightly higher wages than jobs across the entire economy, but there is great variability across the many job categories.

For comparison, the median hourly wage in Wisconsin as of September 2009, was $15.48. This is now below the national level of $15.74. Below are statistics for five Wisconsin employment sectors, including the occupations, average number employed, and average wage associated with each.

Education, Training & Experience

Fortunately Wisconsin is positioned quite well for the green jobs movement because of existing policies on energy efficiency and renewable energy. In addition, the state's technical college system and the Wisconsin Regional Training Partnership (discussed below) are national leaders in developing training programs for green jobs. Through the Sector Alliance for the Green Economy (SAGE) grants, the WI Department of Workforce Development (DWD) supports technical colleges who equip workers with the green skills required to obtain and retain energy industry jobs. In addition, DWD administers the Energy Sector Partnership Grants which address green training gaps in existing workforce development. Most experts agree that green jobs will require some college, but not a four-year degree (2009 Center on Wisconsin Strategy News). Wisconsin's technical college system and universities can build upon existing programs, and take advantage of new funding initiatives, in order to prepare workers for jobs across the green economy.

Not all green jobs require post-secondary education. Let's look at the Status of Green jobs in the state of Oregon for example:

Required Training for Green Jobs

No minimum	32%
High school diploma	32%
Some college	7%
Associate or vocational technology degree	7%
Bachelor's or graduate degree	18%
Other education	4%

SOURCE: The Greening of Oregon's Workforce, June 2009.

As you can see 64% of Oregon's green jobs require no post-secondary education. However, it is not uncommon for jobs in this sector to require special licenses and certifications such as occupation-specific certification or licenses like a hazardous materials certificate, chemical pesticide applicator's license, equipment operator's license, LEED (Leadership in Energy and Environmental Design) accreditation, or computer program training to name a few (2009 The Oregon Employment Department).

For jobs that do not require a bachelor's degree, there is often significant classroom and on the job training that is necessary – one cannot simply walk in off the street and hope to be qualified for a green job. Institutions need to be preparing the workforce now, not only for jobs that already exist, but for those that will exist in the future (2008 Minnesota Green Jobs Task Force).

Since 14% of green jobs in Oregon require some post-secondary education, technical colleges play a major role in preparing the workforce. Wisconsin's technical college system prepares workers for many of the jobs that appear in the sectors mentioned in this report – electricians retrofitting buildings for energy efficiency, lab technicians ensuring quality control in ethanol plants, machinists crafting grid connection components and technicians assembling wind turbines – do not require advanced degrees.

New educational programs are opening up green career paths. For example, community colleges are initiating new programs in high-demand fields that include energy auditing, home weatherization, solar fabrication, and wind turbine manufacturing and maintenance. These education programs are great feeder systems for sector-specific jobs with wind or solar companies, but they are also feeding the utility industry. As an example, wind turbine technology programs train students to work in electric power transmission and distribution (2009 Clean Edge).

In a 2005 survey by the National Association of Manufacturers, 90% of respondents indicated a moderate to severe shortage of qualified skilled production employees such as machinists and technicians. In addition, "according to a 2007 study on the status of the green job market in Berkeley, California, most green business owners and managers reported that their businesses were growing and that they were having difficulty finding appropriately trained new workers. 73% of the California businesses cited a shortage of skilled/qualified workers, with the greatest need in energy, green building, and mechanics" (2007 The City of Berkeley Office of Energy and Sustainable Development). As stated in the Center on Wisconsin Strategy April 2009 News, "the first basic need is a talent pool. Companies aren't just looking for workers. They are looking for workers who can adapt to new technology and it's often a mistake to think that companies are only looking for bodies, they're really looking for skill sets."

Leaders at Wisconsin technical colleges are developing programs to meet the opportunities being forecasted. However, the challenge is creating course materials and curricula on the fly to respond to jobs that are projected to be open and then to be nimble enough to adapt again when technology creates new jobs (2010 Center on Wisconsin Strategy News). It is for this reason that Wisconsin has created the Madison Area Technical College's Consortium for Education in Renewable Energy Technology (CERET), which works with educators in several states to develop classroom and online curricula that prepare students for both jobs now, and jobs in the future. This type of multi-track alternative energy training program can allow workers access to careers in a variety of renewable sectors and broaden their skills set to make them qualified for a broader range of jobs (2008 Center on Wisconsin Strategy).

Expanding Green Job Opportunities

Wisconsin is well positioned to take advantage of the country's interest in a green economy. We have a tradition of manufacturing excellence, existing infrastructure, a workforce with training and experience in manufacturing technology and a populace that believes in the importance of the middle-class. We have an excellent technical college system, and some of the leading universities in the country. In addition, Wisconsin's deep roots in the environment are represented by such favorite sons as John Muir, Aldo Leopold, Frederic Jackson Turner and Gaylord Nelson. Given this history, Wisconsin should be one of the leading states in developing and attracting green jobs.

The American Recovery and Reinvestment Act (ARRA) designated $500 million for projects that prepare workers for careers in the energy efficiency and renewable energy sectors. Grants to educational institutions are to fund programs to teach workers the skills required in these emerging job sectors. With appropriate training, students will qualify for job placement, which will leverage additional ARRA investments which are intended to promote economic growth.

Getting high-quality green jobs for workers in Wisconsin doesn't have to mean creating a rush of new programs. As evidenced in the Tower Tech story (below), we can easily take what we already have established and simply transform it or "green it up" (2010 Boston Herald). It is also important to compete for green jobs regionally by researching the actions of neighboring states. For example, Minnesota and Iowa are actively engaged in attracting green jobs, developing policies and rules that create a stable demand for green products or services, supporting innovation in the CleanTech area, developing a platform for coordination among state agencies, and leveraging federal funding with private sector funds (2008 Minnesota Green jobs Task Force).

WISCONSIN REGIONAL TRAINING PARTNERSHIP & BUILDING INDUSTRY GROUP SKILLED TRADES EMPLOYMENT PROGRAM

The Wisconsin Regional Training Partnership (WRTP) and the Building Industry Group Skilled Trades Employment Program (BIG STEP) are leaders in green jobs training, particularly weatherization, residential construction, lead abatement/hazardous materials removal, and general manufacturing. The WRTP was created to work with member businesses and labor unions in order to identify industry needs, and it coordinates with training providers to develop a proper curriculum for workers. This program was originally founded in the 1990s to solve the skills shortage being experienced by Wisconsin's manufacturing sector. WRTP succeeds by working with businesses, insuring a steady supply of workers (Maguire et al. 2009). This program now provides green jobs training, and also offers services such as "academic assessments and individualized tutoring for apprenticeship exams; pre-employment skills training and certification; and connections to community organizations that can assist with daycare, transportation, GED preparation, job readiness and other services" (Center on Wisconsin Strategy 2010).

These two programs are facing challenges getting the newly trained workers into the workforce due to the recent economic downturn. However, through the WRTP's tracking and evaluation system, they have found that well trained, highly skilled workers are more likely to land a job in a difficult environment than those that are less highly trained (2008 Apollo Alliance).

Why Wisconsin was the right place for Tower Tech to locate:

Tower Tech is an example of how good public policy can encourage investment in new industries. In Manitowoc, Tower Tech converted an existing factory that once built military submarines into a wind turbine tower factory. Now the factory is taking steel sheets and creating towers that are hundreds of feet tall. This is an excellent example of the potential the region harbors in terms of "ability to reorient its industrial capacities to make products for the new energy economy" (2008 Center on Wisconsin Strategy).

TOWER TECH

Wisconsin is currently finding ways to leverage local environmental, economic development, and workforce development programs to grow the green-collar jobs of Wisconsin's future.

The key to expanding green job opportunities is figuring out which sectors harbor the greatest potential for Wisconsin. Those working on the front lines say the promise of renewable energy and improved efficiencies is already creating new jobs. Mass transit is also becoming a subject of conversation as the high speed rail system connecting Madison, Milwaukee, Chicago, and eventually the Twin Cities gains momentum and popularity. Finally, Wisconsin is home to two of the greenest buildings in the country (Aldo Leopold Foundation Headquarters and the Holy Wisdom Monastery), and can "build" upon a growing reputation for innovation and excellence in the green building area.

Key Sectors for Wisconsin to Focus On

ENERGY EFFICIENCY

The existing supply of energy inefficient buildings offers opportunities to create jobs and reduce total energy demand (2008 Global Insight). The Energy Center of Wisconsin undertook two detailed studies in 2000 and 2005 to assess opportunities in the state's housing stock for efficiency measures with payback periods of 10 years or less. Applying the results of those surveys to Milwaukee and adjusting for inflation, a conservative finding was that a $243 million retrofit of the city's housing would cut energy costs by $83 million per year (2008 Center on Wisconsin Strategy). Because of these findings, in 2008, the Center on Wisconsin Strategy and the city of Milwaukee decided to launch a project that promised to both "overcome important consumer barriers to energy efficiency and leverage large sums of private capital and in turn provide many new jobs" (2008 Center on Wisconsin Strategy). This program, Milwaukee Energy Efficiency, or ME2, lets owners install energy efficiency improvements with no money upfront. Ultimately, this project creates "loans" that owners repay out of their energy savings (2009 Center on Wisconsin Strategy News).

According to a report put out by the Apollo Alliance in collaboration with Green for All, the Center for American Progress, and the Center on Wisconsin Strategy, weatherization and building retrofits currently provide the greatest number of green jobs. For every million dollars invested in energy efficiency retrofits, eight to eleven green jobs are generated. In addition, a study in 2009 by the Energy Center of Wisconsin found that if the state tripled its investment in energy efficiency, it could potentially bring in up to $900 million in savings and create between 7,000 and 9,000 jobs by 2012 (2010 Journal Sentinel). Overall, investing in homes and businesses that want to improve their energy efficiency makes sense, both for the economy and for the Wisconsin workers they will hire to do the job. (See Appendix A for additional examples of Existing State Programs.)

Critics point out that a big short-term infusion of stimulus dollars in relatively low-paying jobs does not qualify weatherization and lighting upgrades as viable long-term industries. However, new financing models such as revolving loan funds, and innovative programs like ME2, are being looked at closely by governments across the country as a way to convert these jobs into careers. Wisconsin is playing a large role in this movement and hopefully the success in Racine, Milwaukee, and Madison will encourage more projects in surrounding Wisconsin metropolitan areas. The eight direct jobs created per million dollars invested in building retrofits shows how the 'fifth fuel, 'as energy efficiency is sometimes referenced, has the potential to pack "the most bang for the buck" (2009, The PEW Charitable Trusts).

RENEWABLE ENERGY:

Renewable energy includes the subcategories of wind, solar, and biomass. Given the recent explosion of interest in wind energy, and the resulting increase in jobs in this sector (see below for additional information on the Wind Sector), society's interest in renewable energy is predicted to deliver the largest number of green jobs (2008 Green jobs Task Force). Wind and biomass currently provide an opportunity for significant job growth in Wisconsin, and experts predict that we are at the beginning of a "solar wave", similar to the "wind wave" that has created thousands of new jobs in the wind sector, even during the recession.

Renewable energy technologies can provide, on average, four to six times as many jobs as equivalent investments in fossil fuels when manufacturing, installation, operations and maintenance jobs are all accounted for (2009 Blue Green Alliance). The current U.S. demand for renewable energy technologies exceeds domestic manufacturing capacity, and we are dependant on European and Chinese companies to meet this demand.

There is growing evidence that the biofuels industry has taken root in Wisconsin and is growing rapidly (2008 Center on Wisconsin Strategy). Potentially 350,000 jobs, primarily in ethanol and biodiesel production, could be created in Wisconsin if ethanol can be derived from cellulosic feedstocks. Currently there are enough corn stalks, wood chips, and switch grass in Wisconsin to replace 40 percent of our gasoline and half our coal use, while putting $14 billion back into the state economy (2009 Center on Wisconsin Strategy News).

In recognition of Wisconsin's leadership in the biofuels area, the Department of Energy provided $125 million to the University of Wisconsin to establish the Great Lakes Bioenergy Research Center. The money is to be used by scientists and engineers to conduct basic research toward a suite of new technologies to help convert cellulosic plant biomass — cornstalks, wood chips and perennial native grasses — to sources of energy for everything from cars to electrical power plants. Since receiving that grant, several projects are under development that use biomass as the raw material or energy source. Domtar and WE Energies have proposed a 50 megawatt wood waste powered plant for Rothschild. In addition, Flambeau River Papers of Park Falls is developing plans for a bio-refinery to make biodiesel and wax from wood waste. Finally, the Charter Street plant on the University of Wisconsin Madison campus is being converted to burn biomass .

In 2009, Wisconsin spent $23.5 billion on energy, with nearly all of that money leaving the state to purchase fossil fuels (2009 WI Sustainable Business Council). According to Satya Rhodes-Conway, a senior associate with the Center on Wisconsin Strategy (COWS), "renewable energy generates more jobs per megawatt of power installed, per unit of energy produced and per dollar of investment than fossil fuel energy" (2009 Center on Wisconsin Strategy News). To foster growth in this sector, Minnesota provided tax credits for installation of renewable energy systems, created additional specialized training programs to support industry growth, developed a biomass to energy grant program to support development of this market, and created a grant program to support the development and adoption of new renewable energy technologies (2008 Minnesota Green jobs Task Force). (See Appendix A for additional examples of Existing State Programs.)

MASS TRANSIT AND RAIL

Although building rail systems entails long lead times, higher funding for existing mass transit and rail projects would result in job growth in engineering, electrical work, welding, metal fabrication, and engine assembly (2008 American Progress). Rail is important in urban environments and to connect urban centers. Washington D.C. and Chicago have both been very successful in reducing the number of cars driven into the central city, and Charlotte and Portland (cities comparable to Madison) have very successful light-rail systems.

According to a Fall, 2010 report from WISPIRG, the new high speed rail network connecting Chicago and Minneapolis (running through Milwaukee and Madison) will create 13,000 jobs in Wisconsin. These jobs include manufacturing jobs related to train and railcar construction, the development, maintenance and operations of the trains and intermodal stations, and jobs in private development in and around the intermodal stations (2010 Connecting the Midwest Report).

GREEN CONSTRUCTION:

The construction sector has been hit disproportionately hard by the current recession. However, there is still building being done, and a large share of the new building is either being done to Leadership in Energy and Environmental Design (LEED) standards or Energy Star standards. This bodes well for the future, since construction workers are learning on the job about how green building requires more attention to detail than traditional building. An increase in the pursuit of LEED or other green standards will increase green jobs related to design and construction, and the manufacture of green products used in building construction (2008 Minnesota Green jobs Task Force).

Many builders (both those doing new building and retrofits) don't understand green construction techniques or technologies. The green construction workers of tomorrow are today's builders, with additional training. As green building technology becomes increasingly popular, it will become important for traditional builders to develop their skill sets in ways that will allow them to transform large numbers of ordinary buildings into the most energy efficient buildings possible. A dollar invested in energy efficient retrofits creates significantly more jobs than a dollar invested in fossil fuel production, and the dollar invested in energy efficient retrofits stays close to home (2008 Center on Wisconsin Strategy).

Wind as a Special Example

Wind power installed capacity increased by 39% in 2009, in spite of the recession. More wind capacity was added in 2009 than capacity from any other source of electricity. In fact, the US added as much wind capacity as all of Europe, and almost as much as China. Yet, many components of the wind power manufacturing chain don't have a manufacturing presence in the US. This is starting to change.

The Renewable Energy Policy Project (REPP) has published a series of reports identifying the potential for states with existing industrial infrastructure and skilled labor to become component manufacturing leaders for the wind industry. More than the construction or operation of wind farms, component-manufacturing delivers wind industry jobs. For every megawatt of new wind power capacity, REPP estimates 4.85 Full Time Equivalent (FTE) jobs are created to manufacture, install, and then operate and maintain a small wind farm. If the country could put together the $62 billion dollar investment required to expand wind capacity by 125,000 MW over the next 10 years, we would stabilize U.S. carbon emissions. We would also create nearly 400,000 domestic manufacturing jobs. Wisconsin could be a primary beneficiary of that investment (2009 Blue Green Alliance).

Not all of the benefits of wind power in Iowa accrue to just Iowans. Iowa manufacturers rely upon a supply chain that spreads to other states and around the world. According to the International Trade Administration, the U.S. manufacturing capacity cannot keep pace with demand for products such as wind turbines. Therefore, this market is projected to experience a 40% compound annual growth rate between 2008 and 2013. As a result, the U.S market for wind turbines, components and systems is bound to increase (2008 Minnesota Green jobs Task Force). Rust belt manufacturing strongholds like Wisconsin have the foundries and heavy-duty manufacturing facilities needed to supply the wind industry (2009 Blue Green Alliance).

Iowa's success in the wind industry

Wind power is relatively new, and the majority of jobs related to wind come from manufacturing equipment. The manufacturing of blades, turbines, towers and component parts draws on existing manufacturing expertise, expertise that is well represented in the Midwest. Iowa sought to establish itself as a manufacturing base for the wind sector and committed to growing this expertise before the recent explosion of interest in wind. In 2009, Iowa generated a greater percentage of their electricity from wind than any other state and was home to TPI Composites and Siemens (major blade manufacturers), Clipper Windpower and Acciona (major turbine manufacturers), Trinity Structural Towers (major tower manufacturer) and Horizon Wind (one of the largest wind farm developers in the US). In 2009, 2,300 jobs were associated with wind manufacturing in Iowa, the most in the nation (2010 Iowa Office of Energy Independence).

Wind power can create hundreds of thousands of jobs. These projects also stimulate the rural economy by pumping $15-20 million into the local economy for each 100 megawatts of power produced (2009 Blue Green Alliance).

Existing Federal & State Policies & Initiatives

Wisconsin is well positioned to attract and grow green jobs in the state. Through Wisconsin's focus on energy efficiency, as well as strategic developments with the business community, leadership on green jobs can translate into economic benefit for the state and its workforce. If done correctly, green job initiatives that provide a progression path for low-wage workers can generate a "green wave that lifts all boats" (2008 Center on Wisconsin Strategy).

FEDERAL GREEN R&D FUNDING:
Wisconsin received 132 awards and had 25 recipients of federal green R&D funding over the 2002-2007 grant period. Wisconsin has a number of organizations engaging in green research and development. Some of Wisconsin's green R&D programs include the Michael Fields Agricultural Institute (East Troy), and companies conducting energy related research such as Cooper Power Systems (Waukesha), Virent Energy Systems (Madison), ZBB Energy (Menominee Falls) and Waukesha Electric (Waukesha).

2009 FEDERAL STIMULUS PACKAGE:
The United States' $787 billion stimulus plan, officially the American Recovery and Reinvestment Act (ARRA) of 2009, largely targeted financing green job creation and distributed infusions of federal funds to all states.

- Energy efficiency attracted more than 35 percent of the estimated $470 billion in green stimulus funding from January to May 2009 (2009 Clean Edge).
- Nearly $85 billion was allocated to direct spending and tax incentives for energy, transportation, and related programs (2009 The PEW Charitable Trusts).
- Roughly $197 million was allocated to state weatherization and energy funding (2009 Center on Wisconsin Strategy News).

In Wisconsin, these funds are distributed through the recently created Office of Energy Independence.

STATE LEADERSHIP ON RENEWABLE ENERGY:
Since taking office, Governor Doyle set an aggressive agenda to position Wisconsin as a leader in a growing green economy. In spring 2008, he introduced a comprehensive plan entitled "Green Wisconsin, a Plan for Energy Independence." It promoted an affordable, renewable, and diverse energy supply with targeted investments in job creation and new business opportunities while improving the environment. Since then, Wisconsin has created the energy independent communities program, invested in green job creation, positioned itself to lead in research in cellulosic ethanol and biomass, made great strides to increase energy efficiency in homes, businesses and government buildings, and most notably adopted renewable portfolio standards (RPS) (2010 Wisconsin Department of Commerce). The renewable portfolio standard (10% of electricity must be generated from renewable sources by 2015) have helped spur the growth of wind, solar, and biomass industries in Wisconsin. The same can be seen in other states that have adopted Renewable Portfolio Standards.

Creating a state RPS is an important first step in developing a renewable energy industry in the state. An RPS creates certainty for investors that renewable energy will in fact be purchased at a competitive price. As Wisconsin approaches the capacity to generate 10% (the current requirement) of its energy from renewable resources, continuing investment in new alternatives will diminish or dry up. California recently extended their RPS so as to encourage continuing investment in their growing renewable energy industry.

Wisconsin is one of twenty-three states that are participating in a regional greenhouse gas initiative. These regional initiatives are seeking to increase renewable energy generation and reduce carbon emissions that cause global warming from power plants. Wisconsin has banded together with other Midwestern states to develop the Midwest Greenhouse Gas Reduction Accord (2009 The Pew Charitable Trusts).

GREEN TO GOLD FUND

In Governor Doyle's January, 2010, State of the State address, he announced the creation of the Wisconsin Green to Gold Fund, a $100 million revolving loan fund to help manufacturers move into clean energy production or improve their energy efficiency. The initial capital was to come from existing State Energy Program dollars Wisconsin received through the stimulus bill (the only state to use ARRA funds to support its manufacturing sector) and future Wisconsin Energy Independence Funding (funding that goes toward clean energy manufacturing and research and development).

The Green to Gold fund is to issue loans to manufacturers for:

- implementing energy efficiency measures in their facilities;
- retooling to manufacture products that support the green economy;
- expanding or establishing domestic clean energy manufacturing; or
- creating or retaining jobs engaged in the preceding activities.

PROFITABLE SUSTAINABILITY INITIATIVE

The state is also implementing a $1.75 million pilot project being coordinated by the Wisconsin Manufacturing Extension Program (WMEP). The pilot project has identified 50 small manufacturers, assessed their strengths and weaknesses in terms of sustainability practices, and is in the process of helping them implement sustainability measures that reduce their costs and their impact on the environment.

The pilot program is to target more than energy efficiency improvements. WMEP and its partners will assess participating companies' policies in such areas as energy use, transportation logistics, manufacturing operations, packaging practices, environmental remediation and supply chain issues.

CLEAN ENERGY JOBS ACT

In late 2009, Governor Doyle introduced the Green Energy Jobs Act (CEJA). A comprehensive economic assessment of CEJA found that the package would directly create at least 15,000 jobs in Wisconsin by 2025. More than 1,800 jobs would be created in the first year alone. The assessment also found that between 800 and 1,800 construction jobs would be created each year from 2011-2025. Even more important to Wisconsin, over 2,000 manufacturing jobs would have been created once the law was fully implemented (2010, Wisconsin Department of Commerce).

In April, 2010, the legislature was unable to pass CEJA and the bill died without a vote in the full senate.

Market Opportunities & Hiring Outlook

The number of jobs in the green economy, and how fast the number is growing, are signals to potential investors, both private and public, of promising market opportunities.

Wisconsin is considered to have a small green economy, even though the largest manufacturer in Wisconsin, Johnson Controls in Milwaukee, is a major player. Johnson Controls focused on making buildings more energy-efficient and allowing them to generate their own power. They expect to add 17,000 energy-related jobs in coming years which would mark a 30% boost in employment from current levels. (2010 Milwaukee Journal Sentinel).

Conclusion

The United States, and Wisconsin, will be focused on job creation over the next five to ten years. Creating green jobs has to be a part of the future if we hope to maintain our role as a manufacturing state. Green jobs will gravitate towards states that are the most attractive, or to states that actively increase their attractiveness relative to competing states. The states that actively recruit green businesses will prosper in the longer run.

Wisconsin has a long history of manufacturing strength, and we are increasingly attracting manufacturing companies that are creating green jobs. But we can do more. We have only to look at our neighboring states of Iowa or Minnesota to see the benefit of establishing Wisconsin as a hotbed of green expertise.

New green businesses can create jobs, generate revenues, and help Wisconsin re-emerge as a bell-weather state in the heartland of America.

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Appendix A

INITIATIVES FOCUSED ON ENERGY EFFICIENCY & RENEWABLE ENERGY:

WE2
The initiative, Wisconsin Energy Efficiency, or WE2, was enacted to help overcome the barriers to energy efficiency such as inconvenience, lack of information and lack of financing. This program seeks to make retrofitting easy and accessible to both businesses and residential homes in Madison, Milwaukee (ME2), and Racine (REEP). These state programs are funded by $20 million from the Federal Stimulus Package (2010 Center on Wisconsin Strategy).

The programs allow home and building owners to pay for the cost of energy efficiency improvements as a charge on their municipal services bill, on a schedule that allows them immediate savings. These repayments are even adjusted so that the building owners see a savings each month (Center on Wisconsin Strategy News). If a participating building owner or occupant leaves the property before repayment is complete, the remaining obligation is simply transferred over to the next owner since they will now be benefitting from reduced energy costs. This particular initiative is not focused on giving one-time grants to people, but instead is about establishing revolving funds that can just recirculate the money as retrofits are completed to other households (2010 Center on Wisconsin Strategy).

All in all, this is an essential investment in a green future for our state.

- The program will create thousands of good jobs that range from entry level to highly skilled, all filled locally
- The total value of the retrofit program in Wisconsin is expected to be $120 million. The grants require the private sector and other funding sources to raise five times as much money as the federal tax dollars allocated to the project
- Madison is working on a variety of energy efficiency initiatives, and is expected to launch pilot programs to retrofit residential and commercial buildings, as well as a job-training program in energy-efficiency work

(2010 Center on Wisconsin Strategy News)

REEP
Racine's Energy Efficiency Program, or REEP, was launched in March of 2010. The program emphasizes that it can save customers up to 40% on their energy bills (2010 Journal Sentinel).

MILWAUKEE SHINES – PACE SOLAR LOAN PROGRAM
The city of Milwaukee also recently launched a similar solar-financing program, the Milwaukee Shines PACE Solar Loan Program. Milwaukee Shines has been allocated $135,000 for initial loans from a We Energies grant to start the solar initiative (2010 Journal Sentinel). Just like the retrofit programs, the solar initiative will eliminate the significant upfront cost associated with installing a solar system, either solar electric or solar hot water systems. Participants can save money on reduced costs for energy and use that money to pay back the city for the system. Program managers expect the initial budget to fund between 9 and 12 loans. However, the project is designed as revolving loan fund, so as loans are repaid in full more loans can be created. The first day applications were accepted was May 1, 2010.

ME2

ME2 is the Milwaukee Energy Efficiency initiative, which aims to retrofit as many of the city's residential, commercial, and institutional buildings as possible by helping cover the upfront costs of energy-saving upgrades. This project, created by Joel Rogers, was first developed as a way to "simply insulate some of the draftiest buildings in the city and train the unemployed for green jobs such as insulating homes" (2009 Center on Wisconsin Strategy News). However, the effects of this program have expanded and are huge. The program is now even helping address the biggest challenges faced by businesses when investing in energy efficiency, such as the long payback periods associated with these investments and the insecurity over how quickly buildings change hands. Therefore, this initiative's financing plan has the potential to break through those previously existing financing barriers (2010 Milwaukee Journal Sentinel).

Milwaukee can look forward to seeing a significant reduction in overall energy use and the corresponding cost savings of doing so. ME2 draws on $500 million in private capital, which is to be paid back over 10 years through energy savings (2008 Apollo Alliance). The program will not only provide funding for the retrofits, but will also initially provide expertise since many owners lack knowledge on the topic of retrofits (2008 Center on Wisconsin Strategy).

- Nearly $1.5 million will be spent on the residential program to help homeowners afford the upfront costs of energy-saving upgrades.
- According to city projections, this project has the potential to save the city $300,000-$450,000 a year (2009 Center on Wisconsin Strategy News).
- Among goals of the program are reducing energy use in the residential sector by 15% and in the commercial and industrial sector by 20% by 2025, connected to the goals outlined in our Renewable Portfolio Standard.

RIVER FALLS MUNICIPAL UTILTIES EFFICIENCY PROGRAM

A similar program in Pierce County allows residents to spread out payments on renewable energy additions such as wind turbines, geothermal systems, and solar electric or hot water systems.

MADISON'S "MadiSUN" PROGRAM

The two-year MadiSUN Solar Energy Program was launched by the City of Madison to promote solar for homes and businesses in Madison in an attempt to increase the city's commitment to sustainability. The purpose of the SUN program is the "streamline the process of installing photovoltaic solar-electric panels, and to make it less intimidating" (2008 WKOW). This project's goal is to double the number of solar electric and hot water installations in the city by 2011, ultimately creating green jobs along the way. In order to do so, the program provides interested residents and businesses with a free consultation from a solar agent. This agent provides the potential client with technical expertise as well as answers questions about design and rebates.

The program plans on doubling the use of solar energy in Madison over two years by:

- Simplifying the installation process
- Working to simplify the decision-making process for building owners
- Reducing the length of time required for installations to be completed

(2009 Solar America Cities)

As of June 2009, the program had 404 inquires, 274 quick-look report cards issued, 121 site visits done, 5 systems installed (2 commercial and 3 residential). Overall the program hopes to make Madison a model solar city for the Midwest. The program is funded in part by a grant from the U.S. Department of Energy, through its Solar America Cities program.