



2012 Clean Energy Jobs Year-in-Review and Fourth Quarter Report

Since September 2011, Environmental Entrepreneurs (E2) has documented the growth of the clean energy sector in its monthly Clean Energy Jobs newsletters. Based on announcements detailing new hiring by companies, cities, and organizations, E2's reports show that clean energy and clean transportation are helping drive innovation and job creation in America. You can find each monthly report at www.e2.org/cleanjobs.

BROAD CLEAN ENERGY GAINS IN 2012

In his State of the Union address, President Obama laid out national goals to double energy efficiency and production of clean, renewable energy. Based on the clean energy announcements E2 tracked in 2012, we are well on our way to reaching those achievable goals.

More than 110,000 clean energy jobs could be created based on the 300-plus clean energy and clean transportation announcements tracked by E2 last year. These jobs were announced in every clean energy sector and in every region of the country. These jobs are helping to revive the manufacturing sector in states like North Carolina and Ohio, cutting energy costs for municipalities, and scaling up new industries like electric vehicle manufacturing.

Despite 2012's gains, there were setbacks for the sector late in the year. Specifically, E2 tracked about 2,000 fewer jobs in the fourth quarter in all non-public transportation sectors when compared to the third quarter. E2 also found a sharp fourth-quarter drop in wind energy manufacturing job announcements due to regulatory uncertainty in Washington.

NORTH CAROLINA, SOLAR GAINS OUTSHINE PTC SETBACK

E2 identified several trends in the clean energy economy in 2012. Three of these trends merit highlighting near the top of this report: North Carolina's strong fourth quarter, solid gains in solar, and the negative effect chronic regulatory uncertainty had on the wind energy manufacturing industry.



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North Carolina

First, North Carolina announced more than 7,600 jobs in the fourth quarter alone, thanks to a major light rail project—by far more than any other state. While the West Coast remains a top region for generating clean energy job announcements, growth in two transportation industries—electric vehicle manufacturing and light rail—has vaulted North Carolina into a top-tier state for clean energy jobs, lifting the entire Southeast along with it.

Solar

Second, solar energy was a consistent job creator throughout the year, with 19,100 jobs announced in power generation and manufacturing nationwide. Other clean energy industries experienced steady numbers throughout the year as well—including wind power generation, energy efficiency, advanced vehicle manufacturing, and public transportation. But solar energy's job announcement gains were noteworthy for their relatively high and steady numbers in every quarter.

PTC Setback

And third, the clean energy economy hit a speed bump in the wind energy manufacturing industry. Because Congress was slow to act on an extension of the wind energy Production Tax Credit, or PTC, wind energy developers delayed or canceled projects. With a slowdown in orders, wind energy manufacturing companies experienced a corresponding decline in job announcements in the second half of the year.

Early indications from 2013 show that thanks to the PTC's extension—which was part of the last-minute “fiscal cliff” deal—the wind manufacturing industry has regained some of its footing. For example, Vestas announced it will hire at least 100 workers at its Pueblo, Colorado wind turbine manufacturing plant, a move the company directly attributed to the PTC's extension.¹ However, layoffs announced in late February elsewhere in the company are a reminder of the lingering effects of delayed action on the PTC.

SPECIFIC PROJECTS ILLUSTRATE SECTOR'S REACH

In addition to the aforementioned trends, seven businesses or programs that had compelling stories in 2012 are featured in this report. Most are updates of profiles from previous E2 reports. For example, E2 revisits ABB Inc. in North Carolina, a cable manufacturer for wind farms; the Oregon Cool Schools initiative, a successful statewide energy-efficiency project; and Global Green Lighting, a pioneering manufacturer and installer of radio-controlled light-emitting diode (LED) lighting systems in Chattanooga, Tennessee's parks and neighborhoods.



Policies that emerge from Washington have a significant impact on the clean energy economy. Groups of E2 business leaders make frequent trips to Washington, D.C., to explain to elected officials the impact clean energy has on their home states.

For these businesses and projects, policies that emerge from state capitals and Washington, D.C., matter. Comments made by President Barack Obama in his Inaugural Address and in the State of the Union demonstrate that his administration recognizes that clean energy is a significant job creator. And as E2's analysis shows, if the proper, long-term regulatory environment is firmly put into place, 2013 could be another year of growth for America's clean energy jobs.



In November 2012, the U.S. Senate cast a vote that ensures the military can continue its investments in advanced biofuels that do not interfere with the food supply. Commercialization of clean energy technologies is an important role the military plays in the economy. Because of the Senate's vote, companies are scaling up production to provide the military with fuel. By 2020, the Navy and Air Force want to replace half their petroleum-based fuel with biofuels.



PROJECT REVISITED: 2G-CENERGY, St. Augustine, FL

Announcement first tracked by E2 in April 2012

Four years ago, 2G Bio-Energy Technologies Corporation, a leading German manufacturer of highly efficient, advanced combined heat and power (CHP) systems that can help business and other facilities reduce their energy bills, saw a huge opportunity to expand into the U.S. market. While more than 80 gigawatts (GW) of CHP capacity—the equivalent of more than 130 coal power plants—is currently in use at factories and buildings across the country, the United States has significant potential to increase deployment of these technologies. The formation of U.S.-based 2G-CENERGY soon followed.

After purchasing a 60,000-square-foot facility in St. Augustine, Florida, 2G-CENERGY announced in April 2012 that it would be establishing a production line and hiring up to 125 workers over the next four years.^a With its proximity to major ports, a long list of local suppliers, and a workforce with manufacturing expertise, St. Augustine made an ideal place to locate the company's operations. 2G-CENERGY's investment in St. Johns County was well-received. As Florida Secretary of Commerce Gray Swoope said at the time of the announcement, "2G's expansion will greatly benefit Florida as well as St. Augustine, and we welcome this enhancement to both the local and state economy." The Chair of the St. Johns County Board of County Commissioners, Mark P. Miner, also said, "The project will provide significant economic benefits to St. Johns County through the high number of well-paying, new jobs to be created and commercial tax base to be generated, and will complement the growing number of businesses in the County."^b

Starting in September, the company hired 50 employees and now has its production line partially up and running. 2G-CENERGY's President and CEO Michael J. Turitt believes that the company will be able to reach its targets, including its hiring goals, much faster than originally projected and is already looking at expanding the company's operations into an adjacent property it purchased next to the facility.^c

2G-CENERGY's reliable and cost-effective CHP technologies are already helping businesses across the country to reduce their energy bills. Like other CHP technologies, 2G-CENERGY's systems reduce energy use for business and other facilities by simultaneously generating electricity and useful thermal energy, such as steam, from a single fuel source. The company specializes in designing and manufacturing "plug-and-play"

or "connection ready" systems, which allow for faster and lower-cost installation at facilities than specially engineered systems.^d 2G's CHP systems can typically be installed in a day and a half and, with almost a push of a button, can be ready to use immediately. Their systems are also extremely energy efficient, producing energy for facilities at efficiencies of around 90 percent—far more efficient than conventional power plants, which supply energy at efficiencies of 50 percent or lower on average and lose more than half of the energy they could be providing as wasted heat. This results in not only energy bill savings, but also less pollution that impacts communities.^e

"We are the only one in the U.S. that is coming with this model of a complete, modular CHP plug-and-play system that will save customers at least half the investment and we can have it up and running immediately," says Turitt. The companies' clients are already reporting big benefits from the systems. A manufacturer in Texas, for example, who bought two of the company's systems a year ago and would have been out of business had it not installed this type of new technology, is saving \$40,000 a month in energy costs, which will help the company payback its initial investment much more quickly.^f

2G-CENERGY believes that with the right policies in place to improve energy efficiency, CHP technologies could help many other businesses significantly reduce their energy bills and increase their competitive edge. President Obama's executive order on increasing industrial energy efficiency, which was issued in the fall of 2012 and set a national goal of increasing CHP by 40 GW by 2020, was a good start in focusing more attention on increased deployment, according to Turitt. The company hopes that policymakers will follow suit. "Even one small change in legislation to support CHP and the market would explode," says Turitt. "If our lawmakers could get their heads around the technology's potential, think differently, we could have an energy revolution." In the meantime, 2G-CENERGY keeps moving full steam ahead in Florida. "The market looks great, the future looks bright," says Turitt.^g

^a <http://www.prurgent.com/2012-03-26/pressrelease232863.htm>

^b Ibid.

^c Personal interview with Michael J. Turitt, February 6, 2012.

^d <http://www.2g-cenergy.com/about.html>

^e Personal interview with Michael J. Turitt, February 6, 2012.

^f Ibid.

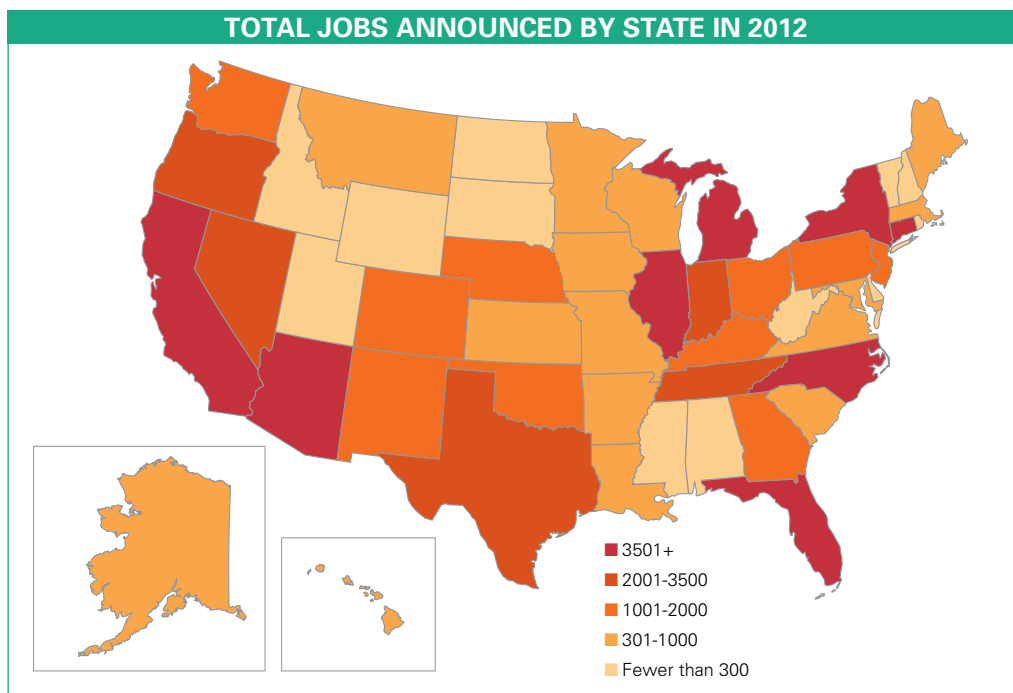
^g Ibid.

2012 JOB ANNOUNCEMENTS

RANK*	STATE	PROJECTS ANNOUNCED	PROJECTS IN OPERATION**	PROJECTS IN PROGRESS**	PROJECTS ANNOUNCED**	TOTAL
1	California	38	1,640	21,126	3,588	26,354
2	North Carolina	19	445	2,121	8,301	10,867
3	Florida	11	539	250	7,870	8,659
4	Illinois	16	1,374	614	4,630	6,618
5	Connecticut	4	-	50	4,908	4,958
6	Arizona	14	620	1,950	1,512	4,082
7	New York	15	61	700	3,032	3,793
8	Michigan	19	472	980	2,262	3,714
9	Texas	13	1,127	640	1,700	3,467
10	Oregon	13	445	702	1,757	2,904

* States have been ranked by the total number of jobs announced in media reports over the past year.

** "In Operation" denotes that an energy project has gone live or a manufacturing facility is on line; "In Progress" is used for any project in construction or any program that has been initiated; and "Announced" captures those projects in earlier stages of development.



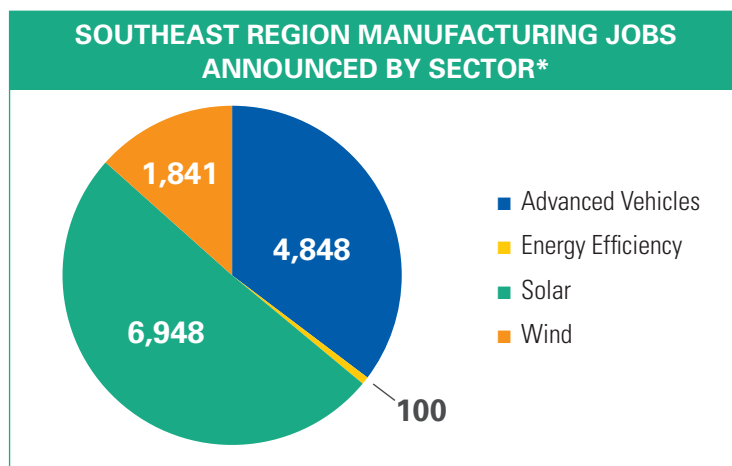
These data cover job announcements from 2012 media reports and are not an exhaustive tally of job creation in the clean economy. Our job announcement database and analyses for this report were based on media announcements found and dated during the calendar year 2012.

REGIONS ACROSS COUNTRY ARE HOSTS TO DIFFERENT TECHNOLOGIES; SOUTHEAST A CLEAN ENERGY MANUFACTURING HUB

Different regions of the country are emerging as hubs for different clean energy technologies. For example, the West Coast saw public transportation projects in Los Angeles and the Bay Area. And in the solar industry, the West Coast also experienced heavy job announcement numbers thanks to the nearly 20 solar farms sprouting up across California.

In the Southwest, energy-efficiency manufacturing has experienced gains in job announcements in states like Arizona. Led by Illinois, the Midwest was one of the top regions for growth, largely attributable to smart transmission upgrades.

The Southeast led all U.S. regions for clean manufacturing with more than 13,700 jobs announced in 2012—about 80 percent of the nation's total in that sector. Solar, advanced vehicles, and wind were the lead industries for manufacturing in the Southeast.



*Southeast region states include: AL, AR, FL, GA, LA, MS, NC, SC, and TN

PROJECT REVISITED: Global Green Lighting, Chattanooga, TN Streetlamp Replacement Project and Hixson, TN manufacturing facility



CREDIT: JOHN BAMBER, BAMBER PHOTOGRAPHY

Announcement first tracked by E2 in January 2012

Downtown Chattanooga, Tennessee, got new lights for Christmas. Last year, the city contracted with Global Green Lighting (GGL), a local manufacturer of high-efficiency light fixtures, to replace its 26,500 streetlamps, spurring a rush of economic activity.^a

GGL acquired a 180,000-square-foot facility last fall in nearby Hixson, Tennessee, installed four production lines imported from the company's subcontractor in China, and began production of its state-of-the-art LED street lights in December 2012. "It's important that we keep our commitment to the City of Chattanooga to produce the lights they purchased from us here in Chattanooga and create local jobs as a direct result of their commitment to GGL," said Don Lepard, the company's founder, president, and CEO.^b

GGL currently has 25 employees and is ramping up with plans to hire 50 to 75 additional workers by the end of the first quarter of this year. The company expects to fill 250 skilled manufacturing, engineering, and marketing positions by the end of 2013.^c With that workforce, Lepard says his company could produce up to 20,000 LED lights per month.^d And the manufacturing, installation, and maintenance of the new lighting systems across the USA, will create more than 1,000 direct and indirect jobs.^e

GGL is not only improving Chattanooga's light fixtures, it is utilizing the local utility's fiber-optic network to enhance the city's lighting grid. Over the next three years, the company will be upgrading the grid to accommodate its custom-designed wireless radio-control technology, which will allow city officials and law enforcement to control each light with a radio signal. Using the city's network to access the server, the city can switch streetlamps on and off or change brightness to fit an area's needs. The new smart lights alert maintenance workers when they burn out, when there's a loss of power, or if repairs are needed.^f

Replacing the old lights with LEDs would alone cut energy use by an average of 70 percent and, with GGL's radio-controlled system, the improvements will save the City of Chattanooga upwards of 80 percent

on its lighting-related energy expenditures. That could translate to \$2.7 million in annual savings once the project is complete. At a total estimated cost of \$18.1 million, the new lighting system will pay for itself in less than seven years, according to David Crockett, the now—retired director of the city's Office of Sustainability.^g

Chattanooga received \$211,000 in federal stimulus funding to finance the \$251,000 project's pilot phase—the lighting of the City's Coolidge Park, which was once beleaguered by gang violence. Since the city installed the new lights, criminal activity in the park has disappeared allowing law-enforcement resources to be used elsewhere, nearby businesses now thrive and keep their doors open long after dark, and the city saves money on energy and maintenance costs. The city has not had to maintain the lights in the two years since their installation.

In March 2012, the City Council voted to fund the lighting project's first phases for \$6 million using low-interest state bonds. GGL then applied for a federally-backed Small Business Administration loan to support GGL's expansion, preparations, and first installments. Five hundred new lights were installed in downtown Chattanooga in December 2012 and an additional 5,500 are scheduled to be deployed across the city this March. Once the first phase is completed, the city will consider multiple options to fund the balance of the project cost.^h

Government and city officials, engineers, commercial investors, and universities from around the world have taken note of GGL's groundbreaking combined low-energy lighting and smart grid technologies. The company currently has requests for transmitters—the first component of their smart-lighting system—in 26 different U.S. cities.ⁱ As GGL has shown in Tennessee, innovative infrastructure upgrades support American businesses, creates domestic jobs, reduce energy use and costs for taxpayers, and make our cities safer, nicer places to live.

^a Mary Jane Credeur, "Chattanooga's Radio-Operated Streetlamps," Bloomberg Businessweek, May 10, 2012, <http://www.businessweek.com/articles/2012-05-10/chattanoogas-radio-operated-streetlamps>

^b Tom Ballard, "GGL buys vacant manufacturing plant, plans to add up to 400 jobs," Tecnovation.biz, <http://www.teknoovation.biz/2012/11/08/ggl-buys-vacant-manufacturing-plant-plans-add-400-jobs/>

^c Personal Correspondence with Don Lepard, founder, president, and CEO of GGL, January 23, 2013.

^d Tom Ballard, "GGL buys vacant manufacturing plant, plans to add up to 400 jobs," Tecnovation.biz, <http://www.teknoovation.biz/2012/11/08/ggl-buys-vacant-manufacturing-plant-plans-add-400-jobs/>

^e "Green Lighting In Chattanooga - Savings, Safety and Jobs," Community Broadband Networks, May 22, 2012, <http://www.muninetworks.org/content/green-lighting-chattanooga-savings-safety-and-jobs>

^f Mary Jane Credeur, "Chattanooga's Radio-Operated Streetlamps," Bloomberg Businessweek, May 10, 2012, <http://www.businessweek.com/articles/2012-05-10/chattanoogas-radio-operated-streetlamps>

NORTH CAROLINA EMERGES AS NATIONAL LEADER IN CLEAN JOBS

North Carolina is emerging as a leader in clean energy job creation, especially in the electric vehicle space. With a strong manufacturing workforce, the state is electrifying our automobile fleet: nearly 2,000 new jobs were announced in this space in North Carolina in 2012.

For example, Biowheels RTS in Asheville makes solar-powered charging stations for electric vehicles. The company expects to bring 1,500 jobs to build more than 900 public charging stations throughout the state by 2015.

Due to another form of transportation—light rail—North Carolina showed strong clean energy job creation in the

fourth quarter of 2012. In October, the City of Charlotte announced plans to extend its light rail system by 9.2 miles, connecting uptown Charlotte with the University of North Carolina's Charlotte campus. With construction to commence in late 2013, the project is expected to generate an estimated 7,000 new jobs, and be completed by 2017.

E2 includes light rail projects in its clean energy jobs reports because such projects displace the need for automobiles and other modes of transportation that are less energy efficient. Commuters who take advantage of public transit often save considerable time and money and enjoy a safer mode of transportation than single occupancy automobiles.

PROJECT REVISITED: ABB Inc., Huntersville, NC Cable Manufacturing Plant



CREDIT: ABB INC.

Announcement first tracked by E2 in October 2012

Twelve miles north of Charlotte, in Huntersville, North Carolina, a 430-foot concrete tower rises high above the pine trees—the most distinguishing feature of transmission and distribution supplier ABB Inc.'s new \$90

million, 240,000-square-foot cable manufacturing plant. The factory, which opened on schedule in September 2012, is the most recent development in ABB Inc.'s rapid expansion. Based in Cary, North Carolina, the North American division of ABB Group, a Swiss-based power and automation-industry manufacturer, employs approximately 2,000 workers statewide, including 120 in Huntersville, accounting for 10 percent of its North American workforce.^a

Local and state incentives were key factors in attracting ABB Inc. to the Charlotte area, says company spokeswoman Melissa London.^b The company committed to investing at least \$84 million and hiring 100 workers in the state—targets that it surpassed by the end of 2012.^c To support that investment in the state, a number of local, state, and federal programs provided additional financing. The North Carolina Department of Commerce's Economic Incentive Committee helped provide financing to the Huntersville plant's construction with a \$2.15 million Job Development Investment Grant. The One North Carolina Fund contributed an additional \$400,000. A worker training program at Central Piedmont Community College is turning out skilled engineers to support ABB's growing workforce, while the town of Huntersville and Mecklenburg County are offering tax rebates. Federal incentives,

including \$12.3 million in funding from the 2009 federal stimulus package, also nurtured ABB Inc.'s expansion in the state.^d

In addition to creating skilled jobs and stimulating the local manufacturing base, the Huntersville plant is producing high-voltage cables to help upgrade the national electricity grid. The plant's cylindrical tower allows for the manufacture of concentric cables with solid flexible insulation as opposed to petroleum-filled insulation, so less oil is used in production. The high-tech cables are made for underground use, which is important for transmitting power through environmentally sensitive areas. And no overhead lines mean far fewer outages caused by storms. The factory will produce direct current (DC) cables that offer significant advantages for utilities, renewable projects—like wind farms—and consumers. The cables are smaller, lighter, and more efficient than their alternating current (AC) counterparts.^e

The ABB Group operates in more than 100 countries and employs some 145,000 people around the globe.^f "We are the world's largest transmission and distribution supplier—no matter what makes the power, it has to get to where it's going and we take care of that," says London.^g Energy efficiency incentives and federal, state, and local financing to support business development have been crucial in driving ABB's growth in the United States. In return, the company's advanced high-voltage cables are making our country more energy efficient and less reliant on oil.

^a John Downey, "ABB Inc. CEO says Huntersville plant contributes to N.C. energy hub," Charlotte Business Journal, September 19, 2012, http://www.bizjournals.com/charlotte/blog/bank_notes/2012/09/abb-inc-ceo-says-huntersville-plant.html?page=all

^b Personal correspondence with Melissa London, media relations specialist, ABB Inc., January 22, 2013.

^c Charlotte Business Journal, "ABB cable plant to employ 100 in N. Meck," September 9, 2010, <http://www.bizjournals.com/charlotte/stories/2010/09/06/daily29.html?page=all>

^d Personal correspondence with Melissa London, media relations specialist, ABB Inc., January 22, 2013.

^e Ibid.

^f Aaron Burns, "New jobs follow ABB to Huntersville," The Herald Weekly, September 14, 2012, <http://www.huntersvilleherald.com/business/2012/09/14/new-jobs-follow-abb-to-huntersville/>

^g Personal correspondence with Melissa London, media relations specialist, ABB Inc., January 22, 2013.

FOURTH QUARTER JOB ANNOUNCEMENTS 2012

RANK*	STATE	PROJECTS ANNOUNCED	PROJECTS IN OPERATION**	PROJECTS IN PROGRESS**	PROJECTS ANNOUNCED**	TOTAL
1	North Carolina	5	225	135	7,250	7,610
2	Arizona	3	300	-	756	1,056
3	Illinois	4	700	-	350	1,050
4	Nevada	2	-	630	420	1,050
5	Texas	2	-	-	900	900
6	Michigan	3	100	500	250	850
7	New York	2	-	-	550	550
8	Florida	3	464	-	-	464
9	New Mexico	1	-	-	450	450
10	California	2	360	-	30	390

* States have been ranked by the total number of jobs announced in media reports over the past 3 months.

** "In Operation" denotes that an energy project has gone live or a manufacturing facility is on line; "In Progress" is used for any project in construction or any program that has been initiated; and "Announced" captures those projects in earlier stages of development.

PUBLIC TRANSPORTATION, POWER GENERATION LEAD ALL SECTORS

Public transportation saw the highest number of job announcements with as many as 43,000 jobs in projects that will build or expand public transit, such as city light rail, intercity passenger rail, and bus routes and terminals. Power generation jobs came in second for the year with more than 30,000 jobs announced, the bulk of which came from solar, wind, and geothermal energy. Manufacturing, energy efficiency, and smart grid and transmission jobs announced rounded out the top five sectors.



PROJECT REVISITED: Algenol Biofuels, Fort Myers, FL



CREDIT: ALGENOL BIOFUELS

Announcement first tracked by E2 in October 2011

Nearly 30 years ago, Paul Woods invented the Direct to Ethanol® technology that his company, Algenol Biofuels, utilizes today to produce ethanol from blue-green algae at its state-of-the-art commercial development campus in Fort Myers, Florida.

Algenol's patented process uses an enclosed photobioreactor (PBR) system to cultivate enhanced blue-green algae and collect ethanol that is secreted from each tiny cell without having to harvest or kill the prolific organisms.^a

The company has made significant progress in demonstrating the success of its production process. The company's target since its inception in 2006 has been to produce 6,000 gallons of ethanol per acre year (by comparison, corn ethanol yields approximately 400 gallons per acre year) for \$1 per gallon. Efficiencies of the company's PBR systems, which employ sunlight to power ethanol production, separation, and collection, have already helped Algenol exceed its goals. The company announced last month that it has demonstrated production rates of more than 8,000 gallons of ethanol per acre per year at its Process Development Unit. In 2012, Algenol also incorporated conversion technologies to produce diesel and jet fuel from the waste biomass. A life-cycle analysis of the overall process shows more than 80 percent less carbon emissions as compared to regular gasoline.

The company has also made tremendous progress in the build-out of a pilot-scale integrated biorefinery. In October 2011, Algenol announced that it broke ground on its biorefinery, a 36-acre project adjacent to the 4-acre Process Development Unit and research laboratories where the company employs more than 120 individuals, including more than

50 with advanced degrees. The company recently finished major construction activities at the biorefinery and initial operations will begin in the first quarter of 2013. Subsequent build-out of the facility will be conducted in phases to meet the goal of producing 100,000 gallons per year, demonstrating the commercial viability of the technology.

In addition to private financing of more than \$160 million, the company received a \$25 million U.S. Department of Energy grant and a \$10 million economic development incentive award from Lee County, FL to help support the company's activities. In early 2012, the biorefinery project was delayed as a result of ambiguous and poorly-vetted state legislation that created regulatory uncertainty for algae-based technologies. Following dialogue with the Florida Department of Agriculture and Consumer Services, an exemption was created to provide regulatory certainty to algae facilities that comply with Florida's aquaculture Best Management Practices. Algenol has operated facilities in accordance with the Best Management Practices since 2007 and has collaborated with the Florida Division of Aquaculture to repeatedly demonstrate the environmental safety of Direct to Ethanol® technology.

"I need to know the rules before I commit to build a facility, and then I need the rules to continue for the life of the plant," says Woods, Algenol's founder, chairman, and CEO. The company met its 2011 and 2012 employment goal of 100 workers. Today, the Florida facility employs more than 120 full-time workers with additional positions still to be filled in 2013. Algenol is moving full steam ahead to optimize its technology and collaborate with landowners, regulators, policymakers, and community leaders to ensure the company can continue to grow in Florida. In 2013, the company will be focused on demonstrating commercially-viable operations at its biorefinery and identifying sites to build commercial facilities, each with the potential to create 2,000 to 4,000 full-time jobs—all of which could be a boon for Florida's economy.^b

^a Algenol Biofuels, "About Algenol," available via <http://www.algenolbiofuels.com/about-algenol/company-history>, (accessed on March 4, 2013).

^b Personal correspondence with Paul Woods, October 16, 2012.



2012 JOB ANNOUNCEMENTS BY SECTOR					
SECTOR	PROJECTS ANNOUNCED	PROJECTS IN OPERATION	PROJECTS IN PROGRESS	PROJECTS ANNOUNCED	TOTAL
Power Generation	162	8,884	11,632	10,042	30,558
Solar Power	82	3,175	4,854	5,760	13,789
Wind Power	64	5,448	4,182	2,972	12,602
Biomass Power	4	6	-	725	731
Biogas Power	7	-	34	510	544
Geothermal Power	3	255	2,462	-	2,717
Other*	2	-	100	75	175
Manufacturing	76	2,409	4,359	9,819	16,587
Advanced Vehicles**	39	1,393	2,545	4,170	8,108
Solar	18	185	1,306	3,814	5,305
Wind	10	831	50	566	1,447
Energy Storage	3	-	430	100	530
Energy Efficiency	5	-	28	1,109	1,137
Other***	1	-	-	60	60
Energy Efficiency	32	2,895	1,192	5,055	9,142
Public Transportation	17	-	21,724	21,395	43,119
Biofuels	16	1,658	60	1,020	2,738
Electric Vehicles	5	20	518	1,700	2,238
Smart Grid/Transmission	5	700	135	2,250	3,085
Other****	6	-	700	2,246	2,946

*Other generation includes ocean thermal and ocean wave and tidal power generation projects.

**Advanced Vehicles includes electric and hybrid vehicle manufacturing and vehicle fuel efficiency manufacturing projects.

***Other manufacturing includes public transportation and smart grid manufacturing projects.

****Other includes public investment programs for clean energy manufacturing and job training and placement.

ENERGY EFFICIENCY ATTAINS RECORD INVESTMENT LEVELS

Energy efficiency job announcements tracked by E2 showed that as many as 9,000 jobs were distributed across at least 20 states, covering all major regions of the country. Based on the most recent government energy data available, it is estimated that energy efficiency in

this area reached \$5.6 billion in 2011, which is greater than 1 percent of all electric and gas utility expenditures in 2011. This investment in efficiency that continues to grow across the United States has yielded more than twice the savings for businesses and consumers by way of lowered utility bills.²

PROJECT REVISITED: Isofoton North America, Napoleon, OH Solar Manufacturer



CREDIT: ISOFOTON

Announcement first tracked by E2 in October 2011

In 2009, solar panel maker Isofoton started searching for a U.S. manufacturing base. After interviewing more than twenty states, Northwest Ohio quickly emerged as an ideal location with a history in advanced

glass manufacturing, a skilled workforce, companies known for solar innovation and efficiency, and home to the University of Toledo's (UT) cutting-edge solar R&D and commercialization programs and local suppliers who can source parts. "It's a natural progression for our region to move into some of these high-tech industries," says Rick Stansley Jr., co-director of UT's Center for Photovoltaic Innovation and Commercialization.^a

After signing agreements to produce 280 MW of solar panels, including 250,000 panels for American Electrical Power's (AEP) Turning Point Solar project, Isofoton North America set down deep roots in Napoleon, Ohio. By October 2011, the company announced it would invest \$31.2 million and create as many as 300 jobs over the next three years.^b "We really wanted to commit to using the product within the state," says Michael Peck, chairman of Isofoton North America. "That means more jobs in Ohio when you support locally sourced and built projects."^c The company also committed to reaching 65-percent "Made in Ohio" content for its product and filling 50 percent of its production assembly line with returning Ohio veterans.^d

Isofoton North America, as well the City of Napoleon, quickly gained national attention for its innovative work and partnerships. In December 2012, the company, the University of Toledo, and other partners received the Department of Energy's highly competitive "Plug and Play" \$21 million award to develop lower cost lightweight rooftop mounted solar technology.^e That same month, the Solar Energy Industry Association came to Napoleon to award the City the title of "the biggest solar small town in the United States."^f

In January 2013, it started commercial production. Forty employees were hired to run the first 50-MW production line inside a former Campbell's Soup facility.^g

The City of Napoleon and the State of Ohio made their own commitments to help Isofoton grow. American Municipal Power worked with Napoleon officials and Isofoton North America to build a 4.2 MW solar array in 2012.^h The project produces power at a competitive 8 cents per kilowatt hour at peak times on a brownfield site in Napoleon that was in need of clean up.ⁱ The project "proved the point about Isofoton North America and the solar model generally," says Dr. Jon Bisher, Napoleon's City Manager. "People in Napoleon take pride in this solar field."^j The state also committed \$15 million in loans for the factory, which will be paid back over the next several years with the first payment due to the State of Ohio this March.^k

Beyond Isofoton North America, about 50 solar supply chain businesses employ 6,000 workers in the region's solar cluster.^l Isofoton North America and the other companies have prospered in Northwest Ohio because of the state's commitment to clean energy. In 2008, the state legislature enacted a renewable energy standard requiring 12.5 percent of the state's power to come from renewable energy sources by 2020.

Wind energy production has increased rapidly, and now the same is happening with solar. "People are putting in rooftop solar and we're starting to do more commercially. It's exciting because the standards are doing what people said they would," says Bisher. "The mindset is changing as more projects go in... People are saying we need more options... That's an awakening for this area of the Midwest."^m

With the initial security of its agreements and support from former Gov. Ted Strickland and current Gov. John Kasich (all of Isofoton North America's formal agreements with the State of Ohio were signed in 2011 under the current administration), Isofoton North America had hoped to hire approximately 120 workers by the start of the year – including 50 Ohio veterans. "The City Manager of Napoleon and I are both veterans, and we had always wanted to hire returning veterans starting four years ago when we first put the building blocks for our NW Ohio presence together," says Peck. "We've identified 126 returning Ohio vets just around the Henry County area."ⁿ

In January, however, the state's public utility commission, under pressure from Ohio utility FirstEnergy, voted to put the Turning Point project's deployment on hold. With its largest order hanging in the balance, Isofoton North America has been forced to delay hiring veterans and other applicants.

State legislative reversal of Ohio's once undeniable clean energy support threatens the region's economic future. "Companies like Isofoton North America are great examples of the people and the commitments we are most dependent on to bring manufacturing back to Ohio," says Stansley. "Just because an administration changes, doesn't mean a commitment changes."^o

Despite these challenges, Isofoton North America and the City of Napoleon aren't backing down and are committed to success in Ohio. The State of Ohio, in partnership with state universities, clean energy business groups and others, is working to reconvene an improved 2.0 version of the Turning Point solar project with a shorter execution horizon that has the potential to create up to 700 good family and community sustaining jobs in rural Southwest and Northwest Ohio starting this summer. "Turning Point and other projects in the state are so important to Isofoton North America to help it grow and gain a foothold in its infancy," says Bisher. "Our hometown solar factory is short on orders right now, but we're working hard to rectify that."^p

^a Personal Interview with Rick Stansley, Jr., January 23, 2013.

^b Jon Chavez, "Plant, projects help Napoleon earn title of 'America's Number One Solar Small Town,'" Toledo Blade, December 20, 2012.

^c Interview with Michael Peck, January 7, 2013.

^d Email Correspondence with Michael Peck, February 8, 2013.

^e "SunShot Initiative: Development of a Low-Cost Residential Plug-and-Play Photovoltaic System," U.S. Department of Energy, available via http://www1.eere.energy.gov/solar/sunshot/pnp_freedm.html, (accessed on February 11, 2013).

^f Chavez, "Plan, projects help Napoleon earn title of 'America's Number one Solar Small Town,'" Toledo Blade, December 20, 2012.

^g Personal Interview with Michael Peck, January 7, 2013.

^h Chavez, "Plan, projects help Napoleon earn title of 'America's Number one Solar Small Town,'" Toledo Blade, December 20, 2012.

ⁱ Personal Interview with Jon Bisher, January 21, 2013.

^j Id.

^k Chavez, "Plan, projects help Napoleon earn title of 'America's Number one Solar Small Town,'" Toledo Blade, December 20, 2012.

^l Personal Interview with Rick Stansley, Jr., January 23, 2013.

^m Personal Interview with Jon Bisher, January 21, 2013.

ⁿ Personal Interview with Michael Peck, January 7, 2013.

^o Personal Interview with Rick Stansley, Jr., January 23, 2013.

^p Personal Interview with Jon Bisher, January 21, 2013.



FOURTH QUARTER JOB ANNOUNCEMENTS IN 2012 BY SECTOR					
SECTOR	PROJECTS ANNOUNCED	PROJECTS IN OPERATION	PROJECTS IN PROGRESS	PROJECTS ANNOUNCED	TOTAL
Power Generation	22	925	1,187	1,503	3,615
Solar Power	14	624	650	1,308	2,582
Wind Power	7	301	537	150	988
Biomass Power	-	-	-	-	0
Biogas Power	1	-	-	45	45
Geothermal Power	-	-	-	-	0
Other*	-	-	-	-	0
Manufacturing	6	0	25	1,971	1,996
Advanced Vehicles**	3	-	-	570	570
Solar	1	-	-	800	800
Wind	-	-	-	-	-
Energy Storage	-	-	-	-	-
Energy Efficiency	2	-	25	601	626
Other***	-	-	-	-	0
Energy Efficiency	5	480	-	280	760
Public Transportation	4	-	75	7,550	7,625
Biofuels	3	464	-	-	464
Electric Vehicles	1	-	500	-	500
Smart Grid/Transmission	3	700	135	150	985
Other****	-	-	-	0	0

*Other generation includes ocean thermal and ocean wave and tidal power generation projects.

**Advanced Vehicles includes electric and hybrid vehicle manufacturing and vehicle fuel efficiency manufacturing projects.

***Other manufacturing includes public transportation and smart grid manufacturing projects.

****Other includes public investment programs for clean energy manufacturing and job training and placement.

SOLAR SHINES IN FOURTH QUARTER; PV INSTALLATION PRICES FALLING

The solar industry continues to mature globally, and it is one of the fastest-growing sectors of the U.S. economy. Solar is projected to show a gain of more than 40 percent in new total capacity in 2012 in the United States. Because of this overall growth, solar had strong fourth quarter job announcements relative to other industries.

In the fourth quarter, solar led the way with a combined 15 announced projects in power generation and manufacturing. This is more than all the other technologies (wind, biomass, biogas, geothermal) E2 tracked in the power generation and manufacturing categories combined. These solar projects could add up to more than 3,300 jobs, the majority coming from power generation.

Throughout 2012, one of the main solar industry themes was rapid solar PV price decline due to oversupply.³

Upstream oversupply is helping to lower installed cost of solar across the country. Also helping drive down costs is the U.S. Solar Investment Tax Credit, as well as state and locally mandated renewable portfolio standards.



PROJECT REVISITED: Energetx Composites, Holland, MI



CREDIT: ENERGETX

Announcement first tracked by E2 in March 2012

Prior to the global economic collapse of 2008, the ownership, leadership, and management teams of S2 Yachts, a designer and manufacturer of yachts based in Holland, Michigan, were evaluating where new business opportunities might

lie. In the fall of 2007, the team determined it was time to start the exploratory journey to find new business ventures. The diversification effort was solidified in July 2008 when Energetx Composites was founded as a standalone sister company to bring S2 Yachts' 50-plus years of composite manufacturing expertise to new markets—from wind energy and aerospace to defense and transportation.

The company's efforts in the wind energy sector began to gain traction. By June 2009, Energetx announced that it would invest \$37 million to produce utility-scale wind turbine blades and other wind energy industry composite parts, creating approximately 1,000 jobs by 2016. The company also secured \$2 million in clean energy tax credits and an additional \$27.3 million tax credit over the next 15 years from the State of Michigan in 2009 and a \$3.5 million grant from the Department of Energy's State Energy Program through the Recovery Act in 2010. Energetx investments coupled with this critical support helped this new company to innovate and reinvent its future, and to use a portion of the 800,000-square-foot yacht-manufacturing facility to expand in its infancy.

The company made significant advances in 2012. Early in the year, the company announced that it would be partnering with Aeroblade, a wind turbine blade designer headquartered in Spain, to produce a 45-meter blade—which is approximately half the size of a football field—and adding an additional 100 near-term jobs at the facility on top of its 30-person professional and leadership team.^a The company is well on its way to that goal.^b Energetx started shipping its first utility-scale blades at the beginning of this year and now employs 116 workers with more hires soon to come as it works to fulfill its current multi-year contracts and picks up additional orders across the North American market.

In addition to creating new jobs, Energetx and other composite manufacturers are driving broader economic growth in the Grand Rapids

area. The company has made several million dollars in investments and purchases in the local community and it sources services from a variety of Michigan companies in the local supply chain. The industry's growth in the area is also bringing back manufacturing to cities like Grand Rapids and Holland. In 2010, for example, manufacturing made up more than 90 percent of the growth in exports from the metropolitan area.^c

Public sector support for the company's early growth, a combination of strategic partnerships, and beneficial clean energy policies combined to help the company deepen its roots in the wind industry. In 2010, the company formed a partnership with the Grand Rapids Community College (GRCC) to provide a steady stream of composite technicians and help train workers crossing over from S2 Yachts to Energetx and other new hires. Bryan Ritterby, who was laid off from his job at an office furniture manufacturing company and highlighted by President Obama in his 2012 State of the Union address, is one of the workers that went through GRCC's program and now has a job at Energetx.^d The company also worked with the Michigan Economic Development Center in launching its business and continues to work with the Center to help root the wind energy supply chain in Michigan.

State and federal policies have also helped to expand opportunities for wind energy suppliers and companies like Energetx that are diversifying into new sectors. "State RPSs have been very important in continuing to drive the industry forward," says Chris Idema, Business Development Associate at Energetx. "This definitely has a positive impact on our business." Policies like the Production Tax Credit (PTC) for wind energy projects have also been important in driving demand for Energetx's products in the U.S. However, uncertainty over whether or not Congress would extend the PTC in 2012 hurt Energetx and other suppliers.

"The wind turbine OEMS orders were drying up as developers were not moving forward on projects," says Idema. While the PTC extension is welcome news to the company and the industry as a whole, long-term market signals are what companies like Energetx need to grow and prosper in Michigan. As Idema puts it, "We continually experience a boom and bust cycle in this industry and it will not change unless there is some type of long-term policy outlook."

^a Alex Shabad, "Made in Michigan: Energetx turbine blades," WZZM13.com, January 15, 2013, <http://www.wzzm13.com/news/article/238885/14/Made-in-Michigan-Energetx-turbine-blades>.

^b ReinforcedPlastics.com, "Energetx Composites exports wind blade moulds to Spain," June 4, 2012, <http://www.reinforcedplastics.com/view/26010/energetx-composites-exports-wind-blade-moulds-to-spain/#.T8zfMbGNy5M.email>.

^c Composites Manufacturing Online, "Top 5 Cities with Growing Manufacturing," March 26, 2012, <http://www.compositesmanufacturingblog.com/2012/03/top-5-cities-with-growing-manufacturing/>.

CONCLUSION

As numbers from 2012 and the fourth quarter showed, states across the country have made gains in the clean energy sector. Thanks to technologies like electric vehicles, and projects like Charlotte's light rail development, North Carolina is emerging as a clean energy leader. And in California, the solar industry remains on an upward trend due to a sunny climate and favorable state tax policies.

At the federal level, when Congress delayed the extension of the wind energy PTC, companies—and in particular manufacturers—laid off more than 3,000 workers. This decline was stark in the third quarter as

the PTC's expiration approached. But with a slightly more firm regulatory footing now in place, wind energy companies have resumed some hiring.

As we reflect back on 2012 and look forward to 2013, the future of clean energy comes into sharper focus: smart, serious companies will continue to develop projects that will generate more clean, renewable energy; reduce our energy waste; provide better choices for transportation and ultimately help drive economic growth.

But in order to establish optimal conditions for the clean energy sector's growth, governments at all levels should enact stable, predictable policies.

PROGRAM REVISITED: Oregon's "Cool Schools" Initiative, Statewide School Retrofit Program



CREDIT: CORBETT SCHOOL DISTRICT

Announcement first tracked by E2 in February 2012

In the picturesque community of Corbett, Oregon, 20 miles east of Portland, early morning temperatures in winter hover around freezing. Students arriving at the K-12 Corbett School—recognized as one of the best public schools in the America—could, until recently,

expect their classrooms to be not much warmer than the outside air.^a "Peak indoor temperature in some classrooms was in the low 50s!" says Superintendent Randy Trani. In need of a heating and cooling upgrade, the Corbett School District secured a \$583,000 loan in 2011 from the Oregon Department of Energy's (ODOE) Small-scale Energy Loan Program (SELP), as part of the state's new Cool Schools Initiative. Most of the money went towards buying and installing a new boiler and a web-managed control system that precisely regulates heating, cooling, and airflow in five district buildings. The upgrades were all in place by summer 2012 and are currently being calibrated, after which the district will monitor its energy savings.^b The district will repay the loan at below-market rates over 15 years, while it saves more than \$20,000 in annual energy costs. These savings are projected to increase to around \$80,000 a year after the loan has been repaid.^c

Oregon Governor John Kitzhaber announced the Cool Schools Initiative in January 2011, directing ODOE to set aside \$2 million in unused stimulus funds for energy audits on 500 public schools. In June 2011 the state legislature established the Initiative's framework as a four-year pilot program and expanded financing mechanisms so schools could implement energy efficiency upgrades.

"There is not one corner of Oregon we haven't talked to about Cool Schools," says the program's coordinator, Jon Belmont. In the first phase, 28 school districts signed up, eight of which secured \$5 million in SELP loans for energy efficiency retrofits.^d SELP has financed about half of the costs of the Cool Schools upgrades and has helped to leverage private loans and bonds to fund the rest. In Phase Two, 27 school districts secured another \$5 million in SELP loans to pay for upgrades at 60 public schools.^e The first two phases have directly created more than 300 jobs.^f The state announced the Initiative's Phase Three in the fall, and to date 27 more school districts have signed up. Plans are in the works for a fourth phase to begin later this year.

"I'm proud the Cool Schools program is helping districts save money while making a better learning place for kids," says Rep. Jules Bailey (D-Portland), a co-sponsor of the Cool Schools bill. "It's been a win-win that we need to expand."^g Studies find that energy upgrades reduce student absenteeism by 15 percent and improve scoring on standardized tests by 5 percent.^h Districts and state governments meanwhile reap the rewards of huge savings in energy expenditures and higher performing schools. "It is a rare program that simultaneously saves money for a district and state and creates a better learning environment for students," observes Superintendent Trani.ⁱ

^a Corbett School District, District Profile, <http://corbett.k12.or.us/about/district-profile/>.

^b Personal correspondence with Randy Trani, superintendent of Corbett School District, January 17, 2013.

^c Oregon Department of Energy, Corbett School District Case Study, Oregon Cool Schools (Phase I) Saving Energy Saves Everything, December 2011, http://www.oregon.gov/energy/SCHOOLS/COOL_SCHOOLS/docs/Corbett.pdf.

^d Oregon Department of Energy, Cool Schools Program Overview, http://www.oregon.gov/energy/SCHOOLS/COOL_SCHOOLS/Pages/overview.aspx.

^e Oregon Department of Energy, Phase III Cool Schools Fall Opportunity Announcement, Technical and Business Assistance Opportunity, webinar, http://www.oregon.gov/energy/SCHOOLS/COOL_SCHOOLS/docs/CS%20Phase%20III%20Opportunity%20Announcement%20Webinar.pdf.

^f Michelle Cole, "Kitzhaber's 'Cool Schools' program gets off to a lukewarm start," Oregon Live, July 23, 2012, http://www.oregonlive.com/politics/index.ssf/2012/07/kitzhabers_cool_schools_progra.html.

^g Personal correspondence with Diana Enright, Oregon Department of Energy, January 24, 2013.

^h Oregon Department of Energy, Cool Schools=Smart Savings, http://www.oregon.gov/energy/SCHOOLS/COOL_SCHOOLS/docs/cool_schools_flyer.pdf.

ⁱ Personal correspondence with Randy Trani, superintendent of Corbett School District, January 17, 2013.

Endnotes

1 Vestas will hire at least 100 in Pueblo, Pueblo Chieftain. Accessed Jan 23, 2013: <http://bit.ly/11A9Z1b>

2 Barbose, G., et al., The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025; Lawrence Berkeley National Lab, January 2013, http://emp.lbl.gov/sites/all/files/lbnl-5803e.pdf?utm_source=BenchmarkEmail&utm_campaign=RP%20Email&utm_medium=email

3 SEIA and GTM Research (Dec 2012) Solar Market Insight Report 2012 Q3. Accessed Jan 30, 2013: <http://www.seia.org/research-resources/solar-market-insight-report-2012-q3>



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