

CLEAN ENERGY WORKS FOR US: 2013 YEAR-IN-REVIEW AND Q4 REPORT

PHOTO: COPYRIGHT: 2011 MIDAMERICAN ENERGY HOLDINGS COMPANY

Clean energy and clean transportation projects continue to create American jobs and drive economic growth. By tracking job announcements from companies; federal, state and local programs and initiatives; the media; and other sources, Environmental Entrepreneurs' (E2's) jobs reports show how and where clean energy and transportation works in the United States.

For more details, including state-by-state breakdowns and more clean energy jobs stories, visit www.cleanenergyworksforus.org.

GAINS IN 2013 AND Q4

More than 78,600 clean energy and clean transportation jobs were announced in 2013 at 260 projects tracked by Environmental Entrepreneurs (E2).

Solar power generation was the year's top sector with more than 21,600 jobs announced.¹ Other strong sectors included building efficiency (12,500) and public transportation (11,400). Job announcements were made in 46 states, with California's roughly 15,400 jobs topping the list. California was followed by Texas, Hawaii, Maryland and Massachusetts.

This is the second full year E2 has tracked clean energy and clean transportation job announcements. Over the past two years combined, E2 has tracked announcements that could create more than 186,500 jobs.

Last year's job announcements were about 30 percent lower than 2012. While this is in part due to our job tracking methodology,² clean energy job growth also faced economic headwinds in 2013. These headwinds came from the continued low cost and volatility of natural gas as well as market uncertainty due to attempts by renewable



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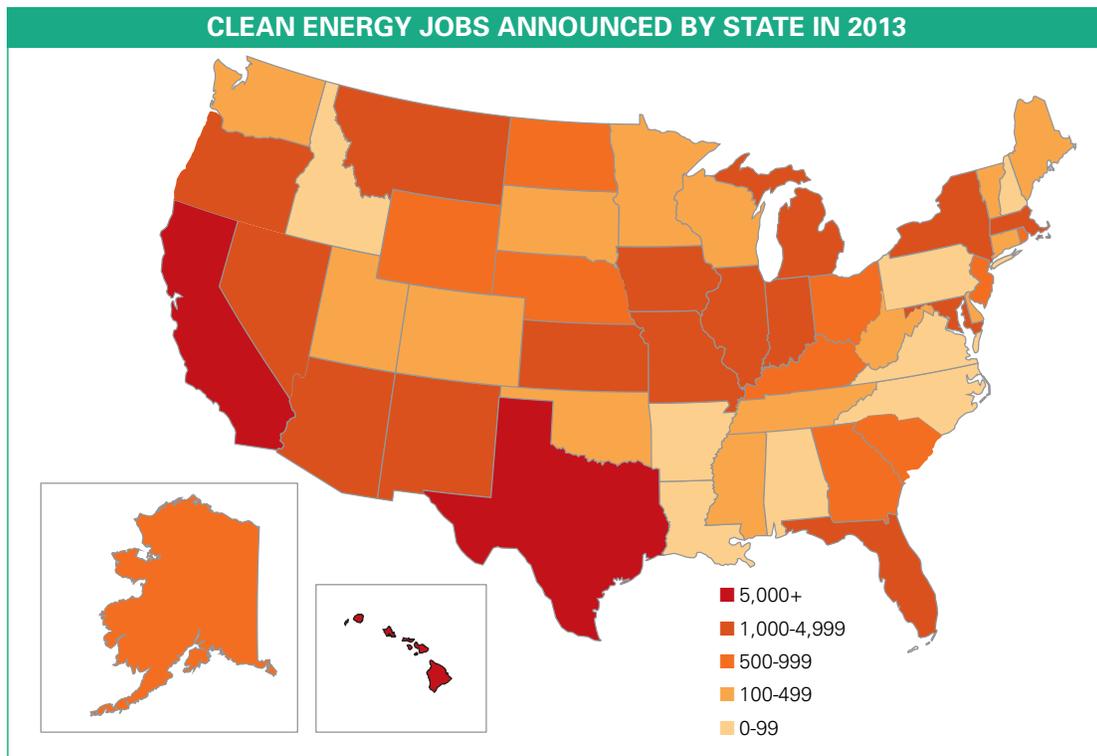
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energy opponents to roll back favorable policies at both the federal level and in numerous states. For example, fossil-fuel industry supporters attempted to roll back renewable energy standards in states such as North Carolina, Kansas and elsewhere, while at the federal level, the wind energy Production Tax Credit (PTC) and numerous energy efficiency tax incentives were left to expire at the end of 2013.

Looking at the fourth quarter alone, E2 tracked more than 70 projects nationwide that could create 13,000 jobs. Spikes in wind manufacturing and solar manufacturing added to the quarterly total, as did announcements from Southwestern states, responsible for nearly 40 percent of the jobs announced during the final three months of the year. The top five states for clean energy job announcements in the October-December period were: Texas (about 3,300 jobs), Arizona, New York, California and Iowa.

RANK ⁱ	STATE	PROJECTS TALLIED ⁱⁱ	CLEAN ENERGY JOBS ANNOUNCED IN 2013 FROM: ⁱⁱⁱ			
			PROJECTS ANNOUNCED	PROJECTS UNDER CONSTRUCTION	PROJECTS IN OPERATION	TOTAL
1	CA	42	7,755	1,880	5,762	15,397
2	TX	15	795	3,368	2,205	6,368
3	HI	5	5,422	125	201	5,748
4	MD	4	4,624	0	55	4,679
5	MA	6	4,177	250	100	4,527
6	IL	9	712	20	3,083	3,815
7	NV	12	2,995	356	7	3,358
8	OR	3	200	3,067	0	3,267
9	NY	16	3,019	130	45	3,194
10	MO	2	2,800	0	0	2,800

ⁱ States have been ranked by the total number of jobs announced in media reports and company press releases over the past year.
ⁱⁱ Project announcements spanning multiple states were each counted as one separate project per state. If job count details were not broken down by state in the announcements, the total number of jobs were divided evenly among each state.
ⁱⁱⁱ "In Operation" denotes that an energy project has gone live or a manufacturing facility is on line; "In Progress" is 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 January 2013 through December 2013 media reports, official announcements, and other sources and are not an exhaustive tally of job creation in the clean economy.

2013: YEAR-IN-REVIEW

Climate Action Plan

Announced in the summer of 2013, the centerpiece of President Obama's Climate Action Plan calls upon the Environmental Protection Agency (EPA) to set standards for the first time on carbon pollution emitted from U.S. power plants. While the plan's impact on 2013 job announcements was likely small, a study conducted by Synapse Energy Economics Inc. shows the market signal sent by standards similar to ones proposed by EPA could increase national employment by a net total of 210,000 jobs by 2020.³

EPA is in the process of developing proposed carbon standards for existing power plants, to be released in June 2014. Once finalized, state governments will develop state implementation plans for those standards. EPA is currently considering approaches that could give states flexibility to build on existing programs and policies such as state renewable energy and energy efficiency standards; participation in the Regional Greenhouse Gas Initiative; or similar interstate programs and green infrastructure banks that cost-effectively reduce pollution and spur economic growth. E2 believes this could be a powerful driver for clean energy job growth in the states in the next few years.

In the fall, EPA held 11 public listening sessions across the country to solicit ideas and input from the public and from stakeholders about the best Clean Air Act approaches to reducing carbon pollution from existing power plants. There was a broad base of support to implement the standards as a mechanism to address climate change and ensure clean air. Clean energy proponents voiced support for the new rules as well, arguing they send clear market signals that spur private capital investment that can result in hiring.

Governors support clean energy

Republican and Democratic leaders in states across the country are already taking steps to increase clean energy and reduce carbon pollution, creating thousands of jobs along the way.

For example, in the first quarter of 2013, Massachusetts announced it will retrofit 700 state buildings, potentially

creating 4,000 jobs.⁴ The announcement is meant to help the state reach energy efficiency and greenhouse gas reduction goals set in 2007 by **Massachusetts Gov. Deval Patrick (D)**. Massachusetts invests more in energy efficiency than any other state in the U.S., according to Gov. Patrick. Solar energy installations in Massachusetts have increased 71-fold and wind energy installations increased by 31-fold since 2007.⁵ A 2013 report by the Massachusetts Clean Energy Center found there are now more than 5,500 firms and nearly 80,000 workers in the state's clean economy. The Massachusetts clean economy also grew by 11.8 percent in 2013, beating out the previous year's 11.2 percent growth in the sector.⁶



In Michigan, Gov. Rick Snyder (R) in December signaled his commitment to use less coal, expand renewable energy, and invest in energy efficiency. The state has already shown how clean energy and energy efficiency creates jobs: In the third quarter of 2013, Michigan ranked fourth in the nation in clean energy jobs announced. While difficulties of legislating during an election year have delayed specifics, the governor said that by 2015 a new clean energy plan should be in place that takes the state through 2025.⁷



In Iowa, Gov. Terry Branstad (R) has also recently cheered clean energy's economic benefits. Iowa generates almost a quarter of its electricity from wind. The state also is home to biofuel companies like Poet, which announced 240 jobs in 2013. In late 2013, Iowa was awarded a \$1.03 million grant from the U.S. Department of Energy. The grant will help launch a program aimed at promoting uniform processes for installing solar photovoltaic (PV) systems throughout the state. "As a leader in wind energy and renewable fuels, Iowa should be at the front of the pack in implementing programs that encourage the use of solar energy as well," Gov. Branstad said while announcing the grant.⁸ According to a January 2014 report from the Iowa Environmental Council, adding 300 MW of solar PV in Iowa over a five-year period would create 2,500 new clean energy jobs.⁹



In Connecticut, Gov. Dannel Malloy (D) voiced support for EPA's carbon pollution standards. "Power plants are the nation's largest source of carbon pollution and this new standard will ensure the new plants are cleaner and more efficient," Gov. Malloy said in a September 2013 statement. "And by driving demand for cleaner sources of energy, this rule will help us realize the enormous economic opportunities in clean energy." Connecticut is a clean energy finance leader, instituting one of the nation's first green banks that is now housed in the state's Clean Energy Finance and Investment Authority. Green banks are now underway in several U.S. regions, states and even municipalities who want to scale clean energy investment, bringing the local economic development and jobs with them.¹⁰



Massachusetts Gov. Deval Patrick tours a wind technology testing center.

PHOTO: ISABEL SLEPOY/MASSACHUSETTS GOVERNOR'S OFFICE

These are just a few of numerous examples in which governors and other state leaders have voiced support and took action to expand the economic benefits clean energy and transportation are bringing to their states.

Regulatory uncertainty reigns

Late in 2012, Congress extended for one year a package of clean energy and energy efficiency tax incentives, such as the renewable energy PTC, which has dramatically expanded wind energy development and helped keep the industry growing in 2013. As previous E2 reports have shown, tax incentives like the PTC generate sustained economic growth by leveling the energy playing field that's currently dominated by the fossil fuels industry, which benefits from billions of dollars in annual subsidies.

Nationwide, the wind industry is the source of 80,700 jobs across fields such as development, siting, construction, transportation, manufacturing, operations, and services.¹¹ But it's once again in a fragile situation with the expiration of the PTC. This has created an environment where the wind industry grows in fits and starts, with regulatory uncertainty holding up investments and placing companies and their workers at financial risk.

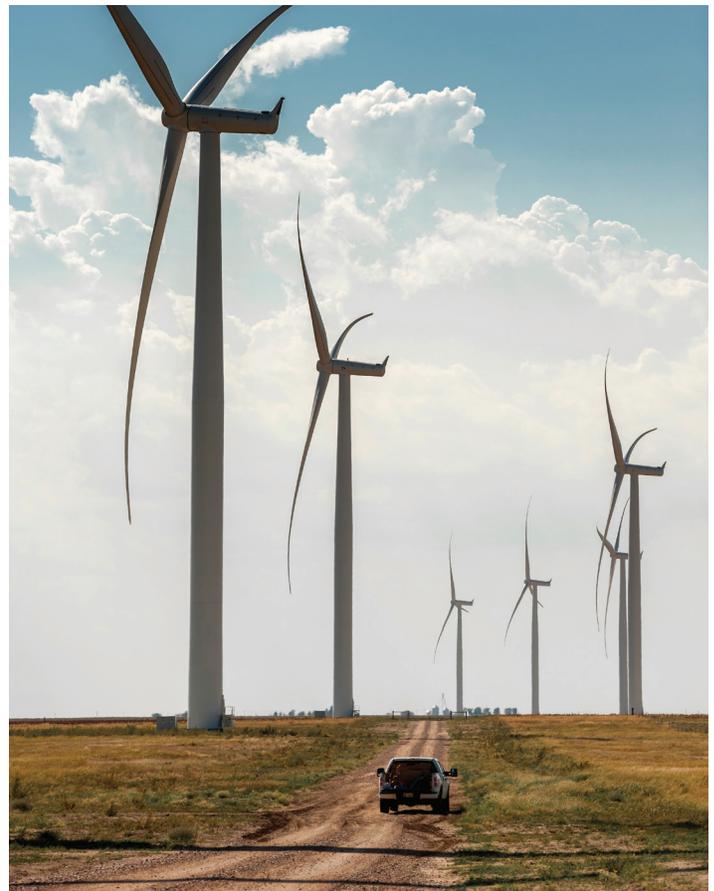
For example, in 2012, E2 tracked more than 3,200 layoffs in 17 states as it was unclear whether or not the PTC would be extended another year. Sure enough, a one-year extension of the credit at the close of the year resulted in a substantial spike in job announcements in 2013. In its Q4 2013 industry market report, the American Wind Energy Association shows that out of 12,000 MW of wind projects currently under construction, 10,900 MW began construction activity in the fourth quarter, just beating the PTC's expiration. E2 expects to see a slowdown in the wind industry this year if the incentives are not extended.

To create stability and inspire further innovation that brings down costs over time, Congress should extend clean energy and energy efficiency tax incentives for multiple years while making improvements to ensure they are performance-based, technology-neutral incentives with maximum impact, but minimal costs.

Threats to Renewable Portfolio Standards

Renewable energy standards have helped 29 states and the District of Columbia to expand clean, renewable resources that will reduce pollution, create new jobs, and drive new investments and economic growth. Despite their success, fossil-fuel funded interests, such as Americans for Prosperity (AFP) and the American Legislative Exchange Council (ALEC) attempted in 2013 to repeal or substantially weaken many of these policies. In each instance, state lawmakers kept these critical policies.

In **Ohio**, Sen. Bill Seitz introduced Senate Bill 58 in 2013. The bill was designed to dismantle the state's landmark clean energy law that was passed with broad support by the state legislature in 2008. The bill would have watered down



the definition of energy efficiency, allowing Ohio's largest manufacturers to opt out of energy efficiency programs, and capped investments utilities can make to help their customers reduce energy bills. The bill would have also eliminated an in-state requirement for renewable energy generation that's helping create local jobs in Ohio's growing solar and wind industries. By early December, two scheduled votes in the Public Utility Committee were canceled, with major corporations like Dow Chemical, Whirlpool, Owens Corning, and Campbell's Soup lining up to oppose S.B. 58.

In **North Carolina**, House Bill 298 proposed to repeal the state's renewable energy standard that requires utilities there to get 12.5 percent of their power from renewables by 2021. As North Carolina is the only Southeastern state with a Renewable Portfolio Standard (RPS) – the political outcome in the state could have national implications. In April, N.C. Rep. Mike Hager, who had introduced the bill to repeal the renewables standard, brought it up for a vote in the committee he chairs, the House Public Utilities Committee. It was considered a foregone conclusion the sponsor's bill will pass his own committee. Instead, lawmakers demonstrated their endorsement of renewable energy by voting it down, 18-13. Job creation was cited as one of the main reasons to keep the standard.

In **Missouri**, clean energy proponents successfully defended the state's Renewable Energy Standard (RES). The standard requires investor-owned utilities to incrementally increase renewable electricity generation so that by 2021, 15 percent

MIDAMERICAN ENERGY AND SIEMENS ENERGY, IOWA CLEAN ENERGY WORKS FOR IOWA: WIND PROJECT IS BIGGEST ECONOMIC DEVELOPMENT PROJECT IN STATE'S HISTORY



PHOTO COURTESY OF SIEMENS

Mid-winter winds can blow across parts of Iowa at an average speed of about 18 miles per hour.¹² That's among the highest in the country. Across the state, there's enough wind to meet all of Iowa's electricity demand – 44 times over.¹³

Because of this abundance – and because of policies like the federal wind energy Production Tax Credit (PTC) – Iowa's wind industry is among the tops in the nation, attracting almost \$10 billion in capital investment, employing more than 6,000 people, and generating about a quarter of the state's electricity.¹⁴

In the fourth quarter of 2013, the state's already robust wind industry got a major boost when Iowa's largest utility, MidAmerican Energy, placed an order with Siemens Energy to manufacture turbines for five wind farms scattered across the state.

Expected to create or support more than 800 manufacturing jobs in Iowa and Kansas, it's the largest onshore wind turbine order in history.

Derrick Clay works at the Siemens wind turbine blade factory in Fort Madison, Iowa. He said this type of economic activity is vital to the region where he lives.

"I think it's real big for the whole community in southeastern Iowa in general as far as jobs and people feeding their families," Clay said.

The Fort Madison plant is located in Lee County, which in 2011 had the highest unemployment rate in Iowa. Thanks in part to the MidAmerican Energy

order, unemployment in Lee County has dropped 40 percent, to 6.2 percent, a statistic cited by Iowa Gov. Terry Branstad in his January 2014 Condition of the State Address.

The MidAmerican Energy order includes almost 450 turbines. When up and running by the end of 2015, they'll generate enough electricity to power more than 300,000 homes.

The turbines' nacelles and hubs will be manufactured at a Siemens plant in Hutchinson, Kansas, while about 1,300 slender white blades will be produced in Fort Madison. If all the blades ordered were laid end-to-end, they would stretch 45 miles – further than the distance between MidAmerican Energy's Des Moines headquarters and Ames.

Gov. Branstad said the \$1.9 billion MidAmerican Energy announcement is the biggest economic development project in Iowa history.

"It is great to have an Iowa-based energy company placing the world's largest onshore order for wind turbines in a facility that has produced more than 9,000 blades since the plant began operations in 2007," Gov. Branstad said in a statement. "Together, these companies continue to greatly benefit Iowa's economy and demonstrate the state's commitment to renewable energy."

The mid-December 2013 timing of the announcement was no coincidence. With the federal wind energy PTC scheduled to expire at the end of the year, companies like MidAmerican Energy and Siemens were incentivized to reach certain project development thresholds before the Dec. 31 expiration of the PTC.

Business leaders in Iowa and beyond are imploring Congress to act immediately to extend clean energy and energy efficiency tax policies like the PTC. If not, clean energy development – and future record-breaking economic development projects like MidAmerican Energy's – could become scarce.

"Extending the production tax credit is critical to giving the wind industry the certainty needed to continue to make investments," said Mark Albenze, CEO of Siemens Energy Wind Power Americas. "These projects demonstrate that wind power is a viable and sustainable part of the U.S. energy mix. This industry has arrived. Let's ensure it will thrive."

— *Environmental Entrepreneurs*

of the state's energy comes from sources like solar, wind, biomass, and small-scale hydro.

In neighboring **Kansas**, which has an RPS that ensures Kansans receive a certain percentage of renewable energy from sources like wind and solar in their electricity mix, culminating in 20 percent renewable energy by 2020, separate bills from the state's Senate and House designed to weaken the standard failed. The 19 wind farms operating in the state have created more than 12,300 jobs for Kansans, \$13.7 million in payments to landowners annually, and \$10.4 million in contributions to communities each year.¹⁵

Defending the standard was a coalition of faith-based groups, environmental groups, clean energy groups, economic development groups, and farmers, as well as steelworkers, wind developers, county commissioners, and several chambers of commerce. Since both chambers of the legislature had a supermajority of Republicans, the failure of the effort to weaken the RPS illustrates clean energy's bipartisan support.

Across the country in 2014, attacks on clean energy standards from groups like AFP and ALEC are expected to continue, threatening clean energy job growth.

2013: REGIONAL AND STATE HIGHLIGHTS

Western states, California lead the way

The region with the largest proportional share of clean energy jobs in 2013 was the West Coast. More than 25,600 jobs were announced in the region last year, constituting almost a third of all clean energy jobs announced nationwide. Sectors with the largest share of job announcements in the region were solar generation (10,200), building efficiency (6,300) and public transportation (4,700).

California topped the list of states for the second consecutive year, with more than 15,000 jobs announced at more than 40 projects. Sectors with strong growth included advanced biofuels, solar, and public transportation. One large biofuels announcement came from the Mesquite Lakes Specific Planning Area, where the California Ethanol and Power Project will produce 66 million gallons of ethanol annually from sugar cane and sweet sorghum. The project is expected to create 800 construction jobs and 400 permanent jobs.¹⁶

Nevada ranked No. 7, with 12 projects expected to create more than 3,300 new positions. The state's strengthened renewable standard of 25 percent renewables by 2025 now includes meeting at least 2.5 percent of the state's total energy needs with solar.¹⁷ About 75 percent of the projects E2 tracked in Nevada last year were solar projects.

Wind, solar, transportation lift Texas

Texas ranked No. 2 in clean energy and clean transportation job announcements last year. More than 6,300 jobs were

announced at more than a dozen Texas projects. While the majority of the projects announced in the Lone Star State were in the wind industry, two large announcements – one in the solar industry, the other in public transportation – together accounted for more than half the state's total.

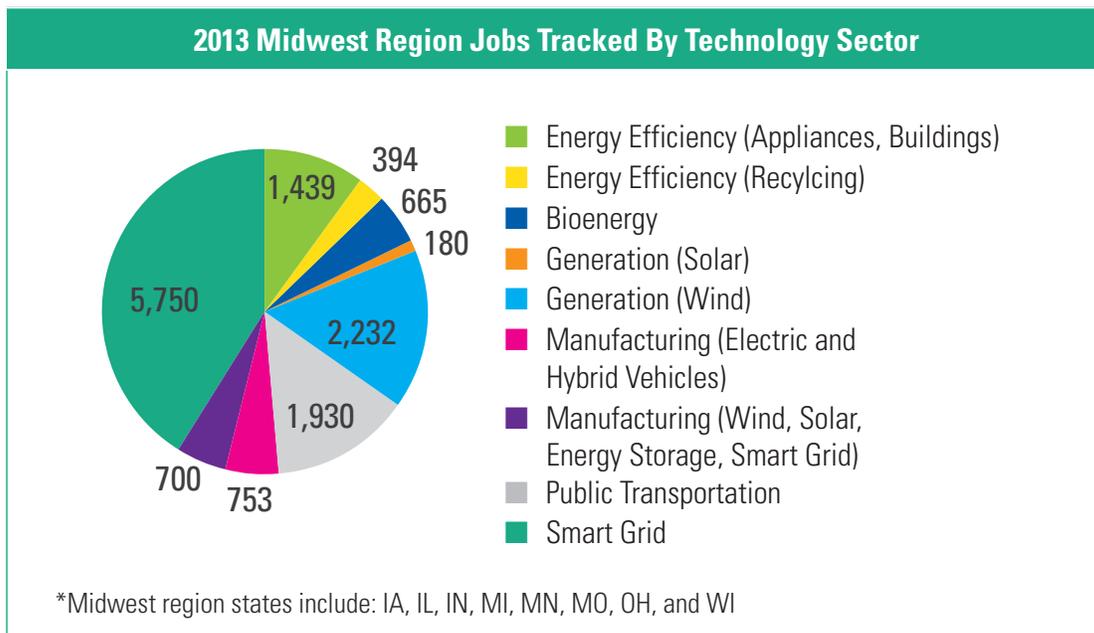
A large Texas wind project was announced by Apex Clean Energy, which is building the 80-turbine, 165 MW Cameron Wind farm near Los Fresnos in South Texas that could create more than 200 jobs and provide enough electricity to power 55,000 households.¹⁸

Broad clean energy growth in Midwest

The Midwest saw diverse and robust job growth in 2013. While the largest chunk of job announcements were in two major smart grid and transmission projects, wind generation, manufacturing, and energy efficiency all contributed to new jobs in the Midwest.

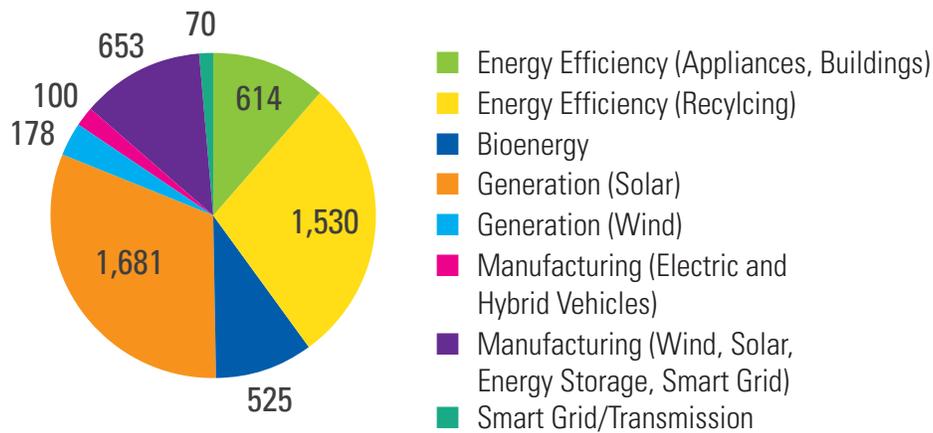
Taking a closer look at the top states in the region, Illinois and Missouri both cracked the top 10 for clean energy and clean transportation job announcements.

Illinois ranked No. 6, with 3,800 job announcements at nine projects in diverse industries, including recycling, smart grid, and biogas. One of the smart grid projects, announced by ComEd in Chicago, is expected to create 2,700 manufacturing, service and professional jobs. Of these jobs, 900 will be new positions as direct hires by the utility or its related contractors. By installing smart meters on





2013 Southeast Region Jobs Tracked By Technology Sector



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

homes and businesses, the utility will streamline energy use and reduce outages and generation needs, saving ComEd customers more than \$100 million annually. Launched at the beginning of 2012, the program has committed \$2.6 billion to modernizing and upgrading Chicago's electricity grid. A 2011 study by Black and Veatch estimates smart grid installation could save ComEd customers \$2.8 billion over 20 years.¹⁹

Most of the jobs announced in **Missouri** (No. 10, with 2,800 jobs) came from a single announcement by Clean Line Energy Partners, which is building the Grain Belt Express Clean Line to transmit more than 3,500 MW of wind energy from Kansas east to other states. The \$2 billion project is expected to be completed by 2018.²⁰

Southeast leads in recycling

E2 tracked 5,350 jobs in the Southeast in 2013. By comparison, more than 13,700 clean energy and clean transportation jobs were announced in the region in 2012, when the Southeast registered strong job growth based on a few large transportation and vehicle manufacturing projects, which generally take years to construct and become operational. While job announcements in component manufacturing for solar, wind and smart grids declined in 2013, solar energy and materials recycling were two bright spots for the Southeast. At least 11 solar projects creating as many as 1,680 new jobs were announced in Florida, North Carolina and Tennessee. As for materials recycling, two of every three recycling jobs in the nation were in the Southeast, or more than 1,500 out of roughly 2,200 recycling jobs announced last year.

2013: SECTOR HIGHLIGHTS

Power generation top sector

Roughly 32,500 of the jobs announced last year were connected to projects that generate power from sources like solar, wind, biogas, and geothermal. That's about 40 percent of the total number of jobs announced.

Within power generation, solar was the leading industry, with 21,600 jobs announced during the year. Solar power generation's numbers jumped 70 percent year-over-year, while wind power generation dropped about 30 percent, to roughly 8,500 announced jobs.

Solar shines

In his 2014 State of the Union address, President Obama highlighted the rapid of growth of solar power, noting "every four minutes, another American home or business goes



SolarCity installed this array atop a Walmart distribution center in 2012. In 2013, SolarCity partnered with Tesla to help businesses tap stored energy during evening hours.

PHOTO COURTESY OF SOLARCITY



SECTOR	CLEAN ENERGY JOBS ANNOUNCED IN 2013 FROM:			
	PROJECTS ANNOUNCED	PROJECTS UNDER CONSTRUCTION	PROJECTS IN OPERATION	TOTAL
Power Generation	16,114	6,924	9,432	32,470
Solar Power	9,150	4,237	8,267	21,654
Wind Power	5,797	2,196	571	8,564
Biogas/Biomass	731	491	551	1,773
Geothermal Power	346	-	43	389
Other ⁱ	90	-	-	90
Manufacturing	6,484	766	1,846	9,096
Advanced Vehicles ⁱⁱ	1,680	100	612	2,392
Solar	1,472	130	181	1,783
Wind	220	250	712	1,182
Energy Storage	417	86	177	680
Energy Efficiency	893	-	164	1,057
Other ⁱⁱⁱ	1,802	200	-	2,002
Building Efficiency	10,009	-	2,518	12,527
Recycling	866	430	947	2,243
Public Transportation	6,900	2,749	1,800	11,449
Biofuels	1,300	650	34	1,984
Electric Vehicles		-	-	0
Smart Grid/Transmission^{iv}	5,520	-	3,245	8,765
Other^v	92	0	-	92

ⁱ "Power Generation - Other" includes a myriad of clean energy projects.

ⁱⁱ "Manufacturing - Advanced Vehicles" includes electric and hybrid vehicle manufacturing and vehicle fuel efficiency manufacturing projects.

ⁱⁱⁱ "Manufacturing - Other" includes public transportation and smart grid manufacturing projects.

^{iv} "Smart Grid/Transmission" includes smart grid, fuel cell and storage deployment as well as transmission connecting to clean, renewable energy sources.

^v "Other" includes public investment programs for clean energy manufacturing and job training and placement.

solar; every panel pounded into place by a worker whose job can't be outsourced." Indeed, the industry announced 21,600 jobs in 21 states last year, outshining all other sectors. A recent survey by the Solar Foundation found that employment increased 20 percent in 2013, with more than 140,000 workers in the industry in November 2013.

Solar energy's success can be attributed to several factors, including technological innovation and private-sector leadership. Photovoltaic module prices have declined rapidly, as crystalline silicon module prices dropped about 60 percent the last two years. Historically, a key barrier to solar power has been intermittency, or providing power when the sun goes down. Yet advancements in energy storage technology are overcoming these issues. For example, SolarCity recently partnered with Tesla batteries to empower businesses to tap stored solar energy during evening hours, reducing demand at times when electricity is most expensive. And Solana's Thermal Generating Station in Gila Bend, Ariz., is equipped with a storage system, enabling the plant to produce electricity six hours after sunset.

Banks are increasingly looking to solar as a low-risk, stable investment. Deutsche Bank recently predicted a "second gold rush" to the sector in 2014, and Goldman Sachs stated it will invest \$40 billion over the next decade in renewable energy. Google, Apple and Microsoft have each committed to operating data centers using solar energy, delivering substantial long-term returns to the companies while reducing their carbon footprints. With backing from the financial sector, the solar industry had the certainty it needed to invest in new hires.

Building efficiency makes gains

Thanks in part to a pair of efficiency investments from state governments in Massachusetts and Hawaii, the number of building efficiency jobs announced in 2013 increased more than three-fold from the previous year, from about 4,000 to 12,500.

In the first quarter, the state of Hawaii announced a \$300 million initiative to upgrade government buildings with energy efficient appliances, lighting, and air conditioning units.

JOINT BASE MCGUIRE-DIX-LAKEHURST, BURLINGTON COUNTY, N.J. MILITARY ENLISTS SUN TO POWER BASE HOUSING



PHOTO COURTESY OF U.S. AIR FORCE PHOTO BY PASCUAL FLORES

Trinity Solar employees Kerry Fagen, left, and James Echavarria line up a solar panel atop a home at Joint Base McGuire-Dix-Lakehurst in New Jersey

Solar energy is a proven asset on foreign battlefields, where soldiers utilize portable solar arrays to power remote, off-grid operations as well as small tactical devices.²¹

But solar energy is also becoming a regular part of America's military personnel stateside.

And in 2013, E2 tracked a job announcement that shows just how important solar is to our military – and our economy.

In the first quarter of the year, 120 jobs were announced as part of a \$35 million project to install solar panels on military housing units at Joint Military Base McGuire-Dix-Lakehurst in Burlington County, N.J.²²

Trinity Solar LLC, which partnered with True Green Capital Management, CIT Group, and United Communities (the private owner and manager of the base's

housing units), completed the 12.3 MW solar PV installation in November. It's now one of the largest solar-powered military family housing communities in the nation.

The project employed engineers, electricians, installers and maintenance workers. It's expected to produce about 40 percent of the power for the 2,100 military family homes at the base, used by the Army, Navy, and Marines.

True Green's Jeffrey Brown said the project demonstrates renewable energy's increased national importance.

"Beyond its status as one of the largest military community-based photovoltaic power plants in the U.S., this is a strategic investment for our firm that reinforces the important role solar energy will play in our domestic energy mix in the coming years," Brown said.

The military has its own financial reasons for deploying renewables on bases.

According to Pew Charitable Trusts' January 2014 report *Power Surge*, the Department of Defense spends \$4 billion annually on facility energy. Over the past decade, DoD has saved hundreds of millions of dollars in energy costs by deploying efficient and renewable technologies, according to the Pew report.

DoD has one of the world's largest inventories of real estate, with 550,000 buildings and other structures encompassing roughly 2.3 billion square feet, according to Pew.

In addition to McGuire-Dix-Lakehurst, the military is pursuing large solar projects at David-Monthan Air Force Base in Arizona, Fort Bliss in West Texas, and elsewhere.

—*Environmental Entrepreneurs*

RANK ⁱ	STATE	PROJECTS TALLIED ⁱⁱ	CLEAN ENERGY JOBS ANNOUNCED IN Q4 2013 FROM: ⁱⁱⁱ			
			PROJECTS ANNOUNCED	PROJECTS UNDER CONSTRUCTION	PROJECTS IN OPERATION	TOTAL
1	TX	8	695	756	1835	3,286
2	AZ	1	-	-	1585	1,585
3	NY	6	1245	-	20	1,265
4	CA	6	225	300	587	1,112
5	IA	3	30	620	-	650
6	RI	3	-	-	595	595
7	HI	2	400	125	-	525
8	GA	3	-	10	430	440
9	ND	1	-	-	355	355
10	NM	3	20	-	305	325

ⁱ States have been ranked by the total number of jobs announced in media reports and company press releases over the last 3 months of 2013.

ⁱⁱ Project announcements spanning multiple states were each counted as one separate project per state. If job count details were not broken down by state in the announcements, the total number of jobs were divided evenly among each state.

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



SECTOR	CLEAN ENERGY JOBS ANNOUNCED IN Q4 2013 FROM:			
	PROJECTS ANNOUNCED	PROJECTS UNDER CONSTRUCTION	PROJECTS IN OPERATION	TOTAL
Power Generation	2,287	1,886	2,469	6,642
Solar Power	705	175	2,469	3,349
Wind Power	1,358	1,346	-	2,704
Biogas/Biomass	224	365	-	589
Geothermal Power	-	-	-	0
Manufacturing	1,525	-	914	2,439
Advanced Vehicles ⁱ	-	-	262	262
Solar	875	-	5	880
Wind	70	-	471	541
Energy Storage	15	-	162	177
Energy Efficiency	525	-	14	539
Other ⁱⁱⁱ	40	-	-	40
Building Efficiency	409	-	590	999
Recycling	188	-	787	975
Public Transportation	-	-	1,800	1,800
Biofuels	-	80	-	80
Electric Vehicles	-	-	-	0
Smart Grid/Transmission^{iv}	-	-	105	105
Other^v	92	-	-	92

ⁱ "Manufacturing - Advanced Vehicles" includes electric and hybrid vehicle manufacturing and vehicle fuel efficiency manufacturing projects.

ⁱⁱ "Manufacturing - Other" includes public transportation and smart grid manufacturing projects.

ⁱⁱⁱ "Smart Grid/Transmission" includes smart grid, fuel cell and storage deployment as well as transmission connecting to clean, renewable energy sources.

Buildings include airports, universities, prisons, and wastewater treatment facilities. The investment is part of Hawaii's commitment to reduce energy use by 30 percent by 2030.

In the second quarter, Massachusetts announced plans to invest \$400 million over the next three years to retrofit state facilities. The program is expected to save the state \$43 million annually.

Other sectors

Manufacturing jobs fell to 9,000 in 2013 from 16,000 the previous year. The auto industry was responsible for much of this drop, with new jobs in advanced vehicle manufacturing falling from about 8,000 announced jobs to 2,400.

There were also fewer large public transportation announcements in 2013, and that sector's new job numbers dropped to 11,400. Smart grid and transmission projects announced 8,800 jobs, while advanced biofuel projects announced about 2,000 jobs.

E2 tracked recycling industry projects for the first time in 2013. The sector accounted for about 2,200 job announcements – about 3 percent of the year's overall total.

Q4: TEXAS, SOLAR SHINE

Thanks in part to the PTC and its wind resources, Texas topped the charts in job announcements in the fourth quarter 2013, with about 3,300 jobs announced, including 1,400 jobs in five wind energy projects. Located in the Plains and Gulf Coast regions of the state, the wind projects are estimated to provide clean, renewable power to more than half a million Texas homes.

But the greatest number of job announcements nationally in Q4 came from solar projects. More than 3,300 jobs were announced – mostly in the Southwest – in both utility-scale and residential projects. Abengoa's Solana Generating Station in Gila Bend, Ariz., came online in October, and it will provide enough electricity to power 70,000 homes. The unique solar thermal storage system will be able to provide power six hours after sunset. The project created 1,500 construction jobs, and it will employ 85 permanent workers.

Fourth-quarter solar jobs were not just created by utilities: SolarCity, one of the largest providers of residential photovoltaic systems, hired nearly 300 installers, sales professionals, and customer service representatives in offices in California and New Jersey.



Fort Madison, Iowa

PHOTO COURTESY OF SIEMENS

CONCLUSION

Clean energy and clean transportation jobs continued to grow in the fourth quarter and throughout all of 2013, with the solar industry and the West leading the way.

New job announcements are growing at a slower pace than previous years, however, in part because of the abundance of cheap natural gas and uncertainty about beneficial state and federal policies.

Inaction by Congress at the end of 2013 to extend the wind industry's PTC, as well as tax credits for renewable fuels and energy efficient buildings and appliances, threatens to put a damper on clean energy and clean transportation jobs in 2014.

Attempts by special interests to roll back renewable energy standards also threaten continued job growth this year.

Clean energy and clean transportation job growth could see an uptick in 2014 if Congress passes extensions to these critical tax policies, which help create a level playing field between clean, renewable energy and fossil fuels. Clean energy jobs also could benefit from the rollout of the first-ever limits on carbon pollution from power plants, as well as from other elements of President Obama's climate change initiative. States and municipalities that work closely with federal policymakers to implement such initiatives could see the biggest benefits for their businesses, workforce and economy.

Endnotes

- 1 On Jan. 27, 2014, The Solar Foundation released its *National Solar Jobs Census 2013*. Its findings show that the U.S. solar industry employed 142,698 Americans – 20 percent more than the previous year. <http://thesolarfoundation.org/research/national-solar-jobs-census-2013> (accessed Jan. 27, 2014).
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February 2014