

# MANUFACTURING

*Production • Fabrication • Components • Supply Chain • Materials • Tooling • Machinery*

## SANDIA NATIONAL LABORATORIES PROJECT EYES THE FUTURE OF DOMESTIC WIND BLADE MANUFACTURING



Sandia National Laboratories is helping makers of wind turbine blades improve the labor productivity associated with blade fabrication and finishing. This improved productivity makes domestic blades more cost competitive with blades from countries that pay workers lower wages.

The Advanced Manufacturing Innovation Initiative, a three-year \$6.3 million project, brought together researchers from Sandia, Iowa State University, and TPI Composites of Scottsdale, Ariz., which operates a turbine blade factory

in Newton, Iowa.

Sandia manager Daniel Laird said AMII is a collection of small, targeted projects. Of 49 proposals considered by the project committee, the 22 accepted projects included automated laying and finishing, using simulation to develop more efficient manufacturing process flows, and improved nondestructive inspection (NDI) capabilities.

The project's goal is to make U.S. wind turbine blade manufacture economically viable in the U.S. market. In addition to taking advantage of the

transportation advantage of in-country manufacture, the project sought to improve labor productivity and reduce the manufacturing time by 35 percent.

The Wind Energy Foundation found that the U.S. now has 61,946 megawatts of utility-scale wind power capacity, and utility-sized wind installations in 39 states and Puerto Rico. Though wind energy production is a vital piece of America's total energy portfolio, high U.S. labor costs have historically made it difficult to manufacture blades in the U.S. competitively.

Building blades isn't easy. Wind turbine blades are large and heavy, and tolerances must be within millimeters of perfection. They must withstand decades of harsh conditions and handle punishing speeds up to hundreds of miles an hour at the blade's tip.

And right now, much of the work of making a wind turbine must be done by hand.

"Wind turbine blade manufacturing consists of a labor-intensive set of highly distributed manual operations including layup of very high volumes of material, infusion, secondary bonding and demolding for many sub-assemblies over a vast manufacturing floor area. All of these considerations make implementation of automation a challenging and expensive endeavor," Laird said.

In one project, Sandia researcher Diane Callow created a factory logic model of the manufacturing plant, allowing researchers to look at process flows and ways to improve product velocity. This work immediately identified and quantified bottlenecks due to an overhead bridge crane. The problems were solved by developing novel, ground-based carts.

In another AMII effort, researchers coupled an engineering data software platform to a 3-D laser projection system to improve fiberglass fabric positioning.

Researchers also modeled the curing of a higher-perfor-

mance spar cap, the part of the blade that carries the bending load.

Sandia senior researcher Dennis Roach led development of a reference sample library used to train those who perform nondestructive inspection of wind turbine blades.

"The NDI project improved the ability of blade manufacturers to confidently determine the quality of their product before it leaves the factory, enhancing the in-service life of the blades. Sandia not only worked to optimize the performance of conventional inspection processes but also developed advanced NDI methods to further improve the quality assurance process. A focused technology transfer aspect of AMII allowed these advanced NDI methods to begin their integration into U.S. blade manufacturing plants," Roach said.

"The combined AMII improvements and innovations reduced the cycle time to manufacture a blade by nearly 50 percent," Laird said.

The project is wrapping up this year with a comprehensive project report, which will be made publicly available.

Learn more about Sandia's Wind Energy Program at the program's website. ↗

— Source: Sandia National Laboratories

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# DOE PUSHES FOR BOOST IN PRODUCTIVITY, EFFICIENCY, AND INNOVATION IN CLEAN ENERGY MANUFACTURING

The U.S. Department of Energy in September announced expansions of its Clean Energy Manufacturing Initiative in support of the American manufacturing sector and a new initiative to support President Obama's goal of doubling energy productivity by 2030. By advancing the development of innovative manufacturing technologies, investing in substantial energy efficiency upgrades at production plants across the country, and training American workers for the advanced manufacturing jobs of tomorrow, the Department of Energy is helping make America's manufacturing sector even stronger in an intensely competitive global market.

"In part due to a dramatic increase in domestic energy production and the Obama Administration's policies and support, the U.S. manufacturing sector has seen a resurgence in recent years, adding 700,000 jobs since 2009," said Energy Secretary Ernest Moniz. "Continued smart investments in advanced manufacturing technologies, and the American workforce today, will strengthen our competitive edge for decades to come."

### ACCELERATE ENERGY PRODUCTIVITY 2030

The DOE announced a partnership with the Council on Competitiveness and the Alliance to Save Energy to launch Accelerate Energy Productivity 2030. Private sector and state and local leaders can engage in energy productivity dialogues, commit to the goal, and share best practices for capturing the economic benefits of improved energy productivity. Accelerate Energy Productivity 2030 will create a national roadmap to grow our economy while reducing our energy costs.

Secretary of Energy Ernest Moniz announced the partnership at DOE's 2014 American Energy and Manufacturing Competitiveness Summit, jointly sponsored by the Council on Competitiveness.

### INVESTMENT IN ADVANCED MANUFACTURING

U.S. manufacturing is more competitive than it has been in decades. Manufacturing output has increased 30 percent

since the end of the recession, growing at roughly twice the pace of the economy overall, the longest period where manufacturing has outpaced U.S. economic output since 1965.

In order to accelerate American innovation and boost our competitiveness in the manufacturing technologies of the future, the Department will provide \$23 million for 12 projects across the country to advance technologies aimed at helping American manufacturers dramatically increase the energy efficiency of their manufacturing facilities, lower costs and develop new manufacturing technologies. These Innovative Manufacturing Initiative project selections leverage federal investments with additional cost share from the private sector to develop leading-edge materials, tools, and techniques that will save U.S. companies money by reducing the energy or materials needed to make their products.

### EFFICIENCY IN MANUFACTURING

Across the U.S., manufacturers spend more than \$200 billion each year to power their plants. Through the Energy Department's Better Plants Program, American manufacturers voluntarily commit to reduce energy intensity by about 25 percent over ten years, or an equally ambitious level for their sector. Today, the Department is welcoming the 23 newest partners to the Better Plants Program from all across the country, including leaders in industry such as General Mills, Comau Inc., General Sheet Metal Works, and Novelis.

All together, the Better Plants Partnership has grown to encompass more than 140 industrial companies, representing about 2,300 facilities and almost 11 percent of the total U.S. manufacturing energy footprint. By cutting energy waste in their factories, American manufacturers in the Better Plants Program have reported close to \$1.7 billion in cumulative energy savings over the past four years.

— Source: U.S. Department of Energy

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## BROADWIND ENERGY SECURES \$14 MILLION TOWER ORDER FROM U.S. WIND TURBINE MANUFACTURER

Broadwind Energy, Inc. recently announced \$14 million in new tower orders from a U.S. wind turbine manufacturer. Broadwind will produce these towers in its Manitowoc, Wisconsin and Abilene, Texas facilities.

Broadwind President and CEO Peter Duprey stated, "With these orders, nearly three quarters of our tower production

capacity for 2015 is sold and we expect to fill the remaining capacity before year-end. We are in discussions with customers for additional commitments into 2016 and 2017 and look forward to a decision on the Production Tax Credit after the November elections. We remain confident about the demand for wind energy assets in the U.S."

# PRODUCT

## LUDECA UNVEILS IMPROVED RS5 ALIGNMENT SENSOR



LUDECA, Inc. recently announced the rollout of the new RS5 sensor for the proven OPTALIGN SMART machinery alignment system.

The RS5 sensor is a fast, highly accurate sensor for the mid-range shaft alignment market segment. Its XL HD detector, combined with InfiniRange functionality makes its measurement range virtually unlimited, even over long spans of 10m (33 ft.). Its 5-axis technology allows the sensor to offer simultaneous Live Move tracking in both planes for machine corrections. This allows live monitoring of horizontal and vertical machine corrections at the same time, with the sensor at any rotational shaft position.

The synergy between the new, faster CPU and the MEMS inclinometer ensures a finer and faster acquisition of misalignment data during a Continuous Sweep. Hundreds of measurement readings are automatically taken during shaft rotation,

ensuring highly repeatable results even in harsh conditions with vibration and under unfavorable mechanical constraints such as coupling backlash. The RS5 sensor permits highly accurate results to be obtained with as little as 60 degrees of shaft rotation, starting and ending anywhere. Users can easily view and compare results in the results table, which stores readings before starting with alignment corrections.

The integrated ambient light compensation makes accurate measurements possible even in strong, direct sunlight. New battery technology means reduced energy consumption for long laser and sensor runtimes in the field. Finally, the RS5 laser and sensor are fully waterproof, shockproof and dustproof for continuous service in the worst of industrial environments.

For more information, go to: [http://www.ludeca.com/prod\\_optaligsmart-shaft-alignment.php](http://www.ludeca.com/prod_optaligsmart-shaft-alignment.php).