



TREASURED TURBINES

U.S. Wind Energy Boom to Power Heavy-Lift Imports, Exports

BY PAUL SCOTT ABBOTT

Big increases in renewable energy installations look to put a powerful wind beneath the wings of U.S. project cargo transportation for decades to come.

As sure as the wind blows, North American demand for wind energy is flying high, according to government and trade association projections, meaning those engaged in transport of the blades, turbines, nacelles, towers and related oversize components used in capturing it may just have to hold onto their proverbial hats.

With lower costs of wind power generation, extended production tax credits, and moves by forward-thinking corporations and state legislatures to reduce carbon footprints, the American Wind Energy Association has set its sights on doubling U.S. wind energy capacity over the next five years.

❖ **ABOVE:** A section of tower for a wind installation is strapped to a specialized truck and taken to an under-construction wind farm. / Credit: Suzlon



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RENEWABLES

Utility companies see wind power providing energy security by diversifying the electricity generation portfolio, protecting against volatile natural gas price spikes, while using an environmentally friendly domestic source of energy. Many utilities have signed long-term, fixed-price contracts for wind energy, often involving bringing the power across state lines.

Lest anyone be fearful of throwing caution to the wind, the U.S. government continues to make projections for very healthy increases in the amount of energy that will be produced by wind.

A May 2016 report from the U.S. Energy Information Administration, or EIA, presents one scenario showing 112 gigawatts of new U.S. wind and solar capacity being added through 2021. The new capacity would more than double the nation's current wind capacity of 74.5 gigawatts, already enough to power more than 20 million homes. The EIA report also presents a case for wind generation growing nearly 150 percent from 2015 through 2040.

Wind energy installations such as northwestern Indiana's Meadow Lake Wind Farm, with enough capacity to power 169,000 homes, are becoming increasingly prevalent in North America.

Credit: Paul Scott Abbott



"Wind is winning.... The challenge is to make renewable technology so cheap that it's the obvious choice."

— Chris Brown, Vestas Wind Systems

The EIA report shows wind surpassing coal as early as 2028 to become the second-largest U.S. electricity generation source, behind only natural gas.

The Obama administration's Clean Power Plan, promulgated in August 2015 by the U.S. Environmental Protection Agency to take effect in 2022, features carbon reduction targets supporting objectives for renewables – especially wind and solar – to become the No. 2 U.S. power generation source by 2030. Also, in December 2015, U.S. Congress extended for five years the tax credit program for generation of electricity from wind plants, with the level of credits incrementally declining until they expire at the end of 2021, when the Clean Power Plan is slated to go into effect.

Some goals are even loftier. For example, the Democratic Party platform going into November's presidential election calls for renewable sources fulfilling 100 percent of U.S. energy needs by 2050.

While that goal might well be unattainable, it is unquestionable that political and corporate standard-bearers are jumping on the wind bandwagon. Legislatures in such states as California, Oregon,

Maryland, Vermont and Hawaii have passed laws requiring greater integration of renewable energy, while corporate buyers including Google, Amazon and Facebook are securing greater amounts of wind power to lower carbon footprints and keep long-term costs under control.

SHIPPING DEMAND GROWS

Whereas much of the federal reporting and various targets highlight anticipated reductions in emissions associated with cleaner energy, the prognostications undeniably indicate that substantial new wind farms will be coming online and thus lots more wind power components will have to be shipped.

As one might expect, Chris Brown, chairman of the American Wind Energy Association, or AWEA, is among those who are extremely bullish on wind as a North American energy source.

"Wind is winning," said Brown, who is president of Vestas Americas and group senior vice president of Denmark-based Vestas Wind Systems, the world's No. 1 provider of wind turbines, during an AWEA conference held in New Orleans in May.

"While our fuel is free, our customers know, the machines aren't free," Brown told the audience. "The challenge is to make renewable technology so cheap that it's the obvious choice."

"That's why we've driven down costs by technology advancement including longer rotors, taller towers, advanced controls and product reliability," he said. "Investor appetite has grown, also lowering the cost of capital. And, as a result, the real cost of wind power in the U.S. has dropped by more than 60 percent" since 2009.



Chris Brown

Vestas Wind Systems



◀ Highland Project Logistics moves Vestas blades from Colorado to Houston.

Credit: GPLN

Peter Kelley, AWEA's vice president of public affairs, said American wind power is on track to achieve the U.S. Department of Energy's vision of doubling its contribution to the U.S. power grid by 2020, to 10 percent of the nation's electricity, up from nearly 5 percent today, and potentially growing to become the leading source of American electricity by 2050, with a 35 percent share.

The decreased cost of wind energy has made wind one of the cheapest new sources of electricity in some parts of the country and cost-competitive in many more, Kelley said. "That's one reason

why wind was the largest source of new electricity in 2015, with more coming online than solar or natural gas.

"Wind power's growth is showing no signs of slowing down, with strong under-construction numbers and many projects in the advanced stages of development," Kelley said.

MOVING OFFSHORE

While the dynamic growth in on-land wind energy installations is undeniable, companies such as Germany's Siemens are at the fore in reducing costs of generating power with offshore wind farms, with innovations being developed off the coasts of such countries as Denmark (where wind already generates 40 percent of the country's electricity) and Scotland. Methodologies include technical improvements

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within turbines, more cost-effective installation practices, new grid connection technologies, better maintenance strategies and enhanced logistics. As a general rule, blades for offshore wind farms are much longer than those for land-based installations.

This summer, the final stage of construction began on the first such U.S. offshore installation, the five-turbine Block Island Wind Farm off Rhode Island. Nearing approval from New York utility authorities is a 15-turbine project to be built off the south fork of Long Island. These and other endeavors indicate that regulatory hurdles and court battles that for years had kept wind farms from springing up off U.S. shores are being surmounted.

Rakesh Sarin, CEO of international business and global service at India-based Suzlon, which ranks among the world's top five wind turbine suppliers, said the growth of wind power brings more business, but also challenges for the logistics industry.

Larger turbines, taller towers and longer blades make shipping more complex, Sarin said, leading to a greater number of components for the American market being made on U.S. soil.

"The U.S. has shifted to domestic manufacturing because of transportation costs and the structure of the wind project," Sarin said. "Apart from the domestic manufacturing ramping up, the size of turbines is also increasing, resulting in the rise in the logistics cost."

"Shipment of components within the U.S. is a big business because of the huge market," Sarin said. "As road transportation is costly, the manufacturers prefer to ship through water and rail. Largely, railway transport is being used for the heavy components."

Sarin said companies are trying to locate component manufacturing as close as possible to wind farm sites, not only reducing transportation costs but

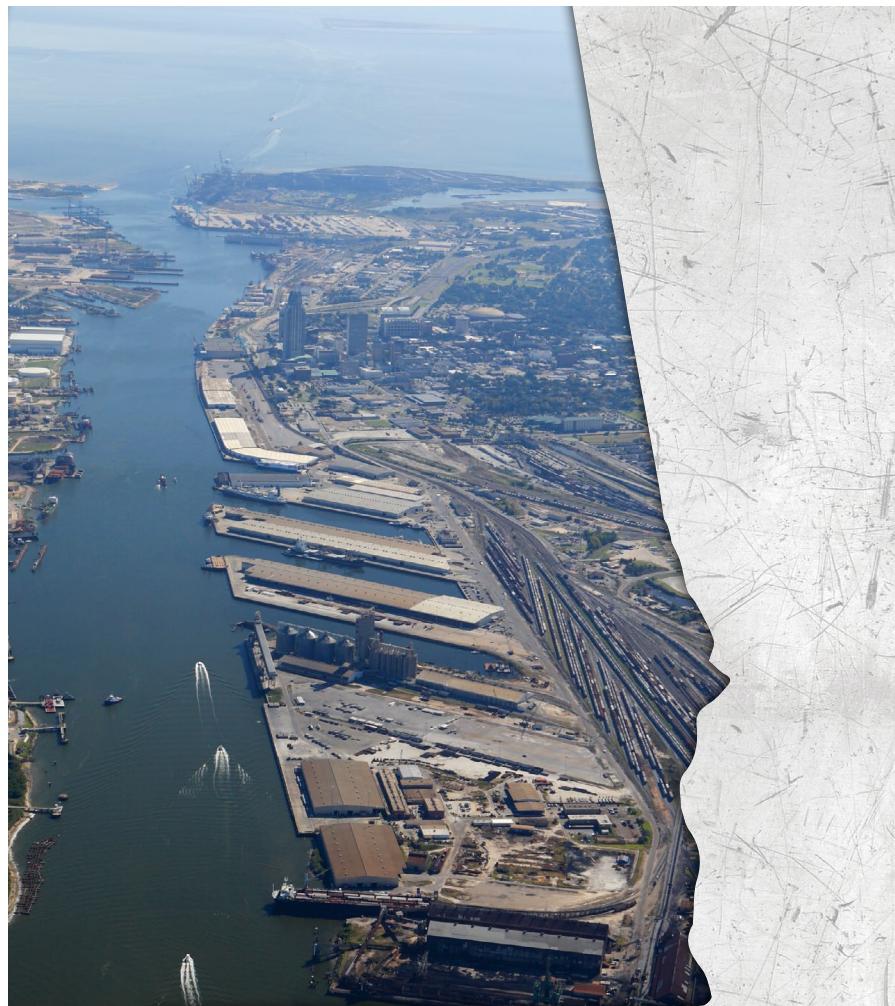
also potentially averting having to cross state lines, as regulations governing oversize and overweight loads can vary dramatically from state to state. **BB**

A veteran transportation writer for the past 40 years, U.S.-based Paul Scott Abbott specializes in maritime topics.



Rakesh Sarin

Suzlon



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WIND-RELATED EXPORTS RISE

Increasing U.S. turbine-related production is heightening export opportunities for domestic project cargo ports, adding to the extensive import activity now taking place.

Jarl Pedersen, chief commercial officer at Port Corpus Christi on the Texas Gulf Coast, said his port is prepared to increasingly use infrastructure originally purposed for inbound shipments to handle outbound activity, just as it has recently done with its facilities for handling a more traditional energy cargo – crude oil – in response to shifting global demand and lifting of a federal export ban.

Shipping of components is a process that requires more and more cooperation, Pedersen said.

"Port Corpus Christi is closely following the innovation in wind turbine technology and is working closely with developers and logistics providers to ensure due diligence and advanced planning to accommodate larger wind turbine components, including taller towers and longer blades."

Port Corpus Christi is used by all major wind turbine manufacturers, primarily for tower sections and rotor blades, but also for hubs and nacelles, according to Pedersen. Imported components head to wind farms in Texas, the No. 1 wind energy production state, and beyond.



Jarl Pedersen

Port Corpus Christi

Alastair Smith

Port of Vancouver USA

Corpus Christi is a wind energy leader in another way. When the six-turbine Harbor Wind Farm opened in 2012 on Port Corpus Christi property, the port became the first North American industrial port with such an on-port installation. And the 200-turbine Papalote Creek Wind Farm rises just to the north of port property.

On the U.S. West Coast, the Port of Vancouver USA in southern Washington, across the Columbia River from Portland, Oregon, is also focused on collaboration to ensure safe, timely, and efficient moves of wind energy cargo.

Alastair Smith, chief marketing and sales officer at the Port of Vancouver USA, said port personnel work with equipment manufacturers and freight forwarders around the globe.

"We came to understand the

growth in the project industry, and learned that these components were going to continually grow in size and weight," Smith said. "We found that shore cranes needed to have capabilities to handle these oversize and heavier shipments, such as wind energy blades, which can now exceed 200 feet in length."

This spurred the Port of Vancouver USA to invest in its first Liebherr heavy-lift crane in 2006, and soon a second similar unit, as well as partner with stevedoring and longshore union leaders in a new crane operator training program providing certification in tandem and engineered lifts.

"Our stevedores – Jones Stevedoring and Ports America – have also invested in trailers, reachstackers and other equipment to ensure they can efficiently move cargo off the docks to waiting trucks or railcars," Smith said. "Both companies have continued to adapt and modify equipment as necessary to suit industry needs."

Smith also cited the importance of terminal laydown space, of which his port offers more than 100 acres, and sufficient rail infrastructure in the handling of wind energy components.

Still, larger components – not to mention a lot more of them – increasingly present logistical challenges.

"The biggest challenges that have begun to test the capabilities of our port are our customer's largest components," Smith said. "Close analysis of routing paths is necessary in order to ensure that there's an acceptable roadway from the port and to the development site for the longest blades."

"Taller towers mean wider towers that may not meet rail clearances through mountain passes," he said. "Nacelles are reaching weights that test road limitations and standard trucking capabilities. It's essential that the shipping community continues to develop answers to these challenges through continued efforts and communication between OEMs [original equipment manufacturers] and transportation entities."



Twin Liebherr mobile harbor cranes unload wind energy blades at the Port of Vancouver USA in southern Washington state.

Credit: Port of Vancouver USA



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