



## OFFSHORE WIND

# This Giant Ship With Legs Must Be The Strangest Sight On The Atlantic

July 21, 2016

From a luxury liner crossing the cold waters of the north Atlantic, Brave Tern may look like an uncharted island rising from the sea. But sail closer, and you will see an unusual ship making history. The boxy, 132-meter-long, 39-meter-wide wind turbine installation vessel framed by four soaring steel columns is carrying five massive nacelles for Deepwater Wind's [Block Island Wind Farm](#), America's first offshore wind farm. The wind farm will be located off the coast of Block Island, Rhode Island, which is also Brave Tern's destination. Owned and operated by the Norwegian company Fred. Olsen Windcarrier, the ship left the port of Saint-Nazaire in France last week.

A nacelle is the box that houses the wind turbine's power-generating components. The nacelles aboard the Brave Tern were manufactured by GE Renewable Energy in [Saint-Nazaire](#) and can produce 6 megawatts each. They are as large as a school bus and weigh as much as 400 tons. They will sit some 330 feet (100 meters) above the waves—as high as the Statue of Liberty—when they are installed atop the wind turbine towers.



Top and above: The Brave Tern in Saint-Nazaire harbor last week.

Images credit: GE Renewable Energy



Once in Block Island, the four massive legs will drop down to the seabed, jacking up the ship high over the water for turbine installation. Image credit: Fred. Olsen Windcarrier

How the nacelles get up there is another engineering marvel. That's because once on Block Island, the Brave Tern will become a real-life Transformer robot, changing from a ship into an at-sea construction platform. The four massive legs will drop down through its deck to the seabed, jacking up the entire ship high over the waves. Then, an 800-ton crane will position the generating equipment on the towers and fasten the blades onto the structure over several intense weeks of installation.

If everything goes as planned, the project will be in service by the end of the year, generating 125,000 megawatt-hours of electricity. That's enough to meet 90 percent of Block Island's power needs and even supply surplus electricity to the mainland via undersea cable.

It will take the Brave Tern about two weeks to sail the roughly 3,300 miles to reach its destination. The exact length of the voyage depends on the weather. Even in the summer, the Atlantic can produce 18-foot waves.

Our photographers caught up with the ship just before it left the port and in the Bay of Biscay during its voyage. Take a look.



The nacelles will ride on specially manufactured platforms that will protect them from high waves. Image credit: GE Renewable Energy





On Block Island, roughly 40 additional workers will join the 30-person crew to help with installing the turbines. They will live on board in the Brave Tern's 56 cabins. Image credit: GE Renewable Energy



The turbine blades [arrived in Rhode Island](#) last month. After they are attached to the nacelles, the tips of the blades will tower 560 feet above the sea at the highest point, twice the height of the Statue of Liberty. Image credit: LM Wind Power



The turbine towers caught a ride on a separate ship from Spain. Image credit: GE Renewable Energy



A sunset in the Bay of Biscay. Image credit: Fred. Olsen Windcarrier



One of the Block Island nacelles is leaving GE's "[temple of turbine](#)" in Saint-Nazaire. Image credit: GE Renewable Energy





The nacelles during production in the Saint-Nazaire factory. Image credit: GE Renewable Energy

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# My Turbine Lies Over The Ocean: It Takes Herculean Labor To Build America's First Offshore Wind Farm

Julv 06. 2016

Eric Crucerey and his team can move mountains. Well, maybe not mountains, but machines that dwarf the Statue of Liberty.

Crucerey, who works for GE Renewable Energy, is the project director in charge of delivering GE's Haliade wind turbines for [America's first offshore wind farm](#) that's being built by Deepwater Wind near Block Island, Rhode Island. Over the next few weeks, he will ship five wind turbine nacelles from France to the U.S. across the Atlantic. Each of these 400-ton structures is as large as a school bus and houses the turbine's power-generating components, including a massive permanent magnet generator. They will sit some 330 feet (100 meters) above the waves.



*A Haliade nacelle outside GE Renewable Energy's [new factory in Saint-Nazaire](#), France. Image credit: GE Renewables*

Each of the nacelles will support three 240-foot-long blades (nearly 74 meters) that weigh 27 tons a piece, and Crucerey has brought them across the Atlantic, too. A cargo ship with all 15 blades on board docked in Providence, Rhode Island, last week. "My job is to be ready for everything, understand any weaknesses in Plan A and always have a Plan B," Crucerey says. "'Never give up' is my motto."

Crucerey is speaking from experience. While working as a project manager a decade ago, he helplessly watched as a 20-ton turbine shaft worth \$560,000 (€500,000) plunge into the murky waters of a Turkish port, never to be recovered.



*Top image and above: All 15 blades for the Block Island wind farm left Denmark aboard the Suomigracht ship. Image credit: LM Wind Power*

That's why today he works with specialists such as Eskil Røset, a project manager with Fred. Olsen Windcarrier—the Norwegian offshore wind developer that has handled massive projects in the U.K. as well as the Irish Sea and Scandinavia. The firm will ship the nacelles 3,300 miles from their birthplace in a brand-new [GE Renewable Energy's factory](#) at the mouth of the Loire River in Saint-Nazaire, France, to the U.S. Røset will also oversee the turbine's offshore installation in August.

Crucerey is also working with commercial director Dorte Kamper and the logistics experts at Danish firm LM Wind Power — the world's largest independent supplier of rotor blades to the wind industry. Together, they coordinated the transportation of the massive

vessel, this one transporting the turbine's sleek white towers, recently arrived in Providence from Aviles, Spain.



*The turbines' massive towers arrived in Providence, Rhode Island, from Spain. Image credit: GE Renewables*

But shipping is just one part of the Herculean transportation task. Getting the equipment to the ports presents its own set of challenges. The team in Saint-Nazaire loads the nacelles on [specialized multi-wheel vehicles](#) that carry extreme loads—as much as 530 tons. The blades, on the other hand, travel in specially manufactured trailers. Like a head of state, each blade travels with a police escort. Turns are especially challenging and the team must sometimes build its own roads to get around tight spots.

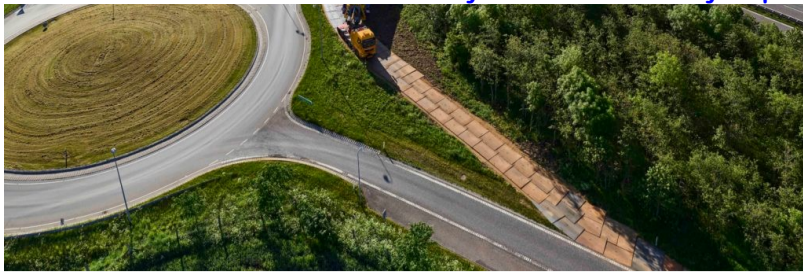


*A Haliade nacelle on its way to the Saint-Nazaire port. Image credit: GE Renewable Energy*



*A 73.5-meter wind blade for the Block Island wind farm is zipping down a Danish highway. Image credit: LM Wind Power*





*Turns were especially challenging and the team had to build its own roads to negotiate tight spots. Image credit: LM Wind Power*

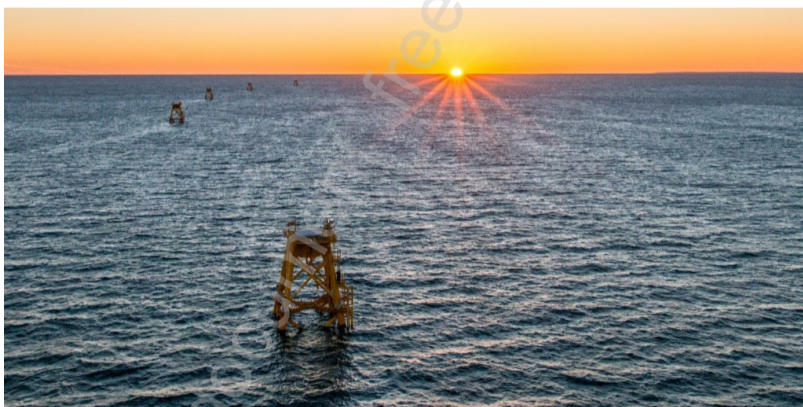
Røset, the Fred. Olsen Windcarrier project manager, says the Block Island nacelles will traverse Atlantic waters that can produce seasonal waves of up to 6 meters. The voyage will take between two and three weeks depending on the weather and course adjustments to avoid any adverse conditions.



*Fred. Olsen Windcarrier's Brave Tern vessel will rise above the waters near Block Island to assemble the wind farm. Image credit: Fred. Olsen Windcarrier*

The nacelles will come to America aboard the 132-meter-long, 39-meter-wide [Brave Tern](#) installation vessel. The ship will chart a southerly route, leaving France in mid-July. The nacelles will ride on specially manufactured platforms so that if huge waves pound the ship, they will pass underneath the nacelles rather than hitting them directly, lessening the chance that any of the gears inside the casing will be damaged.

Upon arrival in the U.S., the Brave Tern will become a real-life Transformer robot, changing from a ship into an at-sea construction platform (*see image above*). Four massive legs will drop down to the seabed, jacking up the ship high over the water.



*The sun is rising over America's first offshore wind farm. Deepwater Wind installed the bases for all five wind turbines last fall. Image credit: Deepwater Wind*

Then, an 800-ton crane will position the generating equipment on the towers and fasten the blades onto the structure over several intense weeks of installation. Roughly 40 additional workers will join the 30-person crew to help with the project, living on board in the Brave Tern's 56 cabins. A specially built Crew Transfer Vessel "Atlantic Pioneer"—a first of its kind in the U.S. that was developed by Atlantic Wind Transfers, a local Rhode Island company—will shuttle crew and supplies between the Brave Tern and the mainland. "With the Block Island Wind Farm, we're pairing European offshore wind experience with U.S. offshore construction expertise to create a uniquely American model for launching a new offshore energy



Deepwater Wind CEO Jeff Grybowski speaking in Providence at his company's wind turbine assembly facility in March, 2016. Image credit: Deepwater Wind

Assuming all goes according to plan and the weather cooperates, the crew will assemble the five GE turbines at sea in the late summer and fall so that the project can be in service by the end of the year. When complete, each turbine will tower 560 feet above the sea, twice the height of the Statue of Liberty. The finished project will generate 125,000 megawatt-hours of electricity, enough to meet 90 percent of Block Island's power needs and even supply electricity to the mainland via an undersea cable.

Says Crucerey: "The entire team is so excited about helping America's first offshore wind farm become real. We can't wait to see what comes next."



This Haliade is working at the Belwind Wind Farm near Ostend, Belgium. Image credit: GE Renewable Energy

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