

A photograph of two large offshore wind turbines in the ocean. The turbines are dark teal or blue. The sky is overcast with grey clouds. The water is dark and choppy. The text is overlaid on the image.

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THE FUTURE OF WIND

# MAKING U.S. OFFSHORE WIND A REALITY



Major European wind players will have to approach U.S. offshore differently than the way it has been done overseas. (Courtesy: Shutterstock)

## *U.S. offshore wind is just over the horizon, but the success of these projects rests on meeting certain challenges head on now.*

By **KENNETH CARTER** ▸ Wind Systems editor

**E**xpect the path to offshore wind in the U.S. to be filled with its fair share of challenges, but facing and solving those challenges will make the end result of renewable energy all the better in the long run.

In that same vein, it is the job of many wind-industry companies to look at ways to solve those challenges before they become obstacles.

That's where Richard Baldwin and his team with Ramboll come in.

Ramboll — a global engineering, design, and consultancy provider based in Denmark — has been a big player in offshore developments in Europe, which has helped parlay the company's entry into the development of U.S. projects, according to Baldwin, who is a hydrogeologist with Ramboll.

"We've designed 65 percent of the Europe foundation system," he said. "And that's certainly a big market entry point for us in the U.S. But, the market is very integrated. Everybody thinks about these turbines spinning offshore, and that's certainly something that Ramboll is completely interested in and capable of supporting. We can support the developers in doing the data collection, data evaluation, engineering. But then there's the whole supply chain and the ports and harbors and the marine infrastructure issue that in the near term we definitely have to evaluate. And that's something we're quite good at."

Obviously, there are many facets of a project to be considered before there's steel in the water, but Baldwin said many recent projects in development are on the fast track.

### **PPAS AND ORECS**

The projects are based on power purchase agreements (PPAs) and offshore renewable energy credits (ORECs), all of which are state solicitations.

"Massachusetts already has an 800-MW solicitation: Vineyard Wind, and that's in the queue," Baldwin said. "They're going through their permitting process right now. Typically, once a power purchase agreement or OREC agreement is signed, there's about a five-year period that you have to go out and collect ocean data. Then, developers have to do a lot of work. So, we're anticipating the next couple of years, two to three years, that things are going to start being built."

And similar steps are being taken in New Jersey, where the winners of that state's first 1,100-MW solicitation are expected to be announced in June, according to Baldwin.

"That's another one that will be in the pipeline very shortly," he said.

Typically, it's a five-year process that is part of the Bureau of Offshore Energy Management's (BOEM) procedures.

In that time frame, a construction and operation plan is

set where developers do a lot of work to completely delineate the sea-bottom conditions, according to Baldwin.

“There’s quite a bit of work once they win one of the solicitations to get there,” he said. “So, five years is actually a fairly short time period for what needs to be done.”

That relatively short five-year period is helped by BOEM’s ability to limit the longevity of some environmental impact statements, according to Baldwin.

“There’s never a question of if they’re not going to be of high quality, so that everything is protective of the environment and all other things that they tend to look at,” he said. “The Feds are trying to help that process. All of the states are very aggressive in trying to make sure that their level of permitting goes through as easily as possible, too. It’s really, I think the excitement and all the regulatory agencies, be it state, local, federal, they want this to go through, so it’s not like there’s a bunch of people dragging their feet.” The U.S. faces several challenges once a site has been given the green light to build a wind farm on, namely the current lack of necessary infrastructure, according to Baldwin.

“There’s a short-term challenge; we also like to think of it as an opportunity: We don’t have the specialized ports and harbors infrastructure that’s going to be required to build these things,” he said. “The scale of the infrastructure — one blade’s going to be 100 meters long, so the length of a football field. Once they are either delivered, and hopefull-

ly in the future manufactured here, they never get very far from the water, because they’re not rail transportable; they’re not road transportable. In the first project or two, a lot of the materials are going to be coming from Europe, because we just don’t have the manufacturing facilities set up in the United States yet. But again, you have to have good equipment-staging and erection facilities. You have to have good ports to harbor structure. You need deep channels and the like. So, that’s probably, in the short term, really the greatest challenge.”

## HOOKING THE FISHERMEN

Another challenge, at least on the East Coast, is the concerns of the commercial fishing industry, who are the biggest opponent to offshore wind as of now.

“They’re very concerned,” Baldwin said. “They think that they’re pretty regulated to over-regulated now, and so when you go to any of these meetings, it’s usually the fishing industry that raises most of the concerns.”

Ironically, it’s been shown that offshore wind farms can actually increase marine habitats, and in the U.S., offshore oil rigs have also contributed to an increase in marine life around the artificial structures.

“They definitely are showing, both in Europe and even off Block Island (off Rhode Island), that they’re increasing the habitat,” Baldwin said. “Typically, it seems like the sport



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and recreational fishing industry really like it. The commercial guys are worried about how they navigate around the turbines. They just want to make sure they're not displaced basically."

Working with the fishing industry is an interesting development in the U.S. that has some positive potential that it doesn't have in Europe, according to Baldwin.

"As I understand, in Europe, the fishermen can't actually fish in the wind farms, and I believe that the plans are, and again, we haven't really constructed any of these things yet, but the plans are to allow the fishing industry and the commercial and recreational fishermen to actually fish within the wind farms," he said. "Which kind of helps with creating the habitat."

Basically, when dealing with the public about the construction of wind farms, transparency is the key to successful projects, according to Baldwin.

"It's really focused on public participation," he said. "Don't surprise stakeholders, whether they're the fishing industry or whether it's the maritime industry. And don't surprise the public. Be open; be honest. I think, too, with the fishing industry, be responsive, listen. You want to show that you're actually thinking, and you're actually listening to them and making sure that you're responsive."

Another takeaway from the European offshore market is that it's going to be a huge job market booster, according to Baldwin.

"There's a lot of white- and blue-collar jobs that will hopefully last for a long time — decades and decades," he said. "Science, engineering, vessel operators, repairs, ship hands, ports, etc. I think that's one of the things that, as time goes on, it's going to develop into quite a strong and robust job market, as they have seen in Europe."

## U.S. VS. EUROPE

With many of the major players in wind hailing from Europe, Baldwin said their approach to the U.S. will have to be a little different than the way it's done overseas.

"With companies such as Ørsted and EnBW and Equinor, they're all European firms that are now coming in," he said. "In Europe, I understand, they're kind of used to being the big boys, the big people on campus, and maybe with more centralized federal governments, they may have a little more sway. I think that the big surprise they're going to have is to do this in the American way. You have to deal with multiple jurisdictions; you have to deal with American business practices, and the like. I think that's definitely a big thing that's going on right now."

Currently, there are about 10 GW in play in the U.S. offshore market with signed PPAs and ORECs, so wind companies will need to know how to approach this potential windfall with an awareness of American business practices, according to Baldwin.

And the need for offshore wind — especially on the East Coast — becomes clear when the location of the most energy-hungry areas is near those shores.

"You've kind of got the load center right next to the main users, so you can be 20 miles offshore, so the wind farm is beyond the visual horizon for most of the time," Baldwin said. "And the wind also blows the most during hot times, so during the summer, it's actually blowing during the hottest time of the day, when we have the biggest usage. With offshore, the scale of turbines is so large. Whereas onshore wind turbines, they're obviously going to be visible, use up a lot of land, and also they typically tend to be smaller, so you need more of them."

## WEST COAST CHALLENGES

The West Coast is also an area that could benefit from offshore wind, but the geographical makeup is vastly different than the East Coast's, making those projects much more of a challenge, according to Baldwin.

"Definitely the Atlantic is going to be moving first because I think the technology is so much better developed; this is where being a geologist is a good thing," he said. "The difference between the West Coast and the East Coast is that the East Coast has a passive tectonic margin. There's nothing much going on, that's why we have the wide continental shelf, and also, it's not hard rock until you get up to Maine. But off New Jersey and New York and that whole area, the geologic conditions are good for installing different kinds of foundations."

The West Coast, on the other hand, has a very active tectonic margin, according to Baldwin.

"You have the San Andreas Fault, and there's just a lot going on geologically," he said. "And that's why we don't really have a nice wide continental shelf off the West Coast with a lot of bedrock. What they're looking at on the West Coast are actually floatable platforms, and that is certainly very exciting, and we're even looking at those on the East Coast for deeper water conditions. But, there's something called the levelized cost of energy, LCOE; that's an acronym you hear a lot. Right now, the way to bring the power to the East Coast in the most economically viable way is with fixed foundations. But it's definitely going to be a big market off the West Coast. The floatable technology is definitely developing, but it's probably a little farther behind."

## SUPPLY CHAIN

Another aspect that makes East Coast wind more economical is the development of a supply chain, since most of the components will ship from Europe, according to Baldwin.

But part of Ramboll's job is to look for possible areas that could be part of a functional supply chain, with a lot of these areas classified as Brownfield sites. A Brownfield site is basically a blighted underutilized site.

"We're looking at facilities to become either port facilities or staging facilities; those are some of the obvious ones that could work, like an old power plant site or something like that, that has some contamination, but we can deal with it, especially if we're able to redevelop it for commercial or industrial purposes," he said. ↵