U.S. Ports Model Themselves After European Counterparts

As offshore wind continues to evolve in the U.S. and Canada, several North American ports have emerged as viable staging locations for the first evolution of offshore wind projects.

BY JESSICA LINK MARTYN & B. JASON BARLOW

Support for offshore wind continues to gain strength in the U.S. A number of interests are exploring offshore wind energy resources in the waters off of both coasts and in the Great Lakes. Along with excitement over the creation of this new industry in the U.S., however, comes concern over the availability of infrastructure and port facilities for the development, construction and maintenance of offshore wind farms.

Although offshore wind energy development in North America continues to evolve, Europe has used this technology for years. Learning from the European experience can provide valuable insight to U.S. counterparts that are preparing for domestic offshore wind development.

Europe is years ahead of the U.S. when it comes to offshore wind. Currently, Europe boasts 39 offshore wind farms in nine different countries with a cumulative capacity of more than 2 GW. During this explosion of projects, several European ports, including Harwich International Port and Ramsgate (U.K.), Dunkirk (France) and Vlissingen (the Netherlands), have established themselves as epicenters of offshore wind construction, and operations and maintenance (O&M). All of these ports have unique attributes that make them well situated to support various stages of offshore wind energy development.

From the European example, it is clear that port size is critical during the initial construction of offshore wind farms. Port facilities must have acres of lay-down space to unload, store and pre-assemble turbine and monopole components. The Port of Vlissingen, for example, has more than 50 acres of dedicated component-storage space.

Construction ports also need deep water and substantial pier and berth facilities to accommodate the large vessels. Vlissingen, for example, boasts water depths of over 54 feet along over 1,100 feet of berth, and Harwich has up to 31 feet of water along more than 3,000 feet of berth. These wharf facilities must be sturdy and equipped with heavy-lift cranes to load and unload the massive wind farm components.

Furthermore, transit between the construction ports and open sea must be quick, with no significant air or sea draft restrictions. Given these requirements, the ports of Dunkirk, Harwich and Vlissingen have emerged as leaders in offshore wind farm construction support. Each of these ports has substantial lay-down space, an ability to accommodate large vessels, heavy-lift capability, deep water, no air draft restrictions, and a proximity to Europe's largest wind farms.

European offshore wind developers also looked for ports that offered turnkey solutions. That is, ports that could provide facilities not only to receive completed turbines, but also to manufacture and assemble the equipment. This combination of manufacturing, pre-assembly and loading at one single port can provide substantial savings over facilities that require turbines to be constructed at one location and then shipped to another. The Port of Vlissingen, for example, has created a separate offshore wind terminal, complete with available expansion space, in an effort to court the European offshore wind industry.

Smaller ports have also played sizable roles in Europe's offshore wind energy development. The Port of Ramsgate, a small commercial fishing and recreational harbor in the U.K., has been designated as the O&M base for two of the world's largest offshore wind farms: the London Array project and the Thanet offshore wind farm. Location trumps port size when it comes to lifelong O&M of offshore wind farms. To maintain the London Array and Thanet projects, it is estimated that fewer than a dozen smaller vessels, such as crew and work boats, will be needed. Several smaller ports, such as Ramsgate, are capable of accommodating these vessels, and Ramsgate's location allows these vessels to sail to wind farm sites in less than an hour – a distinct advantage for long-term wind farm maintenance.

Along the eastern seaboard of the U.S., ports are investing in infrastructure and vying to establish themselves as the most suitable port for offshore wind investment and development. Drawing from European offshore wind experience, offshore wind proponents in the U.S. estimate that vessels transporting component parts may require berths of at least 450 feet and navigation channels with at least 24-foot drafts, 130-foot lateral clearance, and air draft sufficient to transport jack-up rigs and turbines in upright positions from terminal facilities to wind farm sites.

The final assembly and deployment of the turbines must occur at high-capacity port facilities equipped with rail and heavy-lift cranes, due to the size and weight of offshore wind farm components. Although component parts could be manufactured off-site, cost efficiencies and transport logistics favor centralizing manufacturing and assembly functions for turbines, towers and blades.

Component manufacturers are the primary targets for ports hoping to take the lead in offshore wind development. For these manufacturers, lay-down space is a major infrastructure consideration once channel depth and vertical and lateral clearance are deemed sufficient to support offshore wind development.

Along the east coast of the U.S., several terminals may emerge as viable options for manufacturers; however, due to inadequate bridge clearance or insufficient lay-down acreage, some of these sites may be limited to support and maintenance operations or to the manufacture of smaller component parts, rather than staging ports for final turbine assembly.

For example, there is unobstructed access to the South Terminal in the Port of New Bedford, Mass., and the Portsmouth Marine Terminal in the Port of Virginia. With 150 feet of lateral clearance in the channel leading to the South Terminal, the Port of New Bedford has proposed a plan to expand the terminal's berth to 1,600 feet and to dredge a 30-foot channel to that berth and the 14 acres to 20 acres of land adjacent to it.

The Portsmouth Marine Terminal sits on 219 acres of land with 3,540 feet of wharf, three berths and six cranes. Although the Port of Virginia will build a 500,000 square-foot paper and pulp warehouse facility on terminal property in the next year, the port still has room for growth.

The port has water depths of 43 feet at the entrance channel and at the terminal wharf, which will allow it to accommodate large purpose-built offshore wind vessels. Its geographic location on the mid-Atlantic coast is ideal for offshore wind manufacturers and maintainers looking to serve wind farms north and south of Virginia.

The Port of Baltimore is a deep-water port with substantial lay-down acreage and heavy-lift capability. The North Locust Point Terminal, in particular, sits on 90 acres and comes equipped with two 75-ton gantry cranes. The terminal has 19 acres of outside storage space, two sheds with a combined 399,311 square feet of covered storage space, and five 34-foot draft finger piers.

However, the Port of Baltimore has a disadvantage when compared with other East Coast ports because it is 125 miles inland on the Chesapeake Bay. The Chesapeake Bay Bridge provides only 186 feet of vertical clearance, which is likely insufficient to accommodate turbine assembly and delivery to offshore wind farm sites.

Savannah, Ga.'s Ocean Terminal includes 73 acres of open storage, five deepwater berths totaling 3,599 feet with a depth alongside of 42 feet, 1.4 million square feet of covered storage with 60% immediately adjacent to the berth, and 73 acres of paved open storage with additional lay-down area available. However, like the Port of Baltimore, the potential of the Ocean Terminal is limited by a bridge; the Talmadge Bridge has only 185 feet of vertical clearance.

The Port of Charleston is hoping to attract offshore wind manufacturers with a $45 million federal grant awarded to Clemson University for the development of a wind turbine testing laboratory at the Clemson University Restoration Institute in North Charleston, S.C. Two of Charleston's five terminals are capable of handling traditional break bulk, heavy-lift and project cargo. Both have sufficiently deep channels and wharves, ample warehouses, open storage and berth space, and short transit times to the ocean. Nevertheless, the Port of Charleston also has low bridge clearance.

As development of offshore wind progresses on the east coast of the U.S., support and infrastructure requirements will continually be refined. In the meantime, manufacturers will take careful account of the political climate and incentives offered by the various East Coast states, but the main contenders will remain the ports with the best infrastructure to support the physical requirements of offshore wind power. NAP

Jessica Link Martyn and B. Jason Barlow practice in the maritime law and government contracts group at Troutman Sanders. Martyn can be reached at (757) 687-7706 or jessica.martyn@troutmansanders.com. Barlow can be reached at (757) 687-7515 or jason.barlow@troutmansanders.com.