SESSION A: OFFSHORE WIND ENERGY: PARTNERSHIPS, DEVELOPMENT AND US JONES ACT

MAY 6, 2019, 3:45 PM – 5:00 PM

Learn about legal issues surrounding transmission lines in federal, state, local waters; U.S. Jones Act application to offshore wind farms, and the role of the federal regulators; and Coast Guard and Customs and Border Protection responsible for ensuring compliance with these laws.

Moderator/Panelist: Antoine Peiffer, Senior Manager, Global Supply Chain and Development, Principle Power

Panelists:
Meagan Keiser, Legal Counsel, Equinor
Marjorie Krumholz, Partner, Thompson Coburn, LLP
Joshua M. Kaplowitz, U.S. Department of the Interior, Office of the Solicitor, Division of Mineral Resources, Branch of Offshore Resources
Principle Power’s WindFloat: Ready for Commercial Deployment in the US

Antoine Peiffer
Sr. Manager, Global Supply Chain and Development
Principle Power Inc.
Introduction to Principle Power

Global Presence
- Founded in 2007
- ~80 employees - Offices in California, FR, and PT

Strong Backing
- Shareholders
- Partners

Successful 5-year Full Life-Cycle Demonstration
- 2MW Vestas, Identical Performance to Fixed Foundation
- 17GWh, Produced in 12m waves; Survived 17m waves

A Proven Technology

Project Pipeline
- 2 Pre-commercial Projects in Progress (~100MW of installed floating capacity by 2021 in Europe)
- Commercial Developments in Europe, USA, Asia

Our Vision:
- Be the global leader in deep water wind technology

Our Mission:
- To make the WindFloat the most competitive, safe, reliable and environmentally friendly floating technology and unlock GWs of global renewable energy potential
Floating Offshore Wind is an Industry Game-Changer in Two Ways

Key Industry Trends

- Further from shore
- Deeper waters
- Larger Farms

While... Reduction of costs and risk needed to truly globalize the Industry!

Floating wind: a game changer

Open the market for deep water exploitation (>60m)
- Open coastal markets with high power demand, high prices, high population density and deep waters
- Expanding total market for offshore wind

Substitute existing technologies in transitional waters (35-60m)
- Floating Semi-Sub technologies will be a competitive alternative to current foundations (eg. Jackets / gravity based foundations)
- Opportunity to capture market share from existing technologies
Overview of Supply Chain Process/Activities

1. Pre-assemblies fabrication
2. WindFloat Assembly
3. Turbine Mating and Commissioning
Hull Fabrication and Assembly

Hull = Optimized oil & gas Rig

All hulls are identical pre-fabricated components that are assembled.

Floaters can be built in existing industrial facilities and using the existing supply chain.

Similar steel structures, welder qualifications, welding procedures, labor requirements.
Enabling serial production

Design One, Build Many

Increased automation/modularization drives lower costs
Requires deep engagement with supply chain and volume/visibility
Turbine Erection Operation

Fixed Wind = Offshore Operation

- Hard to find and costly to operate Vessels
- Limited Weather Windows
- Larger Turbines will NOT help
- Jones Act restrictions on Vessels
Finalizing Assembly at Quayside

Minimum Offshore Operations and NO Offshore Heavy-lift

Assembled and Pre-Commissioned Onshore

Requires only offshore tug Vessels

Foundation acts as Installation Vessel

> More drastic requirements on port infrastructure (no bridge, land-based crane, bearing capacity)
Revolutionizing O&M

Large O&M conducted “Onshore”
Shorter weather windows required
Fewer and simpler operations to be conducted offshore
No use of specialized O&M vessels
<table>
<thead>
<tr>
<th>Local Contents vs. Economics</th>
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<tbody>
<tr>
<td>Minor Difference with Fixed Final Assembly Facility required to be close to market/sites</td>
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<tr>
<td>Serves as a large O&amp;M facility as well</td>
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<td>European Model is adaptable to US market</td>
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Mooring System and Anchors

Siting Flexibility/Reduced Geotech. Works

- No piling - acoustic disturbances are minimal
- Drag embedment anchors tensioned to 100% design load, NOT driven
- Standard anchor handling and towing vessels readily available in most markets -> Need more in US
Financing Entities acknowledging the benefit on Cost/Risk Axis that Floating brings.

- Reduce Environmental Impact and Geotechnical Requirements
- Water Depth independence
- Serial Production and Quayside Commissioning
- Existing Vessels
- Lower weather risk and Interface Risk with offshore contractor
- Return to Shore for Unanticipated Maintenance
California Market: Offshore wind development is moving ahead with significant state/market interest

- California has a renewable energy requirement of 100% by 2045; Offshore wind load profile complementary to solar (solution to “duck curve” effect)
- Global energy companies are examining the market (ex: Equinor, EnBW, Orsted, etc... from Europe)
- California and U.S. Federal government created an Intergovernmental Task Force to examine offshore wind siting in California
- BOEM Call for Information and Nominations for 3 sites offshore CA (Northern and Central CA Call Areas).
- **BOEM Lease Sale Auction expected to occur in Q1-Q2 2020.**
Jump-starting the industry in CA with the Redwood Coast Offshore Wind Project; Creating unique infrastructure project model due to new CCA environment in CA

100-150 MW, Humboldt County, California, Operational 2024
Flagship project for offshore wind industry in CA and the West Coast

- 12+ MW offshore wind turbines; 25+ miles out; 700-900 m deep; world-class wind resource (9.5+ m/s)
- **Creation of a unique model for an infrastructure project**
  - Redwood Coast Energy Authority (RCEA) is a Community Choice Aggregator (CCA) managing electrical load in Humboldt County
  - PPI part of Consortium selected by RCEA’s RFQ in March 2018
  - Public-private partnership (PPP) created between RCEA and Consortium
- Strong local community support and control
- Potential to revitalize the Port of Humboldt Bay; could become leading hub on West Coast
- Large potential to drive investments in infrastructure and create local jobs
Deep water potential exceeds ‘shallow’ water potential in US waters
Thank you!

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