Learning from the Experts Webinar Series

Port Development Considerations for Offshore Wind

Brent D. Cooper, P.E.
Project Manager
COWI

January 12, 2022
Meeting Procedures

Webinar recordings and presentations will be available at:
www.nyserda.ny.gov/osw-webinar-series

Participation for Members of the Public:

> Members of the public will be muted upon entry.

> Questions and comments may be submitted in writing through the Q&A feature at any time during the event.

> If technical problems arise, please contact Sal.Graven@nyserda.ny.gov
Learning from the Experts

This webinar series is hosted by NYSERDA’s offshore wind team and features experts in offshore wind technologies, development practices, and related research.

DISCLAIMER:
The views and opinions expressed in this presentation are those of the presenter and do not represent the views or opinions of NYSERDA or New York State.
Port Considerations for Offshore Wind
Outline

› Introductions
› Introduction to OSW Ports
› Typical Facility Specifications
› New York State OSW Port Activities and Support
› U.S. OSW Port Activities
› Federal Incentives
› Conclusions and Takeaways
Introductions

Brent D. Cooper, P.E.

› Project Manager

› 14 years experience with coastal / waterfront / offshore engineering
COWI North America by the numbers

FACTS & FIGURES:

- **250 EMPLOYEES**
- **9 OFFICES**
- **ENGINEERS BY PRACTICE**
  - 64% BRIDGE
  - 8% TUNNEL
  - 28% ENERGY & MARINE

NYSERDA LEARNING FROM THE EXPERTS - 12 JANUARY 2022
PORT CONSIDERATIONS FOR OFFSHORE WIND
Services for Offshore Wind Energy Projects

- Project development
- Environmental impact assessments
  - Feasibility studies
  - Wind modelling, siting and energy production
  - Port Facility Identification
  - Met-ocean studies
  - Geotech survey support
  - Design and engineering of foundations and offshore substation(s)
  - Design and engineering port facility improvements
  - Package management (offshore substation, WTGs, foundations, array cables, export cables, grid connection)
  - Procurement and tendering
    - Construction management and support
    - Optimization of wind farm performance
Introduction to OSW Ports
The Role of Ports within Offshore Wind
### "Traditional" Ports vs Offshore Wind Ports
#### Typical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>&quot;Traditional&quot; Port</th>
<th>Offshore Wind Staging Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo</td>
<td>Container, Liquid, Bulk, Breakbulk, Passenger</td>
<td>Foundations, Towers, Nacelles, Blades, Cables</td>
</tr>
<tr>
<td>Location</td>
<td>As far inland as possible (near population centers)</td>
<td>As close to the offshore project site as possible</td>
</tr>
<tr>
<td>Water Depth</td>
<td>&gt;50 ft.</td>
<td>&gt;30 ft.</td>
</tr>
<tr>
<td>Air Draft</td>
<td>&gt;180-215 ft.</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Berth Length</td>
<td>1300 ft. (18,000 TEU)</td>
<td>600 ft. (WTIV)</td>
</tr>
<tr>
<td>Berth Access</td>
<td>Shared</td>
<td>Inbound: Shared, Outbound: Exclusive</td>
</tr>
<tr>
<td>Staging Area</td>
<td>250+ acres (container terminal)</td>
<td>40+ acres</td>
</tr>
<tr>
<td>Live Load Capacity at Berth</td>
<td>500 – 2000 PSF</td>
<td>4,000-6,000 PSF with locally stronger crane pads (&gt;=10,000 PSF)</td>
</tr>
<tr>
<td>Live Load Capacity Storage</td>
<td>500 – 1000 PSF</td>
<td>2,000 – 3,000 PSF</td>
</tr>
</tbody>
</table>
Types of Offshore Wind Ports

› Manufacturing / Fabrication
› Staging
› Operations and Maintenance
Controlling Port Characteristics

› Staging Area
› Dedicated Wharf Frontage
› Live Load Capacity
› Navigable Depth
› Air Draft
› Geographic Location
› Proximity to Project
› Access to / cost of labor
› Intermodal connectivity
Manufacturing and Fabrication - Turbine

How the Haliade-X compares

Empire State Building 1,454 ft
Eiffel Tower 1,063 ft
New GE Haliade-X 853 ft
Statue of Liberty 305 ft
Average onshore US turbine 466 ft
Tallest onshore US turbine 574 ft
Block Island offshore wind project 590 ft

Source: GE, Vox research
Manufacturing and Fabrication Ports

Owner/Operators:
› Component Suppliers
   › Turbine OEM
   › Foundation Fabricators
   › OSS Fabricators
   › Cable Manufacture

Key Characteristics:
› Assembly Area
› Quay Load
› Water Depth
› Labor availability
› Intermodal Connectivity
Manufacturing and Fabrication - Foundation

EEW SPC ROSTOCK

EEW Special Pipe Constructions

New rolling machine

- Capability: up to 10 m
- Wall thickness: 150 cm
- Plate weight: up to 50 to

In operation since June 2013
Manufacturing and Fabrication Ports - Foundation
Manufacturing and Fabrication – Electrical

› Cables
  › MVAC
  › HVAC
  › HVDC
Manufacturing and Fabrication – Electrical

› Offshore Substations
  › Transformer Platform
  › Converter Platform
Staging Ports

Owner/Operators:

› Port Authorities
  › Public or Private
› OSW Project Developers
› EPCI contractors

Key Characteristics:

› Staging Area
› Quay Load
› Air Draft
› Quay Length / Exclusive Vessel Access
Operations and Maintenance Ports

**Key Characteristics:**
- Proximity to project
- Open and covered staging area
- Office Space
- Housing for Staff

**Owner/Operators:**
- OSW Project Developers
- Service Providers
- Turbine OEMs
Typical Facility Specifications
What Specifications to use?

### Massachusetts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wharf Length</td>
<td>(1 x 120m (400 ft.))</td>
<td>(2 ea.) x 200m (650 ft.)</td>
</tr>
<tr>
<td>Live Load - Wharf/Staging</td>
<td>20T/m² (4,000 PSF)</td>
<td>30T/m² (6,000 PSF)</td>
</tr>
<tr>
<td>Live Load - Storage</td>
<td>10 T/m² (2,000 PSF)</td>
<td>15 T/m² (3,000 PSF)</td>
</tr>
</tbody>
</table>

### New York

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wharf Length</td>
<td>120m (400 ft.)</td>
<td>300m (1,000 ft.)</td>
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<tr>
<td>Live Load - Wharf/Staging</td>
<td>10 T/m² (2,000 PSF)</td>
<td>15 T/m² (3,000 PSF)</td>
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### Virginia

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</table>

### Tables

#### Table 18: Turbine Manufacturing and Fabrication Facility Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wharf Load Capacity</td>
<td>200T/m² (4,000 PSF)</td>
<td>300T/m² (6,000 PSF)</td>
</tr>
<tr>
<td>Air Draft</td>
<td>12W (40 ft.)</td>
<td>12W (38 ft.)</td>
</tr>
<tr>
<td>Navigable Channel Depth</td>
<td>4m (13 ft.)</td>
<td>4m (13 ft.)</td>
</tr>
<tr>
<td>Wharf Length</td>
<td>50m (165 ft.)</td>
<td>50m (165 ft.)</td>
</tr>
</tbody>
</table>

#### Table 21: Staging and Installation Facility Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wharf Load Capacity</td>
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<tr>
<td>Wharf Length</td>
<td>200m (650 ft.)</td>
<td>300m (1,000 ft.)</td>
</tr>
</tbody>
</table>

### Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Vessels used</th>
<th>Land parcel size</th>
<th>Waterside infrastructure</th>
<th>Road and rail access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade manufacturing</td>
<td>General cargo vessel</td>
<td>150,000 to 300,000ft²</td>
<td>75 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Tug and targe as compromise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generator manufacturing</td>
<td>General cargo vessel</td>
<td>60,000 to 75,000ft²</td>
<td>15 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Tug and targe as compromise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nacelle assembly</td>
<td>General cargo vessel</td>
<td>75,000 to 100,000ft²</td>
<td>15 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Tower manufacturing</td>
<td>General cargo vessel</td>
<td>120,000 to 200,000ft²</td>
<td>30 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Tug and targe as compromise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation manufacturing</td>
<td>General cargo vessel</td>
<td>120,000 to 200,000ft²</td>
<td>30 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Tug and targe as compromise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submarine cable manufacturing</td>
<td>Submarine cable vessel</td>
<td>80,000 to 90,000ft²</td>
<td>20 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Substation manufacturing</td>
<td>Substation vessel</td>
<td>150,000 to 200,000ft²</td>
<td>40 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
<tr>
<td>Construction staging</td>
<td>Jack-up vessel</td>
<td>150,000 to 200,000ft²</td>
<td>40 x 150 ft.</td>
<td>Need access to major highways; Rail connection highly desirable</td>
</tr>
</tbody>
</table>
New York State OSW Port Activities and Support
Ports & Infrastructure Studies

2017 Ports Assessment
- NYSERDA evaluation of most favorable sites
- 65 Facilities

2018 Ports Assessment
- Industry feedback and NYS evaluation
- Class 4 Estimates
- 7 Facilities
- Class 3 Estimates
- 4 Facilities

2018 Ports Assessment: South Mountain Marine Terminal
- 2018 Ports Assessment: Port of Albany
- 2018 Ports Assessment: Port of Oswego
- 2018 Ports Assessment: Port of Buffalo
- 2018 Ports Assessment: Port of Dunkirk

Potential Offshore Wind Port Facilities

Offshore Wind Lease Areas
RFQL 4259: Offshore Wind Port Infrastructure
OREC RFP20-1
Port of Albany –Rensselaer: Beacon Island Expansion

- Operator: Marmen Welcon allied with Smulders
- Use: Manufacturing Wind tower / Transition Piece Manufacturing
- Key Characteristics:
  - 81 acres
  - 500 LF of 6,000 PSF wharf
- Status: Construction Expected 2022
- Investment: $350M
- Jobs: 550 direct jobs (increased from 350 jobs, due to demand)
Port of Coeymans

• Owner/Operator: Carver Companies
• Use: Manufacturing & Fabrication
  • $86M contract, Riggs Distler & Company, Inc. to construct foundation components for Sunrise Wind (Ørsted and Eversource)
• Key Characteristics:
  • 125 Acres – Port Side
  • 275 Acres – Industrial Park
  • 30 ft. Draft
  • 300 ft. Heavy Lift Main Dock
  • 900 Ton Marine Travel Lift
South Brooklyn Marine Terminal

- Owner: NYCEDC
- Operator: SSBMT (Red Hook + Industry City)
- Initial Lease: Equinor
- Use: Staging and O&M
- Investment: $350M
- Jobs: 350 direct jobs
Port Jefferson

- Owner/Operator: Ørsted
- Use: O&M (SOV)
- Status: in development
- Key Characteristics:
  - Homeport to SOV (Sunrise and South Fork)
  - 60,000 square foot office and warehouse facility
  - 100 permanent direct jobs
Arthur Kill Terminal

- Developer: Atlantic Offshore Terminals
- Use: Staging
- Key Characteristics:
  - Purpose-built
  - 32 acres
  - 1,350 ft. quay (inbound + outbound berths)
- Status:
  - Detailed Engineering and Permitting underway
  - Construction anticipated 2023
  - Operational 2025
New York State Offshore Wind Ports – What’s Next?

- Governor Hochul 2022 State of the State Address
  - $500M to support OSW port infrastructure and supply chain/manufacturing investments as a key element of third RFP for OSW.
U.S. OSW Ports Activities
Maine

- Searsport Feasibility Study

Massachusetts

- New Bedford Marine Commerce Terminal (Staging)
- Salem (Staging)
- Brayton Point (Interconnect, Cable Manufacturing)
- Vineyard Haven (Vineyard O&M)
- Borden and Remington (Mayflower O&M)
Rhode Island

- Quonset Development Corp – Port of Davisville (Staging)
- ProvPort
- Senesco (Fabrication)

Connecticut

- State Pier (Staging)
- Bridgeport (Staging)
New Jersey

- NJ Wind Port (Staging + Nacelle Assembly – MHI Vestas, )
- Paulsboro (Monopile fabrication – EEW)
- Atlantic City (O&M – Ørsted)

Maryland

- Tradepoint Atlantic / Sparrows Point Terminal (Fabrication)
- Ocean City (O&M – Ørsted)
Virginia

- Portsmouth Marine Terminal (Staging)
- Portsmouth Blade Facility (Blade Manufacturing – SGRE)

North Carolina

- Supply Chain Study
California

- BOEM “Infrastructure to Support Offshore Floating Wind”
- Redwood Marine Terminal 1 (floating OSW)
Federal Incentives
MARAD Port Infrastructure Development Program (PIDP) Grants

- 2021 Program Funding: $230M
  - Albany, NY: OSW Tower Manufacturing Port Project $29.5M
  - New York, NY: SBMT 35th Street Pier Expansion Project, $25M
  - Portsmouth, VA: PMT OSW Development, $20M
- 2022 through 2026 Annual Program Funding: $450M

BOEM Lease Program

- Proposed Sale Notice seeks feedback on:
  - “Mechanisms to provide benefits to underserved communities and investments in a domestic supply chain, consistent with goals and objectives of OCSLA.”
Conclusions and Key Takeaways
Conclusions and Takeaways

› OSW requires purpose-built, high-capacity port facilities
› States are beginning to prepare port facilities for OSW use
› OSW Pipeline will require a large number of improved and/or new port facilities
› The OSW projects that can be built first and the bulk of local economic development will be centered around the facilities that are ready to use
› New York has and is continuing to make great strides to facilitate development of the industry
Thank you

Brent D. Cooper, BRCO@COWI.com
Coming Next:

January 26, 1:00 p.m. ET
Harbor Safety and Navigation
Sean Kline, Chamber of Shipping of America

February 9, 2022, 1:00 p.m. ET
A Panel on Nature Based Design Enhancements for Offshore Wind
Carl LoBue, The Nature Conservancy

Visit wind.ny.gov to register

We want your feedback! Send suggestions for future webinar topics to offshorewind@nyserda.ny.gov.