



TALISMAN

E N E R G Y



The Beatrice Windfarm Demonstrator: Applying oil and gas expertise to renewables

Part of the European DOWNVInD Programme

Distant Offshore Windfarms No Visual Intrusion In Deepwater



DOWNVInD Programme



- Programme Objectives

- Research

- » Understand environment and technology

- Demonstrator

- » Show windfarms in 50m are viable

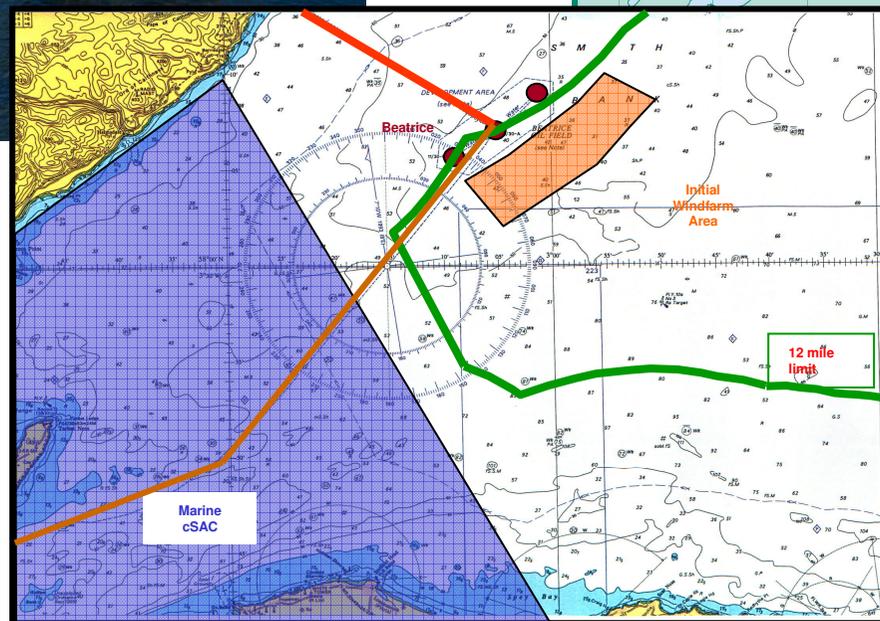
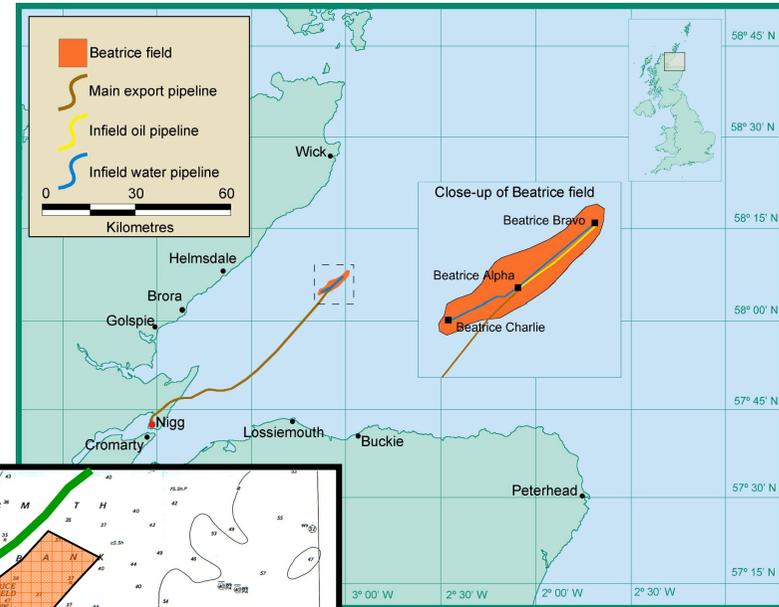
- Operations

- » Learn how to operate





Location and Infrastructure

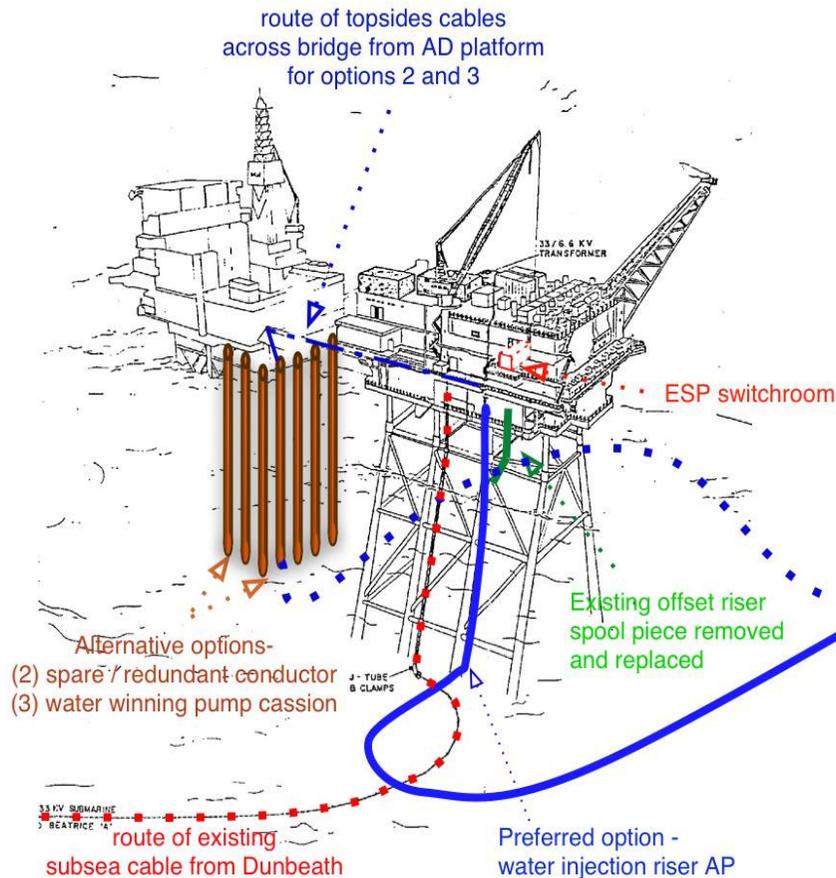




Beatrice Windfarm Demonstrator



Water depth 44 m LAT at turbines



• Demonstrator targeted to:

- Transform water depth envelope
- Pioneer deepwater windfarms
- Establish safe operating practices
- Improve operating performance



Key Innovations



- **Turbine and structure**

- Selection of large next generation 5MW turbine
- First use of a jacket structure in the offshore wind industry

- **Installation**

- Offshore installation using a floating crane
- Onshore assembly of the tower, turbine and blades
- Two stage offshore installation process:
 - » **substructure followed by tower, turbine and blades in one unit**
- Landing device
 - » **to remove relative motion between floating crane and fixed structure**

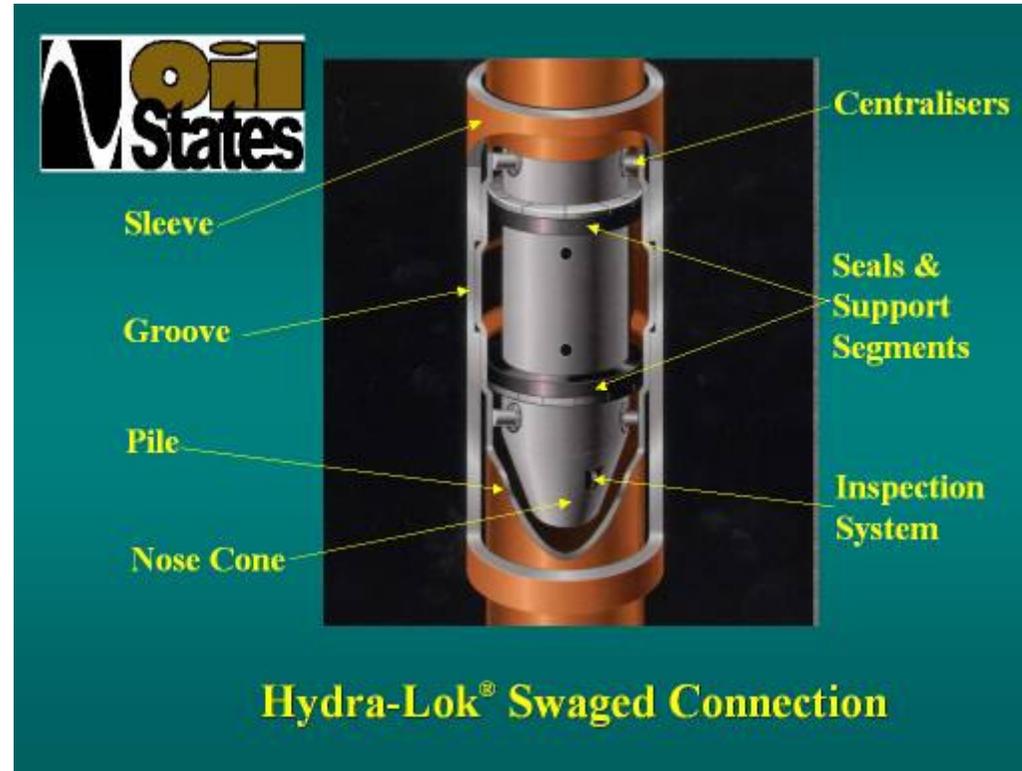
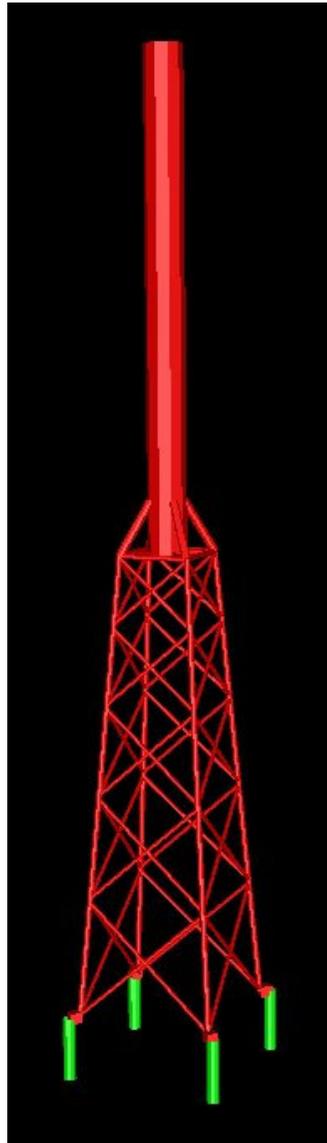
- **Operations**

- » **First use of LIDAR in remote offshore location**
- » **Safe access system.**





Substructure: design and installation

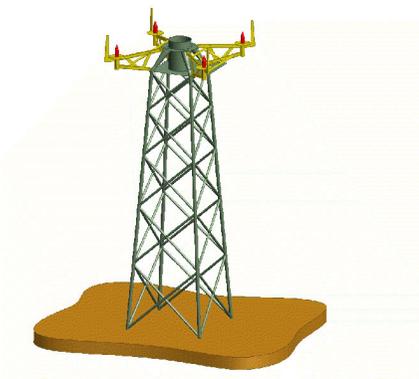


- **Unique Jacket Design**
 - Designed by OWEC Tower
- **Piling**
 - Pile connections swaged



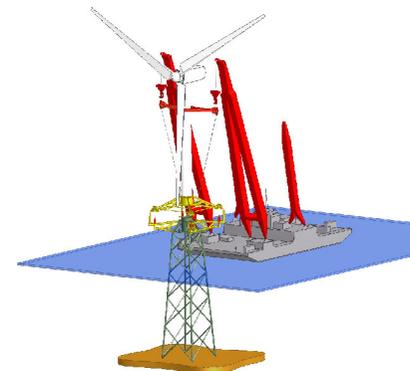
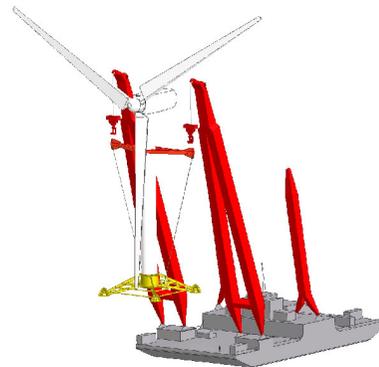


Mirror O&G Installation Practices: Jacket then topsides



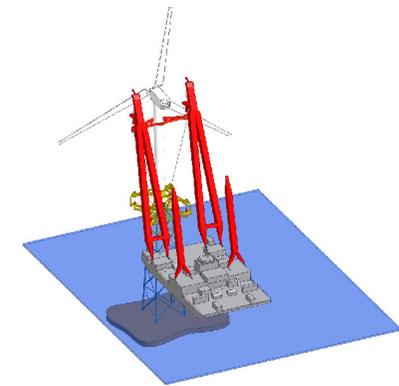
Onshore Activity

- **Assemble turbine**
 - Tower
 - Turbine
 - Rotor
 - Blades
 - On top of landing device



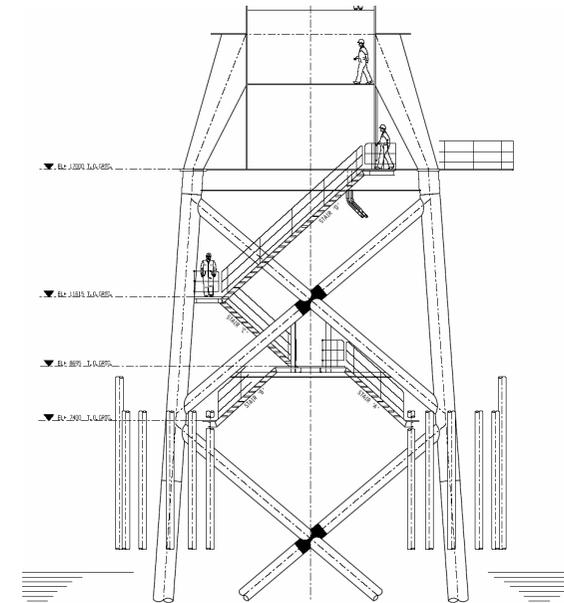
Offshore Activity

- **Floating Crane**
 - Transport assembly to site
 - Single lift to install
- **Landing device**
 - Remove relative motion between vessel and fixed structure





Operations: access and egress



ERIC (Emergency Response Intervention Craft)

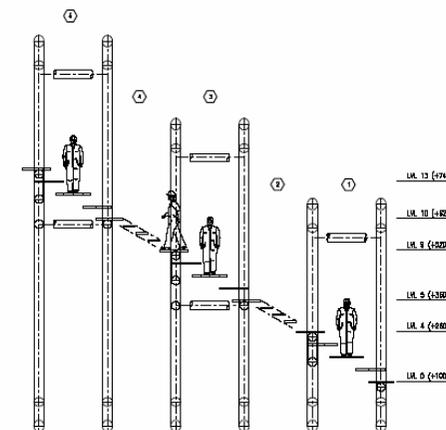
Safe Access from platform to vessel

Access and Egress system

Safe Access from vessel to turbine

Step forward platform to vessel / vessel to platform

No impact on structure / no moving parts





- **Application of Oil and Gas technology**
 - Jacket structure
 - Two piece installation process
 - » **Jacket / turbine**
 - Landing device
 - » **Derived from O&G / defence technology**
- **Impact**
 - Activity moved onshore
 - » **Manageability and cost benefits**
 - Upscaling
 - » **Potential for cost reduction of full scale development**
 - » **Largely independent of water depth**

