

# **Harland and Wolff Heavy Industries Limited**

## **Offshore Renewables Investment and Innovation**

**24<sup>th</sup> November 2011**

# OFFSHORE WINDFARM LOGISTICS

- Barrow (2006), Robin Rigg (2009) and Ormonde (2011)
- Monopiles, TP's, Towers, Hubs, Nacelles, Blades, Grout, Cables etc.
- Receipt, storage, protection, mechanical assembly, painting & cleaning, loading onto installation vessel







MARINE CURRENT TURBINES' SEAGEN  
Assembly, storage and offloading of full  
scale tidal energy generator and  
foundation

CLEARPOWER'S WAVEBOB  
Wave Energy Device

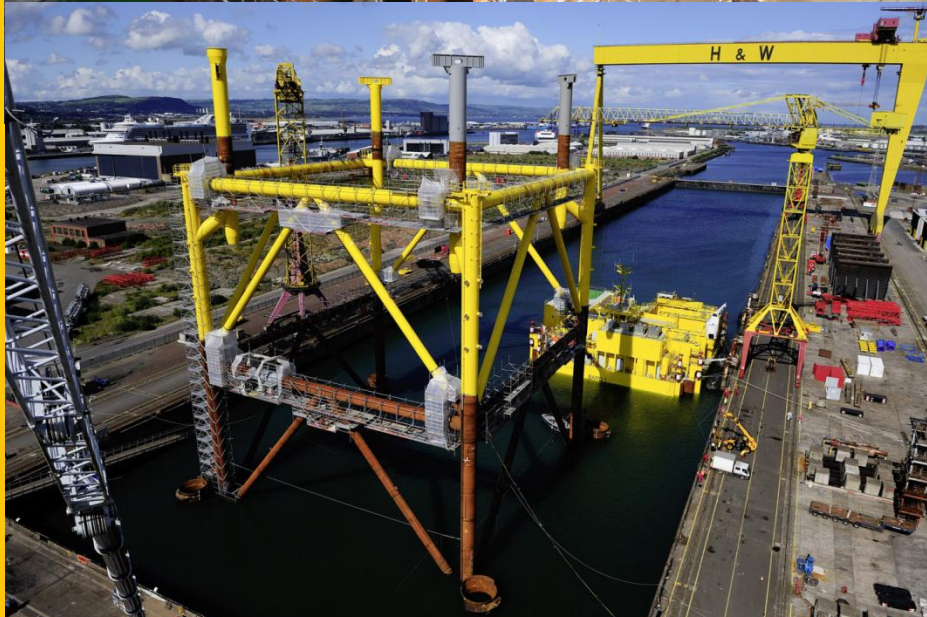
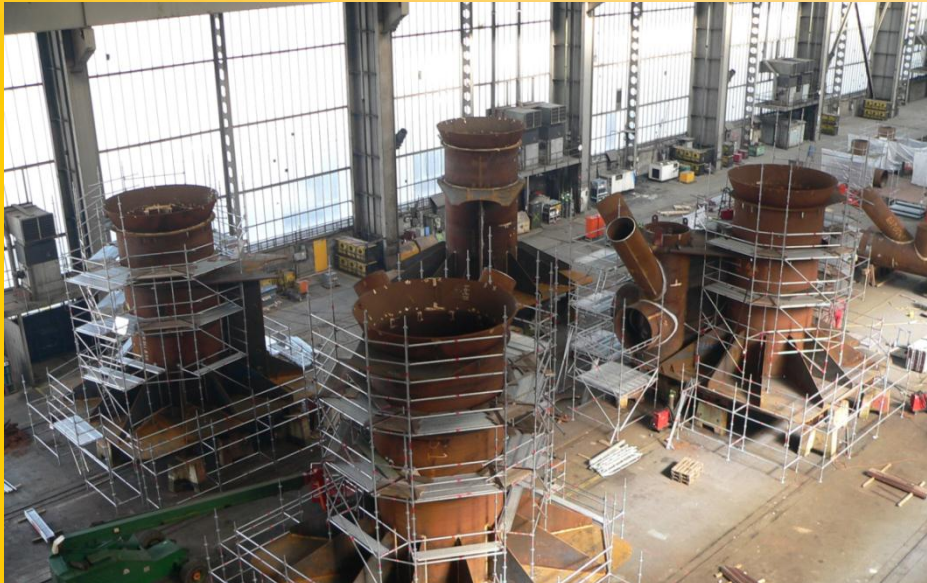


SCOT RENEWABLES SRTT250  
Construction of a large scale  
prototype tidal turbine



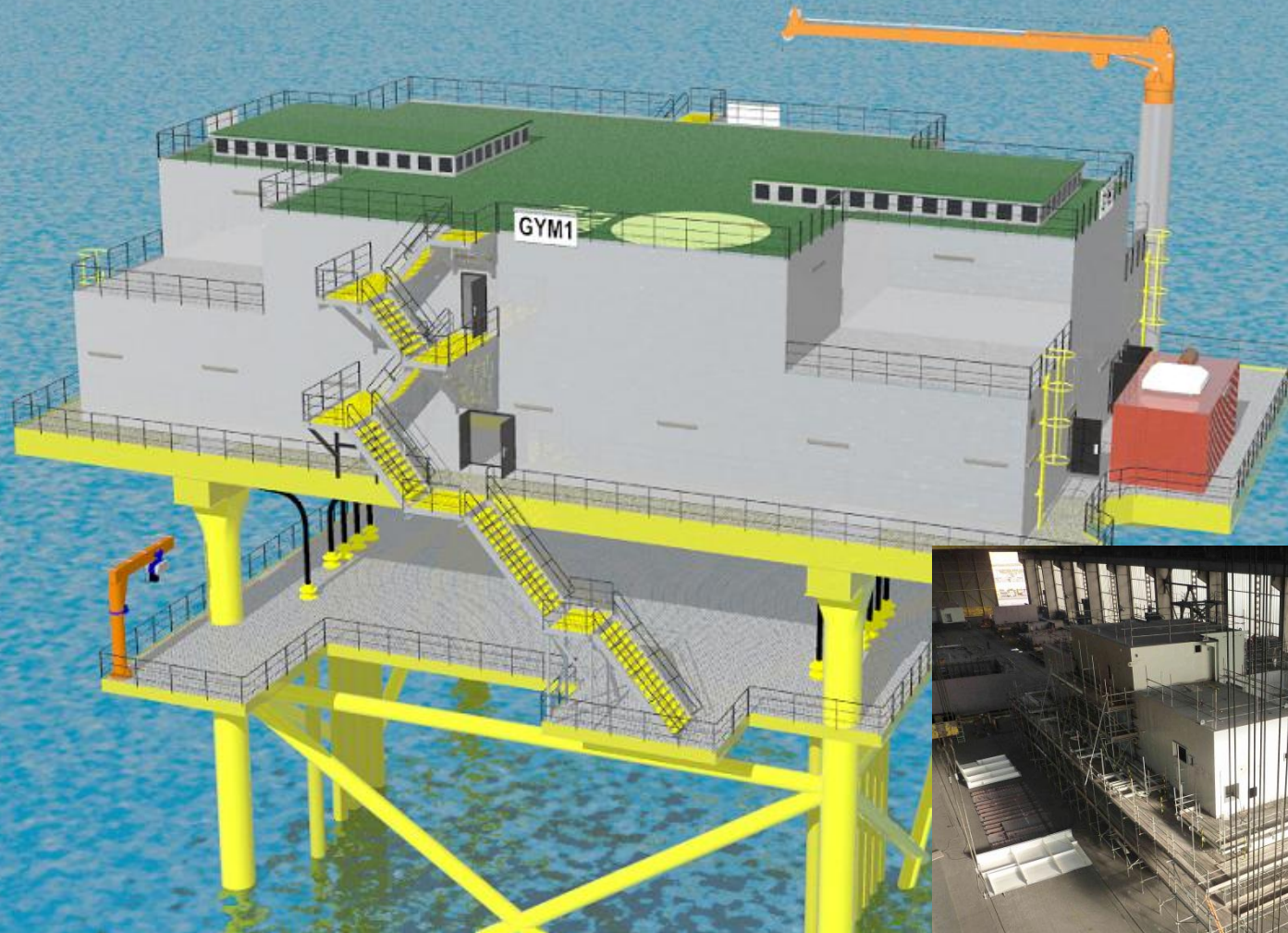
# BARD / WESERWIND - BARD1 Jacket & Transformer Platform

3,000 tonne self-installing jacket structure assembled to accept a 3,500 tonne transformer platform





# SIEMENS' SUBSTATION TRANSFORMER PLATFORMS FOR GWYNT Y MOR OFFSHORE WIND FARM June 2010 to July 2012







## FOUNDATIONS





# MONOPILE SUCTION BUCKET UNIVERSAL FOUNDATION

## Advantages

- Foundation is a little more expensive to manufacture than a monopile (but not by much as it is lighter than a driven pile) but can be installed without large and expensive installation vessels. Result – lower cost.
- Verticality ensured by innovative patented installation system which controls the vertical alignment of the total foundation as it sucks itself into the seabed, reducing total installation time significantly and eliminating the need for a transition piece. This reduces cost and current concerns of grouted connections on transition pieces.
- No pile driving – environmental concerns eliminated.
- No diver intervention required for installation of foundation or for fitting of anodes.
- A wider selection of installation vessel options.
- Reverse suction / jetting process for easier decommissioning or relocation reuse (especially useful for met masts).



Fred. Olsen United AS can now offer a full, packaged solution for offshore wind farms foundations - from feasibility study / design through to finished installation of an integrated system of foundation and turbine.





## **SUMMARY OF H&W RENEWABLES ACTIVITIES**

DESIGN AND MANUFACTURE OF OFFSHORE WIND FARM FOUNDATIONS:  
UNIVERSAL FOUNDATION SUCTION BUCKET PILES, MONOPILES, JACKETS,  
TRIPODS/QUADRAPODS, GRAVITY BASES etc.

DESIGN AND MANUFACTURE OF OFFSHORE MODULES:  
TRANSFORMER PLATFORMS, OPERATIONS/ACCOMMODATION PLATFORMS,  
MINIMUM FACILITY PLATFORMS etc.

MET STATIONS – OCEANPOD

WAVE AND TIDAL ENERGY DEVICES, PROTOTYPE AND MASS PRODUCTION

IRISH SEA LOGISTICS BASE