



Global Projects Organisation

## **Wind Farms:**

### **A comparison with, and lessons learned from the Oil and Gas Offshore Industry.**

Within the North Sea there are at least 45 to 50 years of experience to call upon for the design, construction and installation of fixed or floating offshore structures for the oil and gas industry.

The UK offshore oil and gas industry is a mature industry in many ways with the offshore wind farm industry still in its infancy by comparison. Exciting times lie ahead for the offshore wind farm industry and are characteristic of a rapidly growing industry. This is unlike the mature oil and gas industry where production declines each year in the UK as field reserves deplete and the tax regime makes the UK less attractive for exploration.

When comparing a North Sea offshore wind turbine structure with an offshore oil and gas installation, especially a Normally Unmanned Installation (NUI) the similarities are striking.

Experience and lessons learned from the offshore oil and gas industry are invaluable to the offshore wind farm industry, much more than one would initially consider!

### **Legislation and Standards**

National, European and International Standards exist for almost every engineering aspect within the oil and gas industry, from design to decommissioning. So many of the standards are relevant to the engineering of offshore wind farms, but are not necessarily stated. In absence of a standard in the offshore wind farm industry our recommendation is to reference the equivalent offshore oil and gas standard. One may expect oil and gas standards to be revised to include offshore wind farms under the umbrella of offshore energy installations.

It is acknowledged that further work is required in the areas of legislation and engineering standards for the offshore wind industry.

## Design

The extreme harsh environmental conditions for the UK offshore oil & gas and wind farm industry influence the design, installation and maintenance of structures and equipment. Most offshore oil and gas installations are still in place and operating long after their design life making the lifecycle cost of such facilities an important consideration for new oil and gas developments.

Today, many oil & gas installations in the North Sea are 30 to 40 years old and are now facing serious problems of maintenance and sustainability. This is not the structure or major piece of equipment as one may suspect, but the electronic control and safety critical systems, without which the equipment will not run. Many systems were obsolete within 10 to 15 years, dependent on either the manufacturer or technology selected. This is something that the wind farm industry should bear in mind when designing offshore wind farm support systems.

The offshore wind farm associated technology is developing at a fast pace. A lesson gained from the offshore industry is to ensure the structure and facilities can accommodate modifications, if technology advances make it profitable to install future upgrades. This is a difficult balance, but one must consider the lifecycle of wind farms as opposed to driving costs down early in the design.

## Installation

Installation of both types of facilities, offshore NUI and wind turbines, including associated subsea infrastructure depend upon limited availability of sea-going vessels. Also, installation is typically planned for the summer months to avoid delays due to bad weather. Securing a sea-going vessel for the installation early in the design phase will greatly influence the installation date and cost of installation

Installation and lifting large loads in the oil and gas industry are deemed high risk activities due to the nature of high potential consequences. Risk Management and meticulous planning are employed for such activities. Even with the best planning and risk management processes in place, undesirable outcomes still can happen.

## Maintenance

In the oil and gas industry new facilities make use of the latest technology for performance monitoring to aid planned and predictive maintenance as opposed to reactive maintenance when a component fails. There has been a shift to “more information is better”, sometimes the items you think will be the most likely to fail are often the ones that do not. Having the “more information” as opposed to “no information” allows maintenance engineers to make informative decisions as opposed to blind ones.

## AI Final

UK companies are encouraged to grasp the opportunities developing in the offshore wind farm industry. At a recent DONG Energy presentation, Hugh Yendole<sup>1</sup> informed the assembled audience that DONG Energy were presently developing offshore wind farms using the six megawatt (6MW) generation of wind turbines that are specifically designed for offshore operation rather being onshore derivatives of the three megawatt (3MW) on land units. The discussions included the development of ten-or even twenty (10-20MW) units (with the 20MW units each having their own helipad!). DONG indicate from this that the way ahead is one of continuous improvement.

These developments open up great opportunities for UK companies and, especially, engineers and consultants who have a wealth of offshore experience.

Global Projects Organisation  
Tel : 0800 0198868

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<sup>1</sup> **Hugh Yendole:** DONG Energy Power (UK) Ltd . Director and Programme Manager: *DONG Supply Chain Requirements*, presented at Wynyard Hall Hotel, Teesside, North East England, 29 February 2012.