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Offshore harmony?

The UK has extensive offshore expertise through its oil & gas heritage. But how the wind industry can take advantage of this remains the million dollar question...

IN THE UK there are two energy sectors with a problem. Offshore O&G activity in the North and Celtic Seas has peaked and will decline, leaving a skills and resources base in search of new outlets. At the same time, the emergent (only a decade old) offshore wind sector will encounter resource and experience deficits as wind farms proliferate in UK waters. Would it not be pleasing if the problems of both could be eased by bringing the two entities closer together, the surfeit of one reducing as it decreases the deficit in the other?

A body which believes that something of this sort can be achieved is **Scottish Enterprise**, an organisation having within its purview the highest concentration of O&G expertise in Europe as well as burgeoning wind energy activity. Adrian Gillespie, Director Energy and Low Carbon Technologies at the agency, has in a recent report identified opportunities for the O&G supply chain in design, fabrication and installation of offshore structures.

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Vestas' Engel: "We believe the gearbox is the best solution..."
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Oil & gas and offshore renewables must cooperate
<http://tinyurl.com/7yuzq2>

All-Energy: AREG launches offshore wind portfolio
<http://tinyurl.com/7s5uo35>

Hywind floating offshore wind turbine foundation
<http://tinyurl.com/7ye2and>

The O&G sector has, he points out, extensive experience in heavy steel and concrete fabrication, the movement and placing of large structures on the sea bed, sub-sea engineering, trenching and cabling, marination of offshore plant and working in a hazardous environment within health and safety (HSE) guidelines. Much of this hard-won experience could be of benefit, both immediately and on-going, to contractors working on *Rounds 2 and 3* offshore wind farms.

Equally valuable should be the experience that O&G interests have in the operation and maintenance of offshore structures, both above and below the sea surface. There is vast specialist knowledge in such matters as corrosion protection, remote monitoring, transfer and support of O&M personnel, mitigation of adverse weather and sea conditions, and diving operations. In addition, the O&G sector has access to much onshore infrastructure, some of which could be shared. So, for example, port facilities currently set aside for O&G purposes could be freed up for offshore wind or joint use. Much of the equipment developed for offshore work, from general service vessels to jack-up rigs to accommodation vessels and from geophysical survey kit to sea trenching plant, could potentially be used across both sectors.

In terms of the 'softer' skills, the O&G sector has huge experience of managing large complex projects, surmounting planning and consenting hurdles, undertaking environmental audits and site assessments, managing logistics, training and so on. There are experts in business models and operational methods, reliability and availability enhancement, contractual arrangements, compliance procedures, safety management, cost and pricing structures, funding mechanisms, etc.

Gillespie believes that transferring O&G know-how to the offshore wind industry could reduce the development and operational costs of offshore wind farms by a fifth. He suggests that there is an "awful lot of expertise" within the O&G sector in many areas relevant to offshore wind, which could be useful at a time when "the wind industry is struggling with

Offshore workers in both sectors must operate in an arduous and potentially hazardous environment. Hard-won H&S lessons can be shared (Courtesy, Petrofac Ltd).



issues to do with the move offshore". Gillespie told the publication *Rigzone*: "Expertise that offshore wind needs already exists in spades, but there hasn't really been the dialogue going on that would allow that expertise to transfer. At the same time, the oil and gas companies have not fully understood the potential offered by the offshore renewables market."

Scottish Enterprise is far from being a lone voice in this matter, with many others arguing the same case for the entire UK and, indeed, for Europe as a whole. **RenewableUK**, for one, says that skills present in the O&G sector would be highly pertinent for offshore renewables. It suggests that offshore wind is currently repeating mistakes made in the early days of the UK O&G sector with delays, cost overruns and extra expense due to lack of standardisation. Much of this could, it believes, be avoided, if offshore wind would tap more effectively into the O&G experience pool.

Conscious of protestations that a golden opportunity might be in danger of being missed, a number of commercial interests are determined that this will not happen. One trailblazer is subsea engineering firm **Subsea7** which early last year launched an offshore renewables division. Based in Aberdeen, that epicentre of North Sea O&G activity, the new division offers project management, engineering and construction capability. The company's

CEO, Jean Cahuzac, says: "Our proven seabed-to-surface expertise plus strong safety and risk management processes are fully transferable to support this emerging market. We can help clients deliver offshore developments in a safe and timely manner."

The new division is currently working within an alliance whose aim is to reduce the costs of offshore wind power, its own sphere of responsibility being marine operations and offshore construction. An early involvement is with **Scottish and Southern Energy (SSE)**, helping in the construction of offshore wind farms.

Another company to have taken the plunge is French provider of project management, engineering and consultancy services to the O&G industry, the **Technip Group**. Stephane His, Technip's Vice President Biofuels and Renewable Energies, first began to appreciate the potential for transferring knowledge into a new market in 2008 when Technip contributed to **Statoil's Hywind** project to place a floating turbine off the coast of Norway. The firm has since been working with **Vattenfall Wind Power** and the **Aberdeen Renewable Energy Group (AREG)** in establishing the *European Offshore Wind Deployment Centre* in Aberdeen Bay, as a facility for trialling advanced offshore wind turbines. AREG is a promotional body whose mission specifically includes facilitating the transfer of O&G expertise to the offshore wind sector.

Technip's His asserts that there are numerous activities involved in installing offshore wind that are very familiar to oilfield services firms. By way of example he points out: "When you think about the internal cables to the wind farm, this is pretty much what we do on a daily basis with umbilicals. The kinds of cable that oilfields use for communications and to transmit power are similar to the power cables that connect up wind farms."

Technip is part of a bigger cross-sector picture, being now owned by **Petrofac**, an oilfield services business that is actively targeting offshore wind business. To this end, Petrofac also acquired a couple of years ago the UK renewable engineering consultancy **TNEL**.

Several other energy companies are leveraging offshore O&G experience to advance their wind energy interests. One topical example is **DONG Energy** which, with joint venture partners **SSE** and **OPV**, recently opened the *Walney Offshore Wind* farm – at 374 MW capacity said to be the world's largest – off the coast of Cumbria. The fact that the second phase of this project was constructed in record time no doubt owed much to the partners' accumulated offshore experience gained across both sectors. **DONG** has extensive O&G interest and is active in a number of UK fields, principally to the west of Shetland.

Another energy company, **Centrica**, has highlighted a further strand of cross-sector collaboration by sug-

presence in Aberdeen. **Mwaves**, for instance, a London-based consultancy with strong offshore O&G involvement, has opened an office there in order to exploit the perceived synergies. This consultancy and engineering services company has recently been acting as marine warranty surveyor for the *Thornton Bank Phase II and III* projects off Belgium.

Another outfit seeking, from an Aberdeen office, to bridge the gap between O&G and offshore wind is **RPS Group**, a specialist in planning support and associated front-end services. **RPS** is clear that as offshore wind and O&G extraction both require large structures attached to the sea bed, there is generically similar expertise involved. Its formula for

“Expertise that offshore wind needs already exists in spades, but there hasn't really been the dialogue going on that would allow that expertise to transfer.”
Adrian Gillespie, Scottish Enterprise

Another supplier to Norway's Statoil that is targeting offshore wind business is **Scandpower Risk Management**, which specialises in HSE and emergency response. At last year's *All-Energy* show in Aberdeen, Windpower Team Leader Arne Sandve argued that a customised approach is required for wind energy and cited a new procedure his company has developed for rescuing injured personnel by helicopter from turbines. Scandpower will, he indicated, use new insights developed as a result of the Hywind programme to further improve safety in wind farm logistics.

Statoil is itself an energy company that has interests in both camps. Synøve Helland, Vice President Wind Operations, sees synergies relating to project execution, servicing and maintenance. She claims that maintaining offshore oil platforms, for example, and training of personnel for oil rigs, closely resemble the skills and operations needed on offshore wind turbine platforms.

gesting that fabrication yards used for years by O&G interests could now be used for offshore wind construction. Many of the resident skills, it points out, would be transferable. Construction standards taken from the O&G industry could be applied and the same classification societies – **Lloyds**, **DNV**, **Bureau Veritas**, etc. – could provide the necessary approvals.

A natural hub

Aberdeen, the Scottish east coast 'granite city' that has long been pivotal to O&G activity in the North Sea, is now also becoming a base for companies having a foot in both camps. In 2009 one of these, **Ramco Energy**, re-branded itself **SeaEnergy** in a bid to capitalise on the UK's boom in wind energy. While retaining petrochemical interests, the firm is also establishing an offshore services business aimed at expanding service to the offshore wind industry. With the same aim in mind, several companies have established a

beating down the boundaries between the two sectors is to take experience it has garnered during 30 years of O&G involvement into offshore wind by seconding expert staff into clients' engineering teams.

Established offshore safety training providers can serve wind energy interests too. Norwich-based **Petans Safety Training**, for instance, provides a combination of courses, some that are compulsory – typically in personal survival techniques – and training requested by clients in such topics as confined space access, firefighting and helicopter transfer. General Manager Michael Wilder advises offshore wind developers to make full use of the experience and knowledge available in the O&G sector, says: "We take best practice from the oil and gas sector and adapt it to the offshore wind sector."

Major wind energy companies that command extensive resources of their own are not averse to building bridges with established energy players. It is



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interesting that Ditlev Engel, CEO of **Vestas Wind**, for instance, thinks it important to work hand-in-hand with the fossil fuel industry. As he has previously told *Renewable Energy Focus*: “We need the support of the fossil fuel industry. We need to learn from them. I’ll give you an example. Vestas has an R&D centre in Houston, Texas. People in this region, a big oil region, have a fantastic knowledge of the grid, and there’s a lot of broad knowledge about the energy sector. So building this bridge between the renewable/future energy sector and established energy players is very much what is happening.”

NOGEPA (North Sea Oil & Gas Exploration and Production), the body that is the voice of O&G in the Netherlands, says that cross-sector transfer need not be all one way. It believes that O&G can benefit from it as well as offshore wind and has suggested that residual gas in almost depleted fields could come to the rescue when wind farms are not producing due to lack of wind, if used to generate electricity that

is fed to the grid instead. Conversely, when the wind does blow, electricity from wind farms could be used to help extract gas from low-pressure fields.

Some things remain separate

Of course, not all the expertise garnered by offshore O&G will be helpful to wind interests, not least because there are significant differences between the two sectors. For a start, much of the equipment used for O&G exploitation – jack-ups and heavy-lift vessels for instance – is not optimum for installing and running wind farms. Currently, offshore wind has little choice but to use this equipment, with some penalty in cost, but in time more suitable and cost-effective kit will become available.

A really fundamental difference, though, is that of installation scale and rate. In a typical O&G programme there is intense focus on one massive installation, after which everybody leaves. In contrast, a wind farm might involve several dozen identical installations, albeit smaller ones, so that site

activity is more prolonged and continuous. This leads to very different ways of thinking about how to plan the work.

So declares Sir Ian Wood, Chairman of engineers **John Wood Group**, who adds that the health and safety concerns are substantially different because, with O&G, the emphasis has to be on the safe control of hydrocarbons. This is the more so because it is normal for O&G platforms to be manned, hence strict observance of HSE procedures is required of all personnel. On offshore wind turbines, the hydrocarbon risk is absent but instead there is a focus on safe access to the turbine and working at height.

Then again, although activities in both sectors involve heavy lift, the loads lifted differ greatly. While oil rigs can be built like buildings, by adding levels sequentially, erecting wind turbines involves lifting to the tops of high towers awkward damage-prone components like nacelles and wind rotors. This requires very special high-reach cranes, different from the more conventional heavy-lift cranes required for O&G platforms. Some types of lift will, nevertheless, be similar; for example placing transformer stations on foundations.

One problematic difference is economic. The O&G sector, with its roots in American technology and practice, has become used to ‘big bucks’, a situation that is justified by the high returns delivered by the end product. Consequently material and service costs are high, as are wage levels across the board. Commercial returns from wind farms are not, however, on the same ample scale, so cost levels and expenditures tend to be lower. Unless O&G enterprises take this into account in pitching for offshore wind business, wind interests might not be able to afford the services on offer. Even where this is not the case, the perception in the offshore wind camp that it might be is likely to inhibit contact.

Another difference is that, while standards and regulatory frameworks are well established in the O&G sector, offshore wind is still feeling its way in this respect. As Chris Towner, Energy Partner at commercial law specialist **Bond Pearce**, pointed out at last year’s All-Energy, offshore wind is still a

maturing technology and there are no standard turbine sizes, nor any standard offshore sub-stations, cable sizes or fall arrest systems. Nor is there consensus over which distribution system, AC or DC, should be used.

This all amounts to a big opportunity for O&G to lead the wind camp to appropriate solutions. Increasing standardisation within offshore wind is an essential part of driving down costs, and O&G expertise can hasten progress towards this goal. Towner suggested that standardised procurement processes, allocation of risk and forms of contract – O&G contracts adapted for offshore wind – would help give comfort to financiers. Joint industry working groups should, he said, be set up to make this happen.

Collaborating or competing?

Commonality of resources between two sectors brings, as well as collaboration for mutual benefit, the possibility of competition for those resources. As wind energy ramps up, there will be

times when the same transfer vessels, jack-up rigs, survey equipment, heavy plant, port services and offshore skills will be wanted by both parties. There is a particular likelihood of this happening between now and 2025 because of decommissioning: Some 1.6 million tonnes of O&G facilities are due to be removed in this period, according to RenewableUK, requiring an estimated 8900 vessel-days of activity. Competition, further exacerbated by decommissioning, is likely to bring in its train price inflation, with wind more often the loser because of the economic power possessed by the O&G sector.

Furthermore, the two sectors might clash over sea bed rights. Extensive wind farm building in the North Sea could obstruct the on-going drive to find and develop remaining pockets of oil and gas. O&G interests point out that seismic research is made more complex by the presence of wind turbines, vertical drilling can be impeded and high turbines may obstruct helicopter approach routes to O&G

platforms. Conversely, large exclusion zones imposed around O&G platforms could preclude use by wind developers of substantial areas of ocean. Space ashore might be an issue too, with parties competing for storage yards, factory areas and port facilities.

However, on balance and given appropriate management of the competitive aspect, offshore wind could benefit hugely from O&G's, four decades of hard-won experience and resources. Many experts agree that the two sectors have a vast amount in common, starting with the need to operate safely and economically in one of the world's harshest environments. As Sir Ian Wood, an industrialist with large experience of offshore O&G, is due to comment in a keynote address at this year's All-Energy on 23-24 May: "I see enormous potential for offshore wind to benefit from the huge pool of UK oil and gas offshore expertise and [look forward to] the role we can play in developing the UK's offshore wind resources."

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