

Is your submarine cable your weakest link?

Working with the offshore renewable energy market
by Chris Butler, General Manager, Sales, Cable & Wireless

Introduction

European Governments have set targets for the production of green energy and are now starting to introduce legislation to ensure environmental considerations and agreements are adhered to. Such is the wind farm developer's need to succeed, the resultant pressure is greater than it ever was in the early days of the telecom industry – at a time when there were no overshadowing government targets. The introduction of renewable energy into the submarine cable environment has produced such a steep learning curve for many marine civil contractors, inexperienced in the field of submarine cables, that errors, fundamental to the more experienced, have resulted in project delays and in some cases even cable damage. This paper concentrates on providing solutions from a cable owner and operator's perspective. It focuses on aspects ranging from project instigation through the legal and environmental consents and permit-ting process, to the requirements for both industries to work together to share the seabed. It suggests a process that ensures that 'agreements of principle' and 'standard working practices' and the experience the telecoms industry has to establish agreements with other seabed users and the fishing industry are maintained and transferred to the benefit of the Renewable Energy Market.

Targets

In our opinion, the renewable energy industry has a lot to gain, in terms of planning, knowledge transfer, longevity, programme protection, as well as cost savings. Embracing Cable & Wireless' working practices and expertise when linking the offshore turbines with submarine cables brings power ashore – and keeps it coming ashore.

The last two years have seen the first major offshore wind farms being commissioned. In the next six years, renewable energy production needs to increase significantly. In the UK, for

example, 10% of energy generated is required to be produced from renewable sources by 2010 and 15% by 2015. However, the total UK installed capacity (onshore and offshore) by 2005 is predicted to meet only 1.3% of the required target. Clearly, further acceleration is required if targets are to be met – the majority offshore. Cable & Wireless has been actively involved with planning submarine cable installations since 1870 – yielding both skills and experience which allows us to accurately predict, model and forecast fault probabilities and environmental suitability from natural hazards and external aggression. This is where the expertise of our industry can be invaluable to the renew-able market.

Planning and preparation

The significance of the cabling aspects not performing efficiently can and will cause costly delays.

All new ventures are faced with an array of implementation targets – typically driven by financial pressures. From an outside perspective, the offshore renewable sector also faces being enveloped by a learning curve of exponential proportions, in an area apparently considered relatively insignificant.

Co-operation and relationships

It has long been understood in the submarine telecoms and oil and gas industries (O&G) that co-operation from local agencies and seabed users of all sorts is essential to the successful planning and installation of new submarine infrastructure.

The more efficiently one is able to struggle through the mire of local authorities, agencies and government departments etc., the swifter the agreements and approvals are awarded, the sooner project implementation can proceed with confidence. The telecoms industry has, as a whole, enjoyed a fruitful relationship with such agencies, local industries, local authorities, fishermen, national defence

authorities and inshore land owners (Crown Estates in the UK) which, along with others, are essential contacts necessary to obtain all the permits and licences to install, land and operate a submarine cable. The longevity and strength of such relationships has not materialised overnight. They have been built over many years of best practice learning experiences in such matters for mutual benefit. Now, not only the foundations of these relationships but also the building blocks are available in support of, and to the benefit of, the renewables contractors. The telecoms and O&G operators have recognised the importance and benefits of application and adherence to these rules not least in producing an enviable insurance track record. The publication of accurate as laid data. so essential for preventative damage, maintenance and implementation of exclusion zones, promotes best industry practice for installation and maintenance planning and activities to safe guard all users of the seabed.

Longevity and continuity

Damaged cables means power and revenue losses, as well as longer payback periods.

A submarine cable, whether it's power, telecoms or composite, will tradition-ally have a design life of 25 years. Unfortunately, a cable can rarely be installed and left without further consideration. Events, normally from some form of unexpected external aggression, inevitably contrive to generate a fault during a cable's lifetime.

From a cable owner's perspective, speed is of the essence when it comes to identifying and rectifying these faults. It is essential to have easy access to up-to-date and accurate information on the cable at the fault location including cables/pipelines that cross, or are in proximity to, the specified repair area. Another area in which the telecoms industry has become adept is that of managing the performance continuity of cables. This has resulted in the creation of 'self healing' loops, cable separation, diversification and mutual maintenance plans to the benefit of all. A similar situation can be created in the renewable sector.

These days, most wind farms have single points of failure, usually in the design of

only having one export cable to the shore or having two laid close together. It is strongly felt that physical cable separation guidelines should be part of the planning and design of the wind farm. In addition, it makes sense to leave agreed corridors available through licensed renewable construction areas for the future use of other seabed users wishing to safeguard the ability to make landfall close to a renewable energy site – a practice generally adhered to by the O&G industry.

Route engineering and surveys

During the construction and installation of the first two large wind farms built in Denmark, the first major offshore insurance claims to come to light were for cable damage.

Why did this happen? Could it be incorrect cable protection specifications, poor installation, poor vessel management of in-field operators, or a mixture of all the above? What it wasn't just 'bad luck'. Cable routing involves the real planning and positioning of cables, taking into account all the data available. Thus linking up the wind turbine towers should not be just about straight lines of cables between the turbines and the shore.

It is time to take into account all the issues that the telecoms industry is used to. Among these are:-

- Seabed formation
- Seabed debris
- Conflict with other seabed cable and plant
- Cable protection parameters
- Ability to carry out future maintenance
- Seabed mobility and scouring
- Ability to decommission/recover.

As far as we can tell, routing of cables in the wind farms has not had the same degree of detailed planning that the actual turbine towers have had. This comes as no surprise as the industry has been supported by the engineering expertise from the turbine and tower manufacturers. The cables have come a poor second. This is where the experience from the telecom industry can help with, for example desk studies for the cable route planning, which has not been addressed to date, and guidance on the specification for an electronic survey will ensure that the correct type of data is collected to allow

detailed analysis of the final cable route and the resultant, optimum, cable protection. Cable protection in general, and specifically the cable armouring in the power cable industry, has been treated as standard with little variation to reflect the results of a survey. Cost savings could be considerable if the armouring reflected the hazard to be protected against. After all, assessing the risk of in-field cable damage vs. potential damage to the export cable could highlight significant variations.

Cable installation

Marine expertise from the telecoms industry can bring overall 'Field Operations Management', which, with an understanding of the construction critical path, would optimise the operation.

The restricted work area between the towers, and the concurrent operations being carried out in the field by other contractors, creates a complex working environment. However, the knowledge of the maritime practicalities that cables ship operations have grown to accept as the norm can be used within the wind farm during the construction phase, especially as the wind farms move out into deeper water. Many operations are running in parallel and a central operations management and shipping control would go a long way to ensure that safety and the critical path for the work are optimised in the limited weather windows.

Maintenance

Essential to service levels, and preserving customer satisfaction, is the successful maintenance of the undersea network of cables.

As a damaged cable is causing loss of revenue, a cable owner's interest is in the high standards and speed of response, irrespective of ownership. Many years of learning has again brought together competitors into common agreements for the maintenance of a multitude of cables in a given area on the seabed. Cable & Wireless is represented and influences a number of established maintenance agreements including ACMA (Atlantic Cable Maintenance Agreement) and NSCMA (North Sea Cable Maintenance Agreement). A similar agreement for the renewable energy community would be able to collect and to keep up to date, on a

confidential basis if necessary, all the required information on all cables in the designated area and be available 24 hours per day in order to respond. The economies of scale are substantial under such agreements where the benefits are not only financial but ultimately the service levels are far in excess of those that could be offered on an equivalent system-by-system basis.

Conclusion

Cable & Wireless has been planning and laying submarine cables since 1870. Renewable energy can benefit and probably has an obligation to protect itself, its revenues and its customers as well as the environment from the same commercial and technical 'faux pas' made by an industry that has honed to perfection the planning, survey installation and maintenance phases of submarine cable projects.

It has taken many years for the telecoms industry to establish how the interfaces between seabed users should be managed and to respect, and be respected by, the various agencies and organisations. These lessons have been invaluable in promoting best practice within the telecoms industry. We don't want to see additional risk to our existing cable infrastructure or to those wishing to use the seabed in the future.

We offer support to the wind farm community from a submarine cable owner's perspective, with an emphasis on promoting the best practices already common to the existing submarine cable population.

This experience can be applied directly to the development of the offshore renewable energy market.

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