RENEWABLE ENERGY TECHNOLOGY ACCELERATOR (RETA) PROJECT

PROJECT FUNDED BY:

EUROPEAN UNION
Investing in Your Future
European Regional Development Fund 2007-13

PROJECT PARTNERS:

IHC MERWEDE
IHC Engineering Business Ltd

tecnalia Inspiring Business

PDL

RENEWABLE ENERGY TECHNOLOGY ACCELERATOR (RETA)

Innovation in the supply chain is vital to the success of the offshore renewable energy industry and to ensure economic benefit for the UK. Narec has received investment from the European Regional Development Fund (ERDF) to develop a Renewable Energy Technology Accelerator (RETA) programme to collaborate with industry; encouraging and supporting companies in North East England to develop new products across the supply chain for the offshore renewable energy market.

RETA is working with manufacturing and engineering companies to take forward specific technology development projects in key areas of the offshore renewables supply chain, introduce innovative products and services to market, create and safeguard jobs and accelerate research, development and demonstration projects. The programme runs from May 2013 until March 2015.

THE FIRST TWO INNOVATION PROJECTS SELECTED ARE:

1. INTER-ARRAY CABLE TRENCHER
2. SMART CABLE DEVELOPMENT FOR IMPROVED LIFECYCLE COSTING OF OFFSHORE POWER NETWORKS

INNOVATION PROJECT 1

PROJECT PARTNER
IHC ENGINEERING BUSINESS

INTER-ARRAY CABLE TRENCHER

BACKGROUND

To help drive down the cost of renewable energy below £100 per MW hour, the offshore wind industry needs to increase productivity, efficiency and extend operational weather windows required to conduct successful installation and O&M procedures.

Current tracked vehicles used in the oil, gas and telecommunications markets are designed for predominantly straight line trenching over even, flat seabed topography and are known to have issues with reduction in trench progress when manoeuvring is required. Free swimming Remote Operated Vehicles (ROVs) are designed to trench cables remotely in deep water where high current and wave loading do not dominate operations and are therefore very constrained in operational weather conditions.

Within the offshore renewable energy sector there is a requirement for a purpose built inter-array cable trencher for the offshore wind market that can operate in various topographies (including sand waves) and has greater manoeuvrability.

OBJECTIVE

This project aims to design a purpose built inter-array cable trencher. As it will be designed specifically for the offshore wind market it will:

- Have a tight turning trenching radii, making it suitable for trenching away and towards an offshore structure (turbine foundation, substation foundation).
- Be capable of being operated in shallow water.
- Be capable of manoeuvring over sand ripples and mega ripples; common in offshore wind turbine locations.
- Be operable in harsh weather conditions which will increase availability and reduce operator costs and thus lead to improved operability of offshore wind farms.
- Have a reduced ground pressure and higher traction capability.

PROJECT OVERVIEW

During this project, IHC Engineering Business will undertake the design work of the inter-array cable trencher. To achieve the level of validation required a demonstration vehicle will be built to demonstrate and quantify the key patents associated with trenching tight turning radii <10m, including:

- Testing and validation of a purpose designed and built high manoeuvrability undercarriage system.
- Testing and validation of a mechanical cutter system for tight turning radii trenching.

The demonstration vehicle will be assembled at IHC Engineering Business, Port of Tyne facilities, ready for demonstration and testing in March 2014.

OUTCOMES

It is anticipated that the ERDF RETA project will lead to the successful development of a purpose built inter-array cable trencher for the offshore renewable energy sector. The trencher which will be operable in harsh weather conditions will increase availability and reduce operator costs and thus lead to improved operability of offshore wind farms.

Specifically the project will look to:

- Increase the operating weather window beyond current available free swimming ROV technology. This will help to reduce the duration of the project and subsequent vessel day rates and overall capital expenditure.
- Reduce the deployment and operational time due to more efficient cable burial cycle procedures.
- Reduce the requirement for expensive alternative protective measures (such as, mattressing and rock dump), during installation and also the cost of O&M activities.

In addition, the project partners are located in the North East of England, and will aim to engage the regional supply chain, where possible, enabling North East SMEs to benefit directly from involvement in the development of the device. Additional employment opportunities will also be created by the project partners to deliver the project within the timescales outlined.

INNOVATION PROJECT 2

PROJECT PARTNERS

TECNALIA | JDR CABLE SYSTEMS LTD | PDL SOLUTIONS (EUROPE) LTD

SMART CABLE DEVELOPMENT FOR IMPROVED LIFECYCLE COSTING OF OFFSHORE POWER NETWORKS

BACKGROUND

Offshore grid infrastructure failure accounts for a significant proportion of renewable energy industry insurance claims. Reducing the operational risk around offshore cable infrastructure is an important component in helping to lower the cost of electricity generated by offshore renewable energy technologies.

OBJECTIVE

This project aims to make material progress in the design and development of smart cable technology, with the ultimate objective of improving the real-time understanding of the performance of these critical assets and, as a result, reducing the risk of outage by triggering appropriate and timely maintenance interventions. This project will incorporate new technology in terms of optical fibre design, as well as advances in interrogation equipment to enable improved resolution of cable strain during dynamic deployment and operations.

PROJECT OVERVIEW

Initially, the project will investigate cable design for electrical system requirements, taking into consideration inter-array cable voltages and installation techniques which expose the cable to greater dynamic loads.

Numerical modelling will be used to derive the dynamic loadings that the cable is likely to be subjected to. This will allow safe cable laying practices and protection against the residual stress distributions induced by various cable installation techniques to be accounted for in the cable design process.

A fully instrumented length of cable will be produced based around the size limitations identified. This will include embedding advanced sensor and condition monitoring technology into the cable design and manufacture process in a robust, quality assured, scalable way.

Insights into the mechanical loadings the cable is likely to be subjected to will define the testing programme; the format of which will be developed in association with Narec. The programme will be based upon quality assured, experimental design processes, with the objective of verifying the design and analysis.

The laboratory testing taking place will include new innovations in cable monitoring technology within the cable itself and to measure the dynamic response of the cable under load and during flexing due to installation and operation. The results of the laboratory testing will be used to derive and correlate data sets for comparison of different mechanical stresses.

The work carried out will provide valuable insight into likely cable performance as well as helping to establish the key indicators of cable performance. It will facilitate further data generation and analysis for optimised operations and maintenance interventions, and as a result, reduce operational risk. Finally, a techno-economic appraisal will be produced to gain an understanding of the cost-benefit of developing smart cables, with particular emphasis on the impact of O&M practices and how this translates to the levelised cost of offshore renewable energy.

OUTCOMES

The project partners are located in the North East of England and will work with the regional supply chain, helping North East SMEs to benefit directly from involvement in the supply of products/services and the RETA programme.

This project will also instigate the potential for the commercial scale production of smart cables. Deployed at scale, such technology will, over time, make a positive contribution to the reduction in the levelised cost of offshore renewable energy and a reduction in the risk premium attached to project finance.

As cost reduction is a key driver of the RETA programme, this project will specifically look to:

- Increase the level of understanding into the in-situ performance of cable assets so that operational and asset management practices can be adapted to increase asset usage and in turn energy production and yield.
- Allow maintenance activities to be more optimally scheduled based on a better informed position on the performance of the cable.
- Reduce the risk around the installation/laying process such that remedial damage is minimised.

TECHNOLOGY TRANSFER

In addition to the innovation projects, Narec is providing business innovation support to over 70 companies in the North East of England via workshops, training and individual technical support. The support available aims to encourage and help regional companies to enter the offshore renewable energy sector or develop new products/services across the supply chain. Narec hopes this technical knowledge and business support available will be able to create and safeguard 57 jobs, helping to develop and grow the sector and region.

SUPPORT

- TRAINING
- INNOVATION VOUCHERS
- ACCESS TO FINANCE
- TENDER SUPPORT
- OFFSHORE RENEWABLE ENERGY AUDITS
- TECHNICAL ADVICE AND GUIDANCE/DUE DILIGENCE
- BUSINESS/MARKET ANALYSIS
- TECHNICAL EVENTS AND WORKSHOPS

RENEWABLES
INNOVATION NETWORK
powered by Narec

RENEWABLES INNOVATION NETWORK

Renewables Innovation Network is an active network dedicated to supporting and growing innovative businesses within the offshore renewable energy sector. It is a forum for the sharing of knowledge, contacts and industry intelligence to stimulate technology-led innovation.

To keep up to date on news, events, industry calls and project information, register at **www.renewables-innovation.co.uk** to be part of the network.

CONTACT

If you would like more information on how to get involved in the RETA programme please contact James Battensby, **james.battensby@narec.co.uk** or tel **01670 543 016**.

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