Distributed Acoustic Sensing for Cable Monitoring and Surveying for Offshore Wind Farms providing movement, depth, surface disruption and free-span readings

Informe

Información del proyecto

SENTRY

Identificador del acuerdo de subvención:
768328

Sitio web del proyecto

DOI
10.3030/768328

Proyecto cerrado

Fecha de la firma de la CE
19 Junio 2017

Fecha de inicio
1 Julio 2017

Fecha de finalización
30 Junio 2019

Financiado con arreglo a
SOCIETAL CHALLENGES - Secure, clean and efficient energy

Coste total
€ 1 972 673,75

Aportación de la UE
€ 1 380 871,00

Coordinado por
ELECTRICITY DISTRIBUTION SERVICES LIMITED
United Kingdom

Periodic Reporting for period 2 - SENTRY (Distributed Acoustic Sensing for Cable Monitoring and Surveying for

Offshore Wind Farms providing movement, depth, surface disruption and free-span readings)

Período documentado: 2018-07-01 hasta 2019-06-30

Resumen del contexto y de los objetivos generales del proyecto

EDS is a global leader in HV asset management for offshore wind farms (OWF). In the OWF, newly commissioned engineering projects often experience failures either in the initial years of operation or at the end of their lifecycle. Statistics show that a OWF cable circuit of average length is likely to experience 1-2 faults per 20-year period. Insurance companies increasingly report on HV cable faults being a major issue for financial losses at OWFs. They led to insurance claims totalling more than €60 million in 2015. On average, at least 10 subsea cable failures are declared to insurers each year in the OWF sector. The financial severity of these incidents continues to grow such that they account for 77% of the total global cost of OWF losses. Our CableSENTRY service offering is an innovative solution based on DAS technology that detects subsea cable faults in real time. Acoustic signals from the HV cable create an optical response in a fibre optic cable so faults and other events can be located accurately and immediately on a calibrated system. Applied in addition to existing fault location technology, our solution will be able to identify fault locations in land and subsea HV cables and save an average of 4 days' downtime per fault over current methods.

Importance for the Society: Total installed OWF capacity in Europe now stands at 11,538 MW across 82 sites in 11 countries. The European OWF industry attracted a record €14 billion in new investments during the first six months of 2016. In June 2016, energy ministers from 9 European countries signed a MoU and Work Programme to enhance their cooperation on OWF. In parallel, 11 energy companies signed a declaration to reduce OWF costs to below €80/MWh by 2025. This assumes an annual build-out of 4-7 GW of OWF from 2021 onwards. As the number of OWFs are increasing, social pressures towards cleaner energy generation and geographical limits mean OWFs are being located further offshore. Moreover, based on growing energy demand and dependency on offshore produced renewable energy, submarine power cables have become essential for reliable electric power supply and often can be classified as critical infrastructure. CableSENTRY can provide a monitoring solution for cable lengths up to 94 km which covers new further OWFs.

Overall Objective: To conduct two sets of large-scale customer trials that shall demonstrate the technical advantages over the current deployed technology and ensure all technical and commercial targets are hit prior to market entry.

Conclusions of the action:

Technical (Objective 1): The final product specification met the requirements of our trial partners. During the project whilst gathering a large quantity of data on asset condition, EDS have formulated a plan to further develop CableSENTRY to become a platform technology incorporating several condition monitoring data streams.

Customer Trials (Objectives, 2, 3, 4, 5 & 6): Following twelve trials on eight separate OWFs, our trial partners have acknowledged the potential benefits and commercial impacts that CableSENTRY can bring with respect to asset condition monitoring over the state of the art.

Commercial (Objectives 7, 8 & 9): Following completion of customer trials, the CableSENTRY value proposition, pricing structure and service offering has been presented to our target customers and initial sales are expected to begin in Q4 2019. IP relating to patents and trademarks have been filed to further underpin the commercial outcomes of this project.

Trabajo realizado desde el comienzo del proyecto hasta el final del período abarcado por el informe y los principales resultados hasta la fecha

The first reporting period 01/07/17 to 30/06/18 comprised work packages 1, 2 & 3:

WP1 produced initial specification, site requirements, trial procedures and reporting format by M3. DAS technicians were recruited for the project and were fully trained by M5, providing the project with the personnel to install and survey assets.

WP2 comprised a fault simulation trial (simulating a 42km section of subsea cable) based at equipment manufacturers headquarters in Farnbourgh and six initial trials on OWFs. All trials were in line with objectives and aims to complete onsite analysis of data.

WP3 consisted of data collection and analysis. Data from initial trials were analyzed onsite and then again after each trial highlighting the specifics of each asset tested and delivered a conclusion report. Data from each site was compared to sea states and general weather conditions and cross referenced against bathymetric survey data provided by trial partners when writing reports.

The second reporting period 01/07/18 to 30/06/19 comprised work packages 4, 5, 6 & 7.

WP4 consisted of a second set of validation trials across six OWFs. This data was used to refine a final product specification of which a performance report of the equipment was measured against.

WP5 consisted of finalizing a product development roadmap, registering IP, defining SLAs and finalizing software for the equipment backed up by training and installation documents.

WP6 involved marketing and preparation for commercialisation. This started in M6 and was ongoing to M24. Several marketing and dissemination activities have been carried.

WP7 (Project Management) was an ongoing process through to M24, monthly technical meetings have been held and quarterly reports provided to senior management within EDS. Risks, procedures

and objectives were regularly reviewed and amended when needed with all changes logged accordingly.

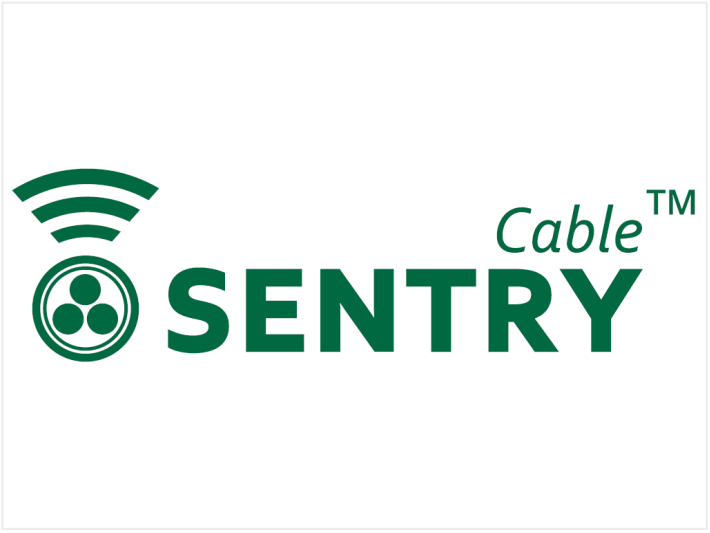
Avances que van más allá del estado de la técnica e impacto potencial esperado (incluida la repercusión socioeconómica y las implicaciones sociales más amplias del proyecto hasta la fecha)

To date, fault detection of subsea HV cables in OWFs is only done in a reactive manner using for example, Optical Time Domain Reflectometry (OTDR) testing. OTDR was developed more than 20 years ago and has become the industry standard for telecom loss measurements which detects the Rayleigh backscattering signals. The principle for OTDR is quite simple and is very similar to the time of flight measurement used for radar. Essentially a narrow laser pulse generated either by semiconductor or solid state lasers is sent into the fibre and the backscattered light is analysed. From the time it takes the backscattered light to return to the detection unit it is possible to locate the location of the temperature event. Major downsides of OTDR used for subsea cable fault detection are the lack of real-time monitoring capabilities and the low accuracy of location detection (+/- 300 m on a 15 km cable).

Quantified benefits of CableSENTRY as compared to the state of the art are;

• Reduce chances of cable faults: Statistics show a OWF cable circuit of average length is likely to experience 1-2 faults per 20-year period. This increases to as high as 5-8 faults per 100km per year in the early lifetime resulting in losses of more than €300,000 per day in revenue for an OFTO. This has led to insurance claims totalling more than €60 million in 2015.
• Increase accuracy of fault detection: current technologies are not very accurate resulting in lengthy repair time.
• Reduce time of fault detection: on average, it takes 8-10 days to detect a fault.
• Overarching need: Reduce downtime & Reduce cost of cable fault: incidents continues to grow – such that they account for 77% of the total global cost of OWF losses.

EDS provides a new, unique, sustainable retrofit or new build solution to provide real-time analysis of true faults and enable HV cable monitoring for full asset management within the OWF industry.



trademark CableSENTRY logo

Última actualización: 23 Diciembre 2019

Permalink: https://cordis.europa.eu/project/id/768328/reporting/es