Department for Energy Security & Net Zero

NET ZERO INNOVATION PORTFOLIO

JDR Cable Systems Ltd

Accelerated development of higher-voltage export & array cables for dynamic application (AHEAD)

CARBON TRUST | OFFSHORE WIND

Project Lead: JDR Cable Systems Ltd

NZIP Grant: £1,606,711

Innovation overview

The project's aim was to develop and test to demonstrate an innovative lead-free dynamic 132 kV cable. The project has included demonstration of an innovative polymer insulation system, construction of a larger 132 kV dynamic cable, and computational modelling of cable configurations with higher loadings or stiffer cabling.

Potential benefit to the industry

By reducing power losses and improving transmission efficiency, 132 kV systems can help lower operational costs.[1] Implementing them would enhance the efficiency of large floating offshore wind farms.

Additionally, the robust design of dynamic cables, built to withstand harsh conditions, could extend the cables' lifespan, reduce maintenance frequency and costs, and minimise downtime, leading to more consistent energy generation.

The lead-free design eliminates environmental and health hazards, addressing concerns raised by the European Chemicals Agency.[2]

"JDR Cable Systems have completed an ambitious qualification programme to secure 132Kv 800mm^2 3 core cable designs for both Static and Dynamic applications. Since completing this programme, JDR have seen considerable interest already from the market in our 132 kV dynamic cable solution. In particular, a number of energy companies and developers are considering the use of Dynamic 132 kV Cables for floating wind farms in deeper waters and at the 150 to 400 MW range. To reduce costs for the offshore wind project, some developers are considering using no offshore substation, since the Export and Array Cables will all be operating at 132kV. This solution will therefore be of benefit to the sector as it seeks to accelerate and demonstrate other floating technology deployments and as floating wind moves from demonstration to small and mid-size commercial developments."

David Bignell

Product Development Programme Manager

[1] The Carbon Trust (2022) Unlocking the next generation of offshore wind: step change to 132 kV array systems
2 Europacable (2022) Possible Authorisation of Lead metal under REACH

Results

Result #1

The project aimed to introduce dynamic lead-free 132 kV cables. These cables have the potential to reduce Levelised Cost of Electricity (LCOE) through various means:

Minimising energy losses

Higher transmission voltages, e.g., 132 kV, reduce energy losses during transmission, which improves overall efficiency.

Extending cable lifespan

Dynamic cables are designed to handle the movements and stresses of floating offshore wind platforms, which means they can last longer.

Reducing maintenance

Dynamic cables are engineered to be more resilient and durable, which means they require less frequent maintenance.

Avoiding failures and downtime

By using dynamic cables that can withstand the harsh conditions of offshore environments, the likelihood of cable failures is significantly reduced.

Facilitating consenting

Using lead-free materials helps meet environmental regulations, which can streamline the consenting process and reduce potential delays and costs.

Result #2

JDR's 132 kV dynamic cables are particularly beneficial for floating wind farms in deeper waters and further at sea.

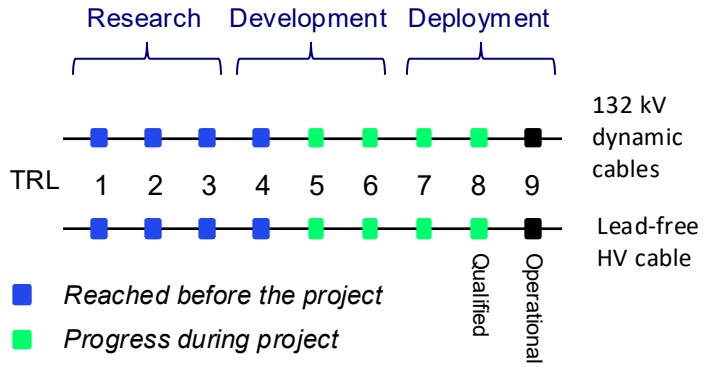
Cost effectiveness

By enabling higher voltage transmission and reducing energy losses, 132 kV dynamic cables can lower the overall cost of energy production and transmission.

Enabling new sites

Dynamic cables enhance the viability of floating wind farms in deeper waters and harsher conditions, enabling sites such as those in the Celtic Sea, West Coast of the United States, France, and South Korea.[1]

What's next?



The Floating Offshore Wind (FOW) Demonstration Programme is a competitive funding initiative supporting the development of floating offshore wind technologies. Through the scheme, the government awarded £31.6 million in grants to 11 projects across five challenge areas: dynamic cables, anchoring and moorings, floaters and foundations, industry-defined innovation, and integrated demonstration of multiple technologies. These projects aim to showcase innovative technologies to reduce costs and accelerate the deployment of floating offshore wind turbines.

Contact information

Name: David Bignell

Email: David.Bignell@jdrcables.com

Funded by: Department for Energy Security & Net Zero

Supported by: Carbon Trust, Offshore Wind

[1] Nexans (2024) Dynamic cables – opening up new markets in offshore wind development