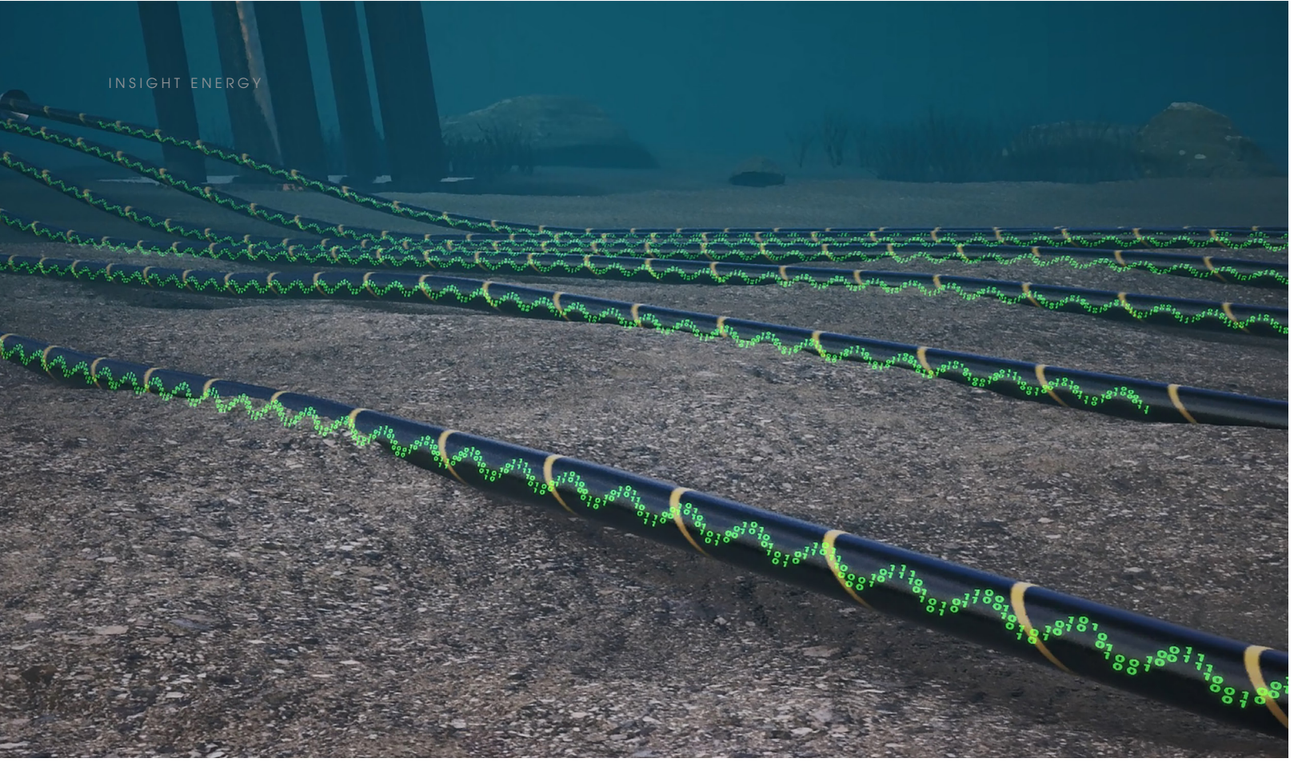


AN ENERGY TRANSITION THAT'S EVOLUTION NOT REVOLUTION

Repurposing capabilities is implicit in any transition, and for Proserv its expansion from oil and gas into the renewables space has seen the creation of an innovative cable monitoring technology that answered a direct industry challenge.

Cables failures are a major challenge for the offshore wind industry. They disrupt operations, threaten hefty insurance claims and inflict eye-watering costs for operators. Identifying a solution set the path for Proserv's entry into the offshore renewables market, winning the first contract for its award-winning technology on the world's biggest offshore wind farm in construction, Dogger Bank.

The energy transition is "evolution not revolution" according to Paul Cook, vice president for renewables for controls technology leader Proserv.

"While others might perceive this as a revolutionary change, we view it as an expansion of our skill-set, expertise and technology. It's a matter of perspective; evolution for us, perhaps revolution for others.

"We're a unified energy company, effectively bridging the gap between traditional oil and gas and renewable energy technologies."

When Paul returned from two years in Houston on oil and gas projects, Proserv's senior leaders asked him to lead the business into the renewables market, building on its 60-year oil and gas heritage.

"It took 18 months to understand where Proserv fitted in terms of its skillset, expertise, technology, integration methodology and our value proposition in the renewable space. It was particularly focused on offshore wind and still is today. We have a clear technology-led strategy, which is predominantly underpinned by our ECG™ high voltage holistic cable monitoring system."

With a solid background in subsea oil and gas, Paul investigated industry challenges. "What was keeping developers and operators up at night? Where could we fill gaps and ease pain for the industry?"

Cables quickly emerged as a huge issue. The team in Great Yarmouth believed that Proserv's experience of distributed sensing technologies and knowledge of traditional methods for cable monitoring could provide the answer.

What started off as a sketch on paper, became a viable concept and winning response to an industry challenge from ORE Catapult and ScottishPower Renewables (SPR), who appealed to the market in 2018 to identify and explore new methodologies for cable monitoring.

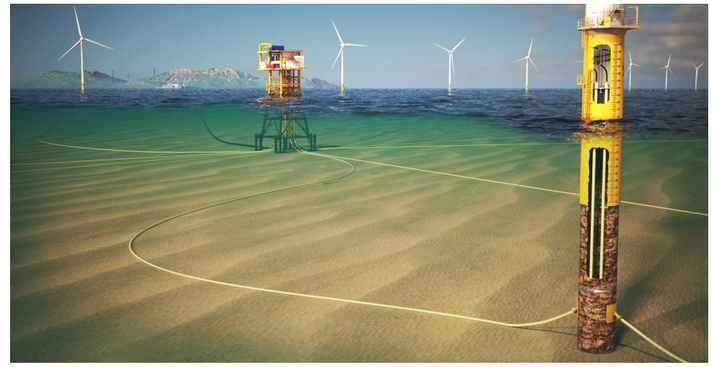
The challenge to develop a new methodology to give operators a holistic view of the cable system came 12 to 18 months into Proserv's research. Two thirds of cable failures are the terminations and joints, but operators had no visibility of terminations, the ancillaries and the joints, so were effectively "operating blind" to the performance of their complete cable system.

From answering the industry challenge, Proserv delivered technology that gives operators full visibility of the condition, integrity and performance of their cable termination assets as well as the cable sections and ancillaries.

It was developed with two industry sponsors – SPR and Equinor – and a £1million grant from Innovate UK's Smart Grant funding call towards the project.

The process also forged a strategic alliance with Synaptec, an SME provider of unique passive sensing technology with a heritage in transmission and distribution for HV networks. Its complementary technology completed the concept and launched a lasting "perfect relationship" that has helped Synaptec grow with support from Proserv.

On top of the value of ECG's holistic visibility, the additional USP and value of ECG exceeds the hardware; integrating all software and correlating the data that is generated by the sensor technology.



"We integrate distributed temperature data and distributed acoustic data with the distributed electrical sensor technology from Synaptec, and we build that into a holistic overview of the cable system asset."

The technology is now being retrofitted in floating offshore wind on Hywind Scotland and Hywind Tampen, off the Norwegian coast, where 11 floating turbines are directly connected to oil and gas platforms decarbonising their hydrocarbon production.

"Proserv has always had innovation in its DNA and we know very well how to innovate effectively," Paul said, adding that the company supported the technology "because we felt that it had real potential".

Support by the independent source ORE Catapult and a credible developer operator in ScottishPower Renewables as an industry sponsor made the development an easier sell in-house, Paul said.

"We innovate through industry. We don't innovate in a silo. ECG is a perfect blueprint for any innovation project going forward because we had an industry body saying that this is a want and need, we had a developer saying that this is a want and need, we had a developer then come on board as an industrial sponsor and endorsed the technology development.

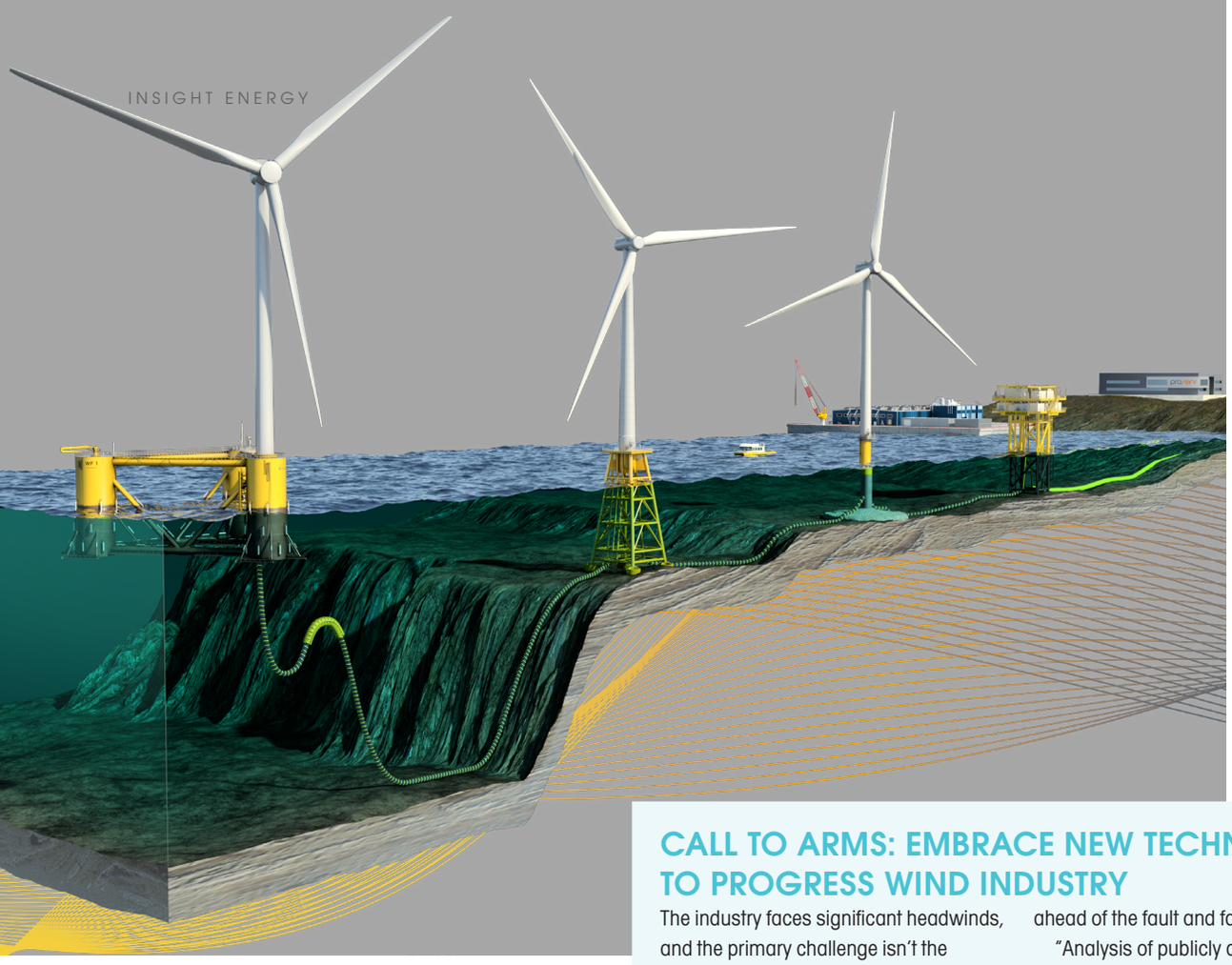
"If you're innovating in that silo, you're not getting the endorsement from the industry, which can make things more challenging when it comes to commercialisation. I haven't come across another scenario or technology, or another company that have worked in that capacity.

"Proserv needed SPR's skill sets and expertise around its cable challenges to discover what it needed in terms of an output from a cable monitoring system.

"We required support with their high voltage expertise and a committed partner to review drawings, documentation and design etc of the technology through the development phase and realise it to the point where it is essentially qualified. They agreed to do that.

"We went public and quickly had a second industrial sponsor, Equinor. We had two very credible developer operators doing →

Above left: ECG utilises the data present within cables to understand their condition. **Top:** High level diagram of cable routes in fixed bottom offshore wind. **Above right:** ECG provides insights including location and type of fault identified across cables and terminations. **Inset above:** Paul Cook, vice president of renewables at Proserv. Images: Proserv



Left: ECG is applicable across all offshore HV assets.
Image: Proserv

effectively the same thing at a 30,000 ft level bringing different perspectives, views and opinions, but it was good and made for healthy engagement on the project and made sure we covered all key aspects of delivering an important and powerful technology to the market."

Its Dogger Bank contract was won through an independent competitive tender by inter-array cable EPCI contractor DEME.

"We have fixed bottom experience, floating offshore wind experience and experience in Power-2-X projects. We have been very fortunate with the types of projects we have been involved in with ECG. They are varied in their approach."

Proserv has worked with Equinor in oil and gas for years. "It is good to strengthen that relationship further in a new and different area, which underpins our commitment to being a broader energy technology company. We are not just an oil and gas company, we are not just offshore wind, we are a controls technology company across the broader energy sector.

"Equinor is very innovative in its approach. It recognises the need for innovation and new technology to make things better, safer and easier, and is following through with that ethos. We hope that follows on with other developers and operators in the industry."

CALL TO ARMS: EMBRACE NEW TECHNOLOGY TO PROGRESS WIND INDUSTRY

The industry faces significant headwinds, and the primary challenge isn't the technology itself, but rather the complex contracting structures inherent in large-scale capital projects.

"While retrofits offer a more direct approach due to working with operators, new capital projects are inherently dynamic and complicated," said Paul.

So Proserv is taking a broader view, looking across generation and transmission because the ECG technologyis agnostic in its approach and applicable to inter-array cables and export cables, HVAC and HVDC cables.

"We are looking for more commitment from the industry to get behind new technology, with more of a focus on the smaller technologies that can have a significant impact on the operation of assets.

"If we want to make a dent in the industry's failure statistics, there needs to be a broader accepted approach to new technology in the market. That is my call to arms to the industry.

"Developers who prioritise speed and low Capex risk overlook vital technologies, setting themselves up for significant operational issues in the long term.

"There are many examples both on inter-array and export cable failures, that if this technology had been deployed, they would have been able to intervene ahead of the fault and failure.

"Analysis of publicly available cable failure reports indicates that our technology possesses the features necessary to either mitigate or completely prevent such incidents. This proactive approach would have resulted in uninterrupted operations, avoided costly insurance claims, and preserved the operator's revenue stream."

Leveraging its 60 years of oil and gas control systems expertise, Proserv's ECG solution picked up RenewableUK's award for Supply Chain Innovation of the Year 2024.

"With six decades of independent OEM controls expertise in oil and gas, Proserv brings a wealth of proven knowledge to the offshore wind sector. Our global team of controls experts, spread across 13 sites, ensures we possess the credibility and breadth of experience to drive this evolution.

"We understand the challenges of navigating technical, commercial and market complexities. The oil and gas industry's robust operational framework serves as a valuable blueprint for offshore wind, and we're dedicated to facilitating the seamless translation of these best practices.

"Proserv's unwavering commitment to this transition is a testament to our dedication."