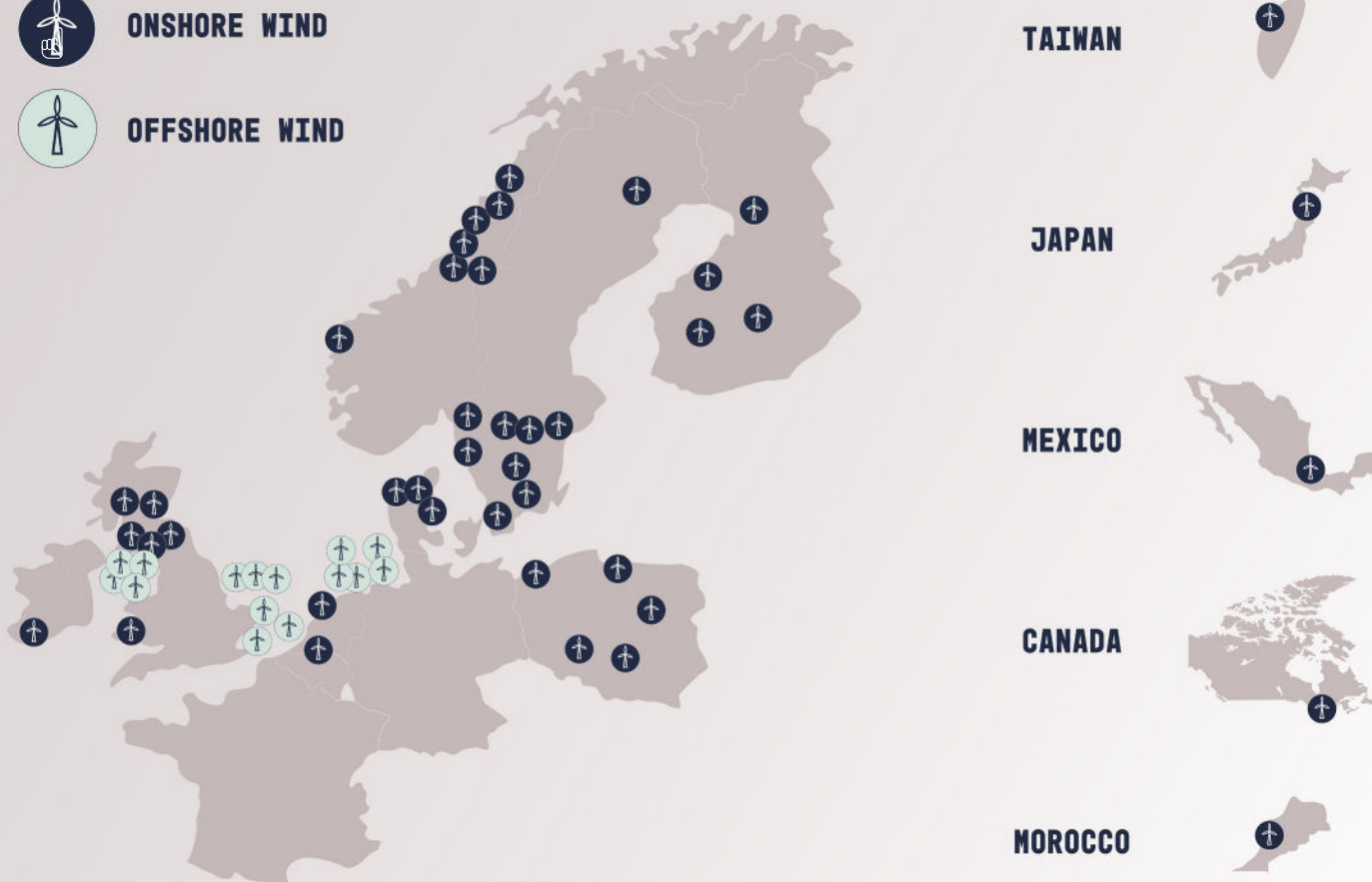




ONSHORE WIND



OFFSHORE WIND



Global Reach - 3WIS

Offering global welding repair solutions

According to WindEurope's latest analysis, Europe currently has 255 GW of wind energy installed, of which 19 GW are newly established facilities from 2022. WindEurope's expectations for the future are that an additional 129 GW will be established in Europe between 2023 and 2027. To meet the 2030 climate goals, the expansion is expected to especially speed up from 2025 to 2027. Based on these predictions, the Danish company 3WIS has expanded its portfolio of repair solutions to include engineering consulting.

3WIS is highly specialized in complex repairs of steel structures on wind turbines and offshore foundations and has accelerated the development of the company by establishing an engineering department. This is built on the foundations of in-house expertise and knowledge, accumulated over the years with highly specialized and complex welding repairs of wind turbines. This

includes up-tower and on-site welding repairs, as well as feasibility studies, root cause analysis, and initial validation of repair solutions in our facilities in Denmark.

Therefore, the company can now bridge the gap between practical problem-solving and consulting before repair and planning, and thus service their clients in all aspects of maintenance and repair, from execution to consulting on future maintenance. By

supporting a larger scope of the supply chain, wind park owners are ensured an extended lifetime of their turbines, fewer downtime hours, and significant savings on repair work.

'All the numbers indicate that the capacity of wind energy in Europe will grow significantly towards 2030, and we want to be part of that development,' explains Daniel Stenstrup Rasmussen, Chief Operating Officer at 3WIS.

'There is a need to increase the quality and speed of delivery in the market, which is why the development of our engineering department is our highest priority right now.

'We are well-known throughout the industry for responding quickly and solving technical complex tasks related to welding repair of steel structures and wind turbines and it is quite natural to add an additional dimension to our business, offering OEMs and developers a complete repair solution that also includes engineering.

'It is a natural next step as we are already deeply involved in these projects. We can simplify complex tasks by combining practical solutions with engineering when it comes to welding and repairing steel structures. Drawing on our expertise, we can create solutions as soon as an inquiry is received.

'In short, we can simplify a complex project into a feasibility study. In the study we can create a mock-up solution, simulating the problem and finding the right solution, thus combining theory and practice to mitigate the risk of the problem and therefore also the costs.'

Particular targets are site managers, park owners, and operators on new projects, and older parks facing challenges and complex problems that require specialist welding repair.

Full-functioning project department

With the new project department fully functional, the organization consists of both engineering and project management. Employees are located at 3WIS' two locations in Denmark, Esbjerg, and Munkebo. In addition, 3WIS has 20 Service Technicians solving tasks around the world.

'We have managed to create an environment with room for professional immersion in welding. In practice, this means that our employees can go deep into their expertise in welding, structures, loads, dynamics, and

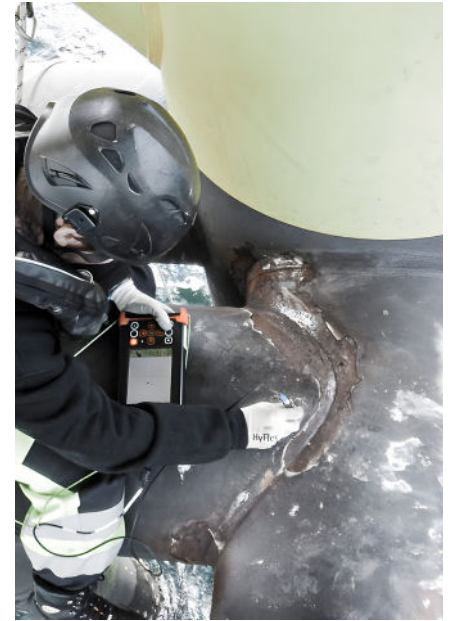


unique solutions. In short, we can turn theory into practice on site,' says Simon Øland, owner and CEO of 3WIS.

Global solutions

The company is founded on strong competencies within welding and steel structures, while specializing in traditional NDT inspections, advanced NDT and QA/QC services towards OEMs and developers and their welding repair-specific projects. Over the last few years, 3WIS has expanded into several industries, with their strongest competencies in onshore and offshore wind.

With most projects executed in Europe, 3WIS has also completed complex tasks in the US, Japan, and Mexico. Its knowledge and experience from the last 12 years are



part of the extensive know-how that has been developed in the Danish wind industry. Denmark is known as the country running the most on wind energy in the world, with 55% of all energy in Denmark coming from wind turbines.

Simon Øland is very positive about the initiation of a new project management department in 3WIS, saying, 'We have already initiated the next step in the development of 3WIS, generating great value for our clients. By merging the executing competencies of our business, our service technicians, and the solutions solved by our project and engineering department, we can make great use of our on-site experience.'

🌐 www.3wis.dk

Core solutions from 3WIS

Up-tower solutions: bed frame repair

Damage to wind turbines occurs continuously because of dynamic loads or failures in manufacturing processes.

The bed frame is one of the most heavily stressed components in a wind turbine. Therefore, a sustainable repair is vital to avoid further damage to the component. Particular attention must also be paid to the fire protection and safety of the personnel during hot-work repair up-tower.

3WIS provides on-site repair to meet any client demands and requirements. Not only by delivering the repair, but also by the necessary NDT inspection and following surface protection.

Inspection, lifetime extension, tower inspection

Lifetime extension is becoming increasingly important in the wind industry. A conventional ultrasonic

inspection is very complex and not very accurate. The solution is an automated phased array combined with TOFD inspection, where complete data sets are recorded within one to two days per tower.

The evaluation is carried out offline by the NDT supervisor using 3D evaluation tools. Ultimately, the data is digitally available and can be used for further evaluation if needed. Any damage found during the inspection can be professionally repaired.

Yaw, pitch repair

A common problem with yaw rings, a vital component for power production, is the teeth can wear down over time.

3WIS offers a welded repair solution performed both onshore and offshore, removing the requirement for replacing the entire yaw ring. This reduces the downtime of the turbine to only a few days. With this solution, the client will avoid the need for lifting down the entire nacelle by crane and will instead receive a repair with a minimum cost and risk.

Quick facts

3WIS creates solutions for the wind, marine, and energy industries on a global scale. They supply complete turnkey solutions within engineering, inspection, and welding in relation to solving clients' challenges, as well as supplying them with timely and effective inspection and maintenance plans.

Examples include inspection of liquid-filled transformers; leakage repair on transformers; welding of transformers and top-up procedures; yaw ring reparation and recovery; up-tower welding and hot work; rope access recovery; NDT, specially developed for turbines; inspection and repair of fractures; foundation and platform repair; generator bearing exchange and Helicoil; and recovery of flanges, studs, and thread.