

Special feature

Bridging the gap: AI innovation in offshore wind

By lead sponsor, Beam

Many nascent markets are emerging and racing to increase capacity. However, there are several hurdles that must be overcome for the industry to succeed – a growing workforce need is one of them. This year's Global Wind Workforce Outlook reveals the scale of this challenge, identifying that over 530,000 technicians will be needed to work in C&I and O&M by 2028.

To emphasise the urgency of addressing this workforce gap, regional targets, such as the European Union's ambitious goal of achieving 111 GW of offshore wind capacity by 2030 (compared to 34 GW installed in 2023) illustrates how formidable the challenge for the industry is. According to GWEC, aligning with WindEurope's projections, the EU requires an average of 8.5 GW of new installations annually until 2028. However, this pace falls significantly short of the average installation rate needed for the EU to meet its 2030 offshore wind target.

If the industry is to understand and tackle this gap between current capabilities and targets, we must look at solutions that can help address the workforce challenge too. In the offshore wind market industry can utilise advanced technologies to improve efficiencies and facilitate a fundamental revision of how work is conducted. Beam, a leading deep technology company, believes AI and automation can help achieve this by using AI and autonomy on robotic ships and underwater robots to service offshore wind farms and improve existing capabilities.

Pioneering AI solutions: advanced autonomous technologies

In a significant advancement for the industry, Beam successfully deployed the world's first fully autonomous inspection of an offshore wind jacket at Scotland's Seagreen wind farm, a joint venture between SSE Renewables, TotalEnergies, and PTTEP.

The success of this deployment is a crucial milestone in the application of AI to offshore wind maintenance. The technology offers several groundbreaking capabilities, notably fully autonomous underwater inspections without human intervention.

This new approach to operations and maintenance work at offshore wind farms allows real-time data to be streamed directly to shore, provides advanced 3D asset reconstruction, as well as comprehensive visual data collection. It also allows for the automated monitoring of marine growth and erosion at foundations.

Transforming inspection efficiency

The significance of this type of technological advancement lies in the need to move away from the manual and labour-intensive processes that offshore wind typically relies on. Data from Beam's AI-powered operations shows this approach can reduce inspection timelines by up to 50%, reduce operational costs, and enhance data quality and accessibility. The success at Seagreen, the world's deepest fixed-bottom offshore wind farm, has demonstrated the technology's potential for large offshore wind superstructures.

Workforce revolution

This technological advancement is creating new opportunities to attract top talent, including from tech industries and the oil and gas sector, where many of the transferrable skills that offshore wind needs are held. By offering appealing, technology-driven roles with competitive compensation, the offshore wind industry can draw the best and brightest minds to accelerate the energy transition.

The transformation of traditional roles, underpinned by technology, brings many benefits. By taking on the repetitive, manual parts of a job, workers may shift their focus onto more complex tasks. We believe that a technician paired with AI can complete exponentially more work than they can alone. At the same time, unsupervised autonomy is allowing sea based vehicle operators to work onshore, now as autonomous fleet managers with associated mitigations of worker safety risks.

Building a sustainable future

An increasingly automated and digitalised workforce is much more than an engineering achievement. It's a blueprint for achieving the EU's dual objectives of climate action and economic growth, as these advancements show how we can help meet a climate goal, such as offshore wind capacity targets, while alleviating workforce supply issues.

This is vital, as the workforce challenge remains significant. With a workforce powered by this strategic deployment of cutting-edge technologies, the industry can better meet demands while creating more efficient, safer and more sustainable operations.

The future of offshore wind energy is reliant on the convergence of AI innovation, workforce transformation and clear environmental targets. Deployments such as Beam's at Seagreen, demonstrate how, through technological innovation and strategic deployment, we can collectively drive forward a sustainable energy future.

