

Ardersier Energy Transition Facility Project Scotland, UK



The Ardersier Energy Transition Facility Project, located near Inverness in the Scottish Highlands, represents a transformative and highly ambitious development that significantly supports the UK's renewable energy objectives. This site, once a dormant brownfield, has been revitalised by Haventus into a world-class energy transition facility.

This multi-million-pound undertaking aims to meet the increasing demands of the renewable energy sector, particularly the offshore wind industry. Central to this groundbreaking redevelopment is the construction of a 660m long quay wall, an essential piece of infrastructure meticulously designed and expertly delivered by Bauer Technologies Ltd. The quay wall is pivotal in enabling the port to support the large-scale vessels required for offshore wind installation projects, ensuring that Ardersier Energy Transition Facility becomes a cornerstone in achieving the UK's ambitious target of 50GW of offshore wind energy by 2030.

The construction of this state-of-the-art quay wall has been approached with a commitment to technical innovation, sustainability, and collaboration. These principles underpinned the successful

delivery of the project ahead of schedule, setting a new standard for complex infrastructure projects in the UK.

Scope of Works

Double Diaphragm Wall Construction: The design featured two parallel diaphragm walls, a structural solution carefully chosen for its durability and capability to meet the high demands of this industrial facility. The front quay wall reached impressive depths of up to 52m, while the rear anchor wall extended to depths of 27m. Together, these walls formed a robust foundation for the port's operations.

Innovative Material Utilisation: Bauer Technologies demonstrated remarkable ingenuity by using dredged sand sourced directly from the site as a key ingredient in concrete production. This approach was facilitated by an on-site batching plant, which reduced the need for imported materials and significantly minimised transportation emissions. Additionally, the project employed eco-friendly bentonite support fluids, reinforcing Bauer's commitment to minimising environmental impact.

Efficient On-Site Assembly: To streamline construction and address logistical challenges, an on-site steel assembly yard was established.

This facility enabled the efficient production of reinforcement cages, ensuring both reduced material wastage and expedited project timelines.

Advanced Equipment Deployment: A suite of high-capacity equipment was used to ensure seamless operations. This included Bauer MC Duty Cycle Cranes, bespoke lifting beams, and a cutting-edge bentonite plant that supported uninterrupted construction activities.

Project Challenges and Solutions

Bauer Technologies had to establish an on-site batch plant, bentonite farm, and steel assembly yard to ensure seamless operations. Additionally, the design of the quay wall needed to address substantial surcharge loads and dredging depths required to accommodate future large vessel operations. A meticulous design optimisation process was undertaken to achieve cost-efficiency without compromising the project's functionality.

Sustainability Initiatives: Incorporating site-sourced materials and eco-friendly

construction practices reduced the project’s carbon footprint. Significant volumes of spoil material were repurposed on-site.

Innovative Techniques

Bauer Technologies employed cutting-edge methods to overcome technical challenges:

3D Modelling: Detailed modelling facilitated clash-free reinforcement cage assembly and ensured precise alignment of tie rods and inclinometer tubes.

Factory-Style Assembly: Prefabricated cage sections were assembled and lifted on-site, streamlining construction and reducing logistical demands.

Trial Panels: Full-scale trial panels validated the construction methodology, enabling seamless progression to the main diaphragm wall installation.

Health, Safety, and Sustainability

The project posed challenges due to its remote location and the regulations governing construction in an ecologically sensitive area. Bauer tackled these obstacles by leveraging strategic planning, innovative methodologies, and an unwavering focus on collaboration.

The remote nature necessitated comprehensive on-site facilities, ensuring every aspect of the project could be executed without delay. Bauer set up a fully functional batch plant, a bentonite farm, and a steel assembly yard directly on-site, a self-sufficient operational hub that supported seamless construction activities from start to finish.

Environmental stewardship was a cornerstone of the project’s execution. For example, to protect the marine mammals inhabiting Moray Firth, Bauer’s methodology eliminated construction

noise in the water column reflecting the company’s commitment to ecological sensitivity and sustainability. Bauer partnered with Breedon to develop bespoke low-carbon concrete mixes. This not only reduced the project’s carbon footprint but also showcased how innovative material solutions can align with ambitious sustainability goals.

The quay wall’s design demanded meticulous attention to detail, particularly regarding its structural integrity and efficiency of delivery. A comprehensive design process was undertaken to optimise the wall’s functionality while ensuring cost-effectiveness. This accounted for substantial surcharge loads and the significant dredging depths required to accommodate large vessels, striking a balance between practicality and efficiency. Additionally, Bauer’s efforts extended to repurposing spoil material on-site, an initiative that significantly lowered transportation emissions and reduced the project’s environmental impact still further.

Technical Innovations

Bauer Technologies employed a range of innovative techniques to overcome the project’s technical challenges and deliver exceptional results:

Advanced 3D modelling tools were used to ensure precision. These models facilitated the clash-free assembly of reinforcement cages and ensured the accurate alignment of tie rods and inclinometer tubes. Large sections of reinforcement cages were assembled in the on-site steel assembly yard and subsequently installed in the diaphragm wall. This factory-style assembly significantly expedited the construction process, reducing logistical complexities. Full-

scale trial panels were constructed to validate construction methodology. This ensured a seamless transition to the main diaphragm wall installation, guaranteeing both quality and efficiency.

Health, Safety and Sustainability

These were integral to the project. Bauer Technologies implemented rigorous protocols to safeguard our workers and the environment, achieving several notable milestones:

High HSE Standards: Operating around the clock with a team of over 250, the project upheld an excellent health and safety record, showcasing Bauer’s dedication to HSE excellence.

Energy-Efficient Practices: Practical efforts were made to reduce the environmental impact of the project.

Conclusion

The successful delivery of this project marks a significant milestone in geotechnical engineering/sustainable construction. Completed six weeks ahead of schedule in November 2024, the project has established Ardersier as a critical hub for the offshore wind sector. This facility is poised to drive economic growth and contribute to the UK’s renewable energy future.

This redevelopment underscores Bauer’s expertise in managing complex infrastructure projects. By combining technical innovation, environmental stewardship, and collaborative delivery, Bauer has set a new benchmark for sustainable engineering solutions. The project not only supports the offshore wind industry but also serves as a model for how large-scale infrastructure projects can harmonise economic development with environmental responsibility.

<p>Principal Contractor: BAUER Technologies Limited</p>	<p>Bauer’s Scope of Works: - 660m long diaphragm walls</p>	<ul style="list-style-type: none"> - Bespoke lifting beams for reinforcement cages - Steel assembly yard with gantry crane - On-site concrete plants & trucks - High-capacity bentonite plant with mixers and silos etc.
<p>Contractor: Haventus</p>	<p>Equipment used: - 2 x Bauer MC Duty Cycle Foundation Cranes</p>	
<p>Contract Period: 15 May 2024 to 5 November 2024</p>	<ul style="list-style-type: none"> - Bauer hydraulic & rope grabs - Service cranes - 120t to 400t capacity 	