



Aerial view of Zenobē's 200 MW / 400 MWh battery energy storage site in construction in Blackhillock, Scotland © Zenobē

# Powering a future of renewable energy

## Energy storage projects improving the grid's long-term stability and reliability in the UK

### The Story

The United Kingdom (UK) has identified opportunities to upgrade its existing power system to better suit the needs of its citizens. With the UK targeting 100% greenhouse gas emission reductions by 2050, integrating energy storage technologies with the grid for more efficient and flexible energy dispatchability has become a major priority.

### Optimising storage-plus-wind

Wärtsilä continues to play an important role in improving the UK's grid by installing two energy storage systems (ESS) totalling 500 MW / 1 GWh. The systems will be owned by Zenobē, an international electric vehicle fleet and battery storage specialist, and will be some of the largest in the country to-date.

The projects will be some of the firsts in the world to deliver stability services using transmission connected batteries, which will support the country's transition to a zero-carbon energy network by preparing the grid for an increased supply of renewables.

The transmission connected batteries provide important stabilisation for the grid, which has traditionally been supplied by fossil fuel-powered generators.

The UK leads the world in offshore wind energy. Located in north-eastern Scotland, the Blackhillock system will integrate nearby offshore wind energy projects in the North Sea with the UK's energy grid, supporting the UK's 2050 net-zero target and the **Scottish Government's** ambition to deliver 20 GW of additional low-cost renewable energy capacity by 2030.

The challenge	Wärtsilä's solution	Benefit
<ul style="list-style-type: none"> <li>Allow for integration of wind energy projects with the UK grid.</li> <li>Provide stability services as the UK phases out fossil fuel plants.</li> <li>Meet network demand and customer cost expectations.</li> </ul>	<ul style="list-style-type: none"> <li>Provide short-circuit level and true synthetic inertia to the National Grid Electricity System Operator.</li> <li>Deliver inverter technology that pushes the technical boundaries of the type of support that batteries can provide to the grid.</li> <li>Supply Wärtsilä's GEMS Digital Energy Platform to optimise operations, while easing network constraints by importing electricity at times of peak renewable generation.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate the UK's transition to net-zero by enabling more wind power onto the transmission network.</li> <li>Enhance the long-term stability and reliability of the electricity grid.</li> <li>Improve the UK's energy independence and lower consumer energy bills.</li> </ul>

“The battery at Blackhillock brings together the very latest in grid scale battery technology that will be crucial to lower consumer bills and enable more renewable energy onto the grid. With Wärtsilä and other project partners, we look forward to delivering this significant grid infrastructure project that will be an important milestone in the UK’s net-zero transition.”

*Semih Oztreves, Director of Network Infrastructure, Zenobē*

“Reaching this significant milestone demonstrates Zenobē’s commitment to better utilise wind power and support its growth by doubling Scotland’s battery storage capacity. Kilmarnock South will enhance the country’s position as a leader in delivering energy that is cost-effective, clean and efficient. This is an important moment as we bolster the UK’s energy infrastructure and help to ensure that every household feels the benefits of sustainable, affordable electricity.”

*James Basden, Founder, Zenobē*

## Reliability coupled with innovation

The Blackhillock ESS is the first project to be delivered under National Grid’s NOA **Stability Pathfinder Programme** to improve the long-term stability of the electricity system. The Kilmarnock South project is also delivered under the Programme. Owned by Zenobē, the storage systems will assist grid operators in the management of challenges related to balancing supply and demand, power stability and constraints.

Energy costs can rise dramatically without warning. The UK went through its own energy crisis beginning in late 2022, where energy costs nearly doubled and pushed inflation costs to above 10 percent. These storage systems delivered under the Pathfinder Programme will ensure that network demand and customer cost expectations are met.

The battery systems will provide stability services to the National Grid Electricity System Operator, including short-circuit level and true synthetic inertia, which are essential for the grid to function efficiently as fossil fuel plants phase out. In the context of electricity grid engineering, inertia is a by-product of fossil fuel-powered generators and is important to ensure stable operation of the grid.

As the UK phases out fossil fuels, it requires other ways to create inertia to keep the grid operational, including using energy storage assets to create “synthetic inertia.”

The Blackhillock project is built with Wärtsilä’s Quantum, a fully-integrated, modular and compact ESS. Kilmarnock South is the first project to be delivered with Quantum High Energy, a next-generation energy storage system with advanced safety features and enhanced energy density. Both Quantum systems are coupled with inverter technology, innovative solutions that push the technical boundaries of battery support to the grid. The systems are robustly supported with Wärtsilä’s sophisticated software that can monitor facilities in real-time.

## Combining hardware and software

The **GEMS Digital Energy Platform** will manage the complete energy storage systems. The software will ease network constraints by importing electricity at times of peak renewable generation. GEMS’ data-based intelligence will enable Zenobē to participate in the most valuable UK electricity markets.

## RELATED RESOURCES

[Wärtsilä’s energy storage technology](#)

[Wärtsilä to provide energy storage system to Zenobe, delivering first-of-kind project in the United Kingdom](#)

[Wärtsilä to deliver one of Scotland’s largest energy storage systems to Zenobē with Quantum High Energy](#)

### Site sizes:

200 MW / 400 MWh  
300 MW / 600 MWh

### Site locations:

Blackhillock &  
Kilmarnock South,  
Scotland, United  
Kingdom

### Applications:

Renewables+

### Scope of services:

Engineering  
Equipment  
Delivery (EEQ)

### Delivery:

2024–2025



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