

## Case study

EPC for battery energy storage system  
United Kingdom

### Project Summary

**Project:** Power grid stabilization and supply security

**Application:** 10 MW Battery energy storage system

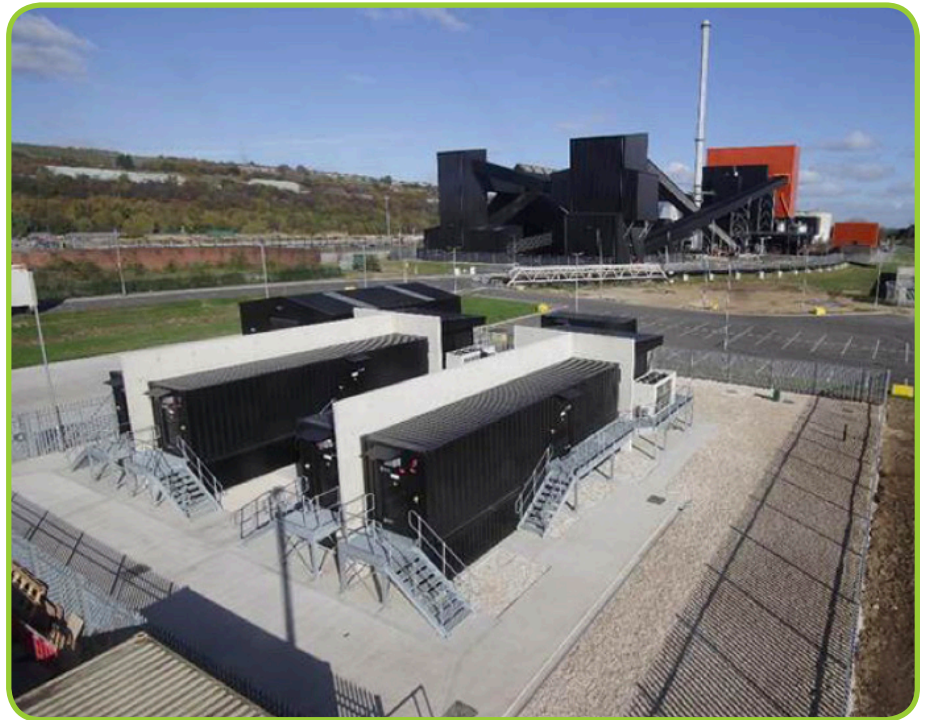
**Client:** E.On U.K.

### Nidec's Role

E.ON chose Nidec Industrial Solutions to provide complete Engineering Procurement Construction services for the United Kingdom's first Enhanced Frequency Response (EFR) battery energy storage installation.

### Scope of Supply

- 2 – 450 V, 33 kV Step up transformers
- 2x33 kV switchgears
- 4 – PCS and battery containers, including 1,088 battery modules
- HVAC system
- Fire protection system
- Civil construction
- Electrical and mechanical erection
- Power and energy management systems
- SCADA system with national grid interface



### The challenge:

**To help the United Kingdom achieve a stable power supply, while supporting the range of power generation sources feeding into the nation's national grid.**

As the United Kingdom moves away from coal-fired power generation to renewable energy sources like wind and solar power, its grid has grown more vulnerable to sudden variations in power generation or consumption. To address sudden surpluses or deficits in supply and bring stability to the grid, today's utilities need power sources that can reach full output or consumption in less than one second.

Battery energy storage systems (BESS) can be designed to meet these Enhanced Frequency Response (EFR) requirements. But in 2016, no systems of this kind had ever been constructed in the U.K.

E.On UK, a British energy company, decided to break new ground when it announced plans to build a 10 MW EFR at its Blackburn Meadows biomass power plant and integrate it with the original plant's power management system. The company sought an Engineering Procurement Construction (EPC) partner experienced in electricity stabilization and power conversion technologies to complete the turnkey project. It selected Nidec Industrial Solutions, which had completed similar projects throughout Europe.

**The solution:****The United Kingdom's first Enhanced Frequency Response system**

Over a one-year period, Nidec designed, procured and installed a 10 MW EFR system at the Blackburn Meadows site. Nidec's services began with site preparation, soil analysis and drainage improvements, before moving to metal construction, assembling, testing and commissioning the battery systems.

The new BESS – the first of its kind in the United Kingdom – consists of four lithium-ion battery modules – two 1.5 MVA active front end AC/DC converters and two 900kWh battery banks. Housed in shipping containers for easy transportation and “plug-and-play” installation at Blackburn Meadows, each unit came complete with power converters, transformers, batteries and a control system. The 10 MW battery has the same power as approximately 100 automobiles. Located next to an existing biomass combined heat and power plant, it holds the same amount of energy as 500,000 mobile phone batteries.

In addition to the EFR solution, Nidec also provided HVAC, fire protection, power and energy management systems for the project, as well as a SCADA system that integrates with the national UK grid for performance and billing.

Commissioned in 2017, the battery storage allows E.On to make the best use of its renewable energy sources by harnessing the energy and having it ready for use whenever it is needed. Nidec's innovative battery storage technology not only increases the share of renewable energy on the grid and improves the security of supply, it paved the way for other EFR projects in the UK.