

Noriker Power

A Vertiv™ Case Study

Case Summary

Location: West Midlands, UK

Vertiv Solutions:

- Liebert® EXL GS (Grid Support) inverter systems with enclosures and batteries
- Vertiv LIFE™ Services

Critical Needs: Reliable energy storage solutions to maintain stability of power supply to UK National Grid

Results:

- 20 MW of Fast Frequency Response Dynamic power directly to UK National Grid at 33 kV 50 Hz
- Consistent power supply to the National Grid throughout peak demand times when required
- Energy storage during low demand periods

About the company

Noriker Power is a fast growing company, which develops rapid response, flexible power systems to deliver services such as frequency control to the UK National Grid. These plants are a major component of the future control infrastructure of the grid, and are being built to address problems brought about by the decommissioning of old power stations, the decarbonisation of electricity production and the transition to renewable energy.

Noriker Power provides balancing services for the National Grid with embedded generation facilities in support of a renewable grid. The aim at Noriker Power is to provide low cost and highly reliable services, capable of responding to meet the National Grid's energy demands.

www.noriker.co.uk

Background

The past few years have seen the power generation industry shift significantly from using fossil fuels as primary power sources to renewable sources, such as wind, water and solar. This shift has triggered a reduction in the use of rotating machines which has led to lower electrical grid inertia and irregular power effects due to the unpredictable nature of wind and sun.

A key metric used by the National Grid (and other grid systems around the globe) to monitor inertia is Grid Frequency, which must be maintained within very tight tolerances. The National Grid invites forward thinking companies which can provide energy storage solutions to join the [Frequency Response Services \(FRS\)](#); this includes Fast Frequency Response Dynamic (FFR-D), which helps maintain the stability of the grid. Noriker Power, which had been supplying conventional power to the UK electrical grid, recognised that joining the FRS required different technology. Noriker Power approached Vertiv to supply this new technology because the technical speed of response needed was at a speed that Vertiv could deliver.

Facilitating the transition to renewable energy

Delivering the future energy needs of UK citizens efficiently in a low carbon economy is a complex mission. Over the last few years, the National Grid has maintained its focus on transitioning towards renewable energy for heat and transport, and examined how the capability and versatility of the gas network can be used to meet customer demands. “The transition of our industry from fossil fuels to renewable sources is challenging as the task of predicting wind, sun and tidal energy is very complex,” said Dr Marc Thomas, of Noriker Power.

In addition, the interest from UK Government and the public in the future direction of the energy industry has continued to rise. Energy supply in the future will need to be secure, sustainable and affordable. It has to operate safely and reliably for 365 days of the year, it must facilitate decarbonisation of the energy industry. The challenge of achieving all of this is known as the ‘energy trilemma’.

Dr Thomas added: “The transition in the UK to using renewable energy is having a major impact on the National Grid and requires very fast acting and reliable techniques to assist frequency control. We

needed to find a robust and trustworthy solution which could store and deliver energy in real time to meet the requirements of dynamic frequency response and control.”

For Noriker Power, facilitating this transition to renewable energy in a cost-effective manner was a difficult task, especially when natural resources for power generation are unpredictable or unavailable.

Expertise in design

After assessing a variety of options, Noriker Power deployed both valve regulated lead acid (VRLA) and lithium-ion batteries connected to the Vertiv grid support inverters. These batteries are used to store power on standby in readiness for additional energy to be injected into the grid to meet demand in milliseconds. They are also able to correct grid power factor and harmonics.

In addition, generators were also incorporated into the design as the site’s power supply was ‘non-symmetrical’, as the grid connection available had different export and input kiloWatts. Generators were also provided to take the strain from the batteries after a certain period, which led to a lower cost battery installation.

The lithium-ion and VRLA batteries are connected to a series of Liebert® EXL GS inverter systems. The systems are monitored by Vertiv LIFE™ Services, a remote diagnostics system that is manned 24/7/365 by Vertiv service experts. This provides real-time insights and information needed to maximise uptime of the systems and give the customer peace of mind that the Liebert EXL GS units are under surveillance by Vertiv service experts at all times.

Dr Thomas added: “We looked at a broad range of options and decided that a combination of VRLA and lithium-ion batteries was the most effective way forward. To manage the flow and storage of our energy to these batteries, we needed to find a company that could work seamlessly with both battery types, as well as being able to work with the bespoke control system required to operate the site. The site’s wide control system was designed in partnership with Vertiv’s technical team, to enable the inverters to react to remote signals, in order to meet the National Grid requirements for this service.”

Vertiv offers a range of inverters enabled for all types of battery storage technology including Lithium-ion and VRLA energy sources. These systems range from 100kW to multiple MW solutions and are also able to supply large amounts of reactive power and fault currents to networks if required. Vertiv offers

full turnkey packaged solutions, or supply only packages, which gives flexibility to prospecting solar and generator contractors around the world.

Managing grid frequency to support the National Grid

The Liebert EXL GS inverter technology allows Noriker Power to provide consistent power to the National Grid throughout peak frequency response demand times, and also store energy generated during low demands periods.

Vertiv's expertise in design resulted in the combination of VRLA and lithium-ion batteries, which delivered 20 MW of Fast Frequency Response Dynamic power directly to the UK Power grid at 33 kV 50 Hz.

Alan Whelan, managing director for Vertiv in Northern Europe, said "We are seeing companies responsible for power generation increasingly moving towards renewable sources, and the challenge is how to manage the frequency on the grid when these sources are not predictable or available in a cost-effective manner. We are proud to have been involved in this innovative project using our inverter technology to support the UK National Grid."

"The project has been a huge success and Vertiv has been instrumental in its delivery."

Dr. Thomas concluded.