



CASE STUDY
13178

Wandylaw

Onshore Wind Farm Project - Renewable Energy



Major design considerations:

The scope was to design and install a 66kV outdoor open-terminal substation comprising a 24MVA 66/33kV transformer and 33kV substation building to house the indoor 33kV switchgear and associated protection and control equipment for both the wind farm and Northern Powergrid (NPG).

Powersystems worked in conjunction with Jones Bros Civil Engineering to design a substation building that complied with Northern Powergrid's requirements, and provided the storage, welfare, and security requirements of Blue Energy and the building planning conditions.

Project facts and figures:

- ▶ Number of turbines: 10
- ▶ Wind turbine capacity: 2.0MW
- ▶ Totalled installed capacity: 20.5MW
- ▶ Length of onsite 33kV underground cabling: 18km
- ▶ Length of onsite fibre optic underground cabling: 6km
- ▶ 66/33kV grid transformer: 24MVA
- ▶ 66kV cable connection to Northern Powergrid's 66kV substation
- ▶ Powersystems have connected 24% of all onshore UK windfarms



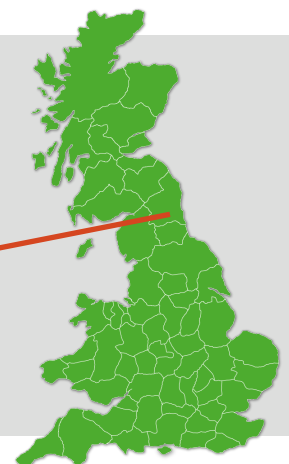
Wandylaw Wind Farm

Powersystems were responsible for the design, installation, testing and commissioning of the electrical infrastructure associated with this project. This consisted of a 66kV outdoor open-terminal substation as well as the electrical works for ten 2.05MW Senvion MM92/2050 wind turbines.

Wandylaw wind farm is a 20.5MW capacity wind farm situated about 12km north of Alnwick, Northumberland, England. Granted full planning permission in 2009, the wind power generation site began generating clean renewable energy in August 2013.

The completed site produces enough electricity to power over 11,200 homes. The wind farm was constructed on pasture farmland, but some turbines are on heather moorland and close to areas of plantation woodland. These habitats, and the site's proximity to the protected Northumberland coast, presented certain ecological and ornithological challenges during the project planning and impact assessment stages.

The electrical work was undertaken in partnership with Jones Bros Civil Engineering on behalf of the client, Blue Energy.



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How Powersystems helped:

Powersystems were appointed by Blue Energy to design, supply, install, test and commission a new 66kV substation and carry out the 33kV electrical balance of plant for the connection of ten 2.05MW wind turbines.

Scope of works:

The major items of electrical plant that Powersystems designed, supplied, installed, and commissioned were:

- ▶ 24MVA 66/33kV transformer and ancillary plant
- ▶ 66kV cable sealing ends
- ▶ 66kV disconnectors
- ▶ 66kV protection panel for protection and control of the grid transformer, including auto-voltage regulation (AVR) relay.
- ▶ Commissioning of interface signals between Northern Powergrid and the Senvion SCADA system
- ▶ 33kV 3-panel indoor switchgear and associated protection equipment
- ▶ 33kV 50kVA auxiliary/earthing transformer
- ▶ 33kV neutral earthing resistor (NER)
- ▶ Cable laying of 33kV, fibre optic and earth cables
- ▶ Earthing and lightning protection systems at the substation building and ten wind turbines
- ▶ 33kV cable terminations onto the 33kV switchgear at the Senvion MM92 wind turbines
- ▶ Energisation and operation of the wind farm in accordance with Powersystems Electrical Safety rules until handover to the client.



The results:

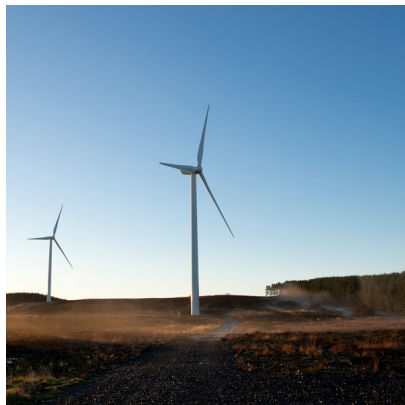
- ▶ Wandylaw wind energy project was officially opened in August 2013

Economic benefits:

- ▶ The Wandylaw wind farm community benefit fund is being made available by Blue Energy, the owners of the Wandylaw wind farm, to support projects that improve the local quality of life and community resources for residents
- ▶ Community funding from the Wandylaw windfarm project has been used to improve communications for broadband and transport. These are both aspects to do with preventing isolation and rural poverty. The other areas of high priority were sustainability with renewable energies and improving the thermal comfort of homes

Environmental benefits:

- ▶ The wind farm provides enough electricity to power over 11,200 homes



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