



# SMITH brothers

## Case Study

### Large-scale renewable challenge:

Tullymurdoch and Welton of Creuchies  
Green Cat Renewables / SSE

Construction Dates: August 2017 – May 2018

### Objectives and purpose

When two sites in Perth and Kinross, Scotland were ready to be connected to the grid, high-voltage power engineering specialist Smith Brothers rose to the challenge. As the Independent Connection Provider (ICP) for the Tullymurdoch and Welton of Creuchies wind farms in Scotland, the power engineering experts had to overcome the combined challenges of adverse weather conditions and difficult landscapes in order to successfully complete the project.

With eleven wind turbines located across the two adjacent sites, the farms were developed to deliver a combined output of 23.55MW to the SSE network – 14.35MW from the seven turbines at Tullymurdoch and 9.2MW from four at Welton of Creuchies, a joint venture between the landowner, local community and Green Cat Renewable Developments. And it was down to the 26-strong Smith Brothers team – and 21km of 33kV cabling – to connect both wind farms to the grid.

### Challenging cabling conditions

Located in the hills above Alyth in Perthshire, the route for the contestable 14.5km 33kV cable grid connection and fibre optic link from the wind farms to the Coupar Angus primary substation, was not a straightforward one. Navigating hilly terrain and complicated access, the carefully devised course mainly crossed arable farmland and moorland, but also traversed two major rivers – River Isla and River Erich – a National Grid High Pressure gas mainline and nine roads.

This meant that in addition to the usual preparatory proving and engineering work, specialist equipment was also required to deliver the connection with minimal disruption. Horizontal directional drilling and cable pulling techniques were therefore used alongside trenching to install the required cabling.

On the private side of the assignment, a further 6.5km 33kV cable grid and fibre link were installed between the two wind farms – making this the longest cabling connection for the Smith Brothers

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### Turnkey capabilities

Specialising in end-to-end electrical engineering assignments, Smith Brothers is often enlisted to deliver a full connection package for large-scale projects – covering both contestable and private elements. So, alongside the extensive cable grid installation, the power engineers were also responsible for the establishment of two substations.

At Welton of Creuchies, the team was tasked with building a new adoptable substation for SSE and fitting out the switch and metering room with all switchgear and associated equipment. Acting as the grid connection point for both wind farms, this entailed the installation, testing and commissioning of two Siemens NX switchboards, auxiliary transformer, battery chargers and accompanying gear.

Smith Brothers was additionally responsible for the construction and fit-out of a brick-built private substation for Tullymurdoch wind farm, also located at Welton of Creuchies. Once the build was complete, the engineers also carried out the installation, testing and commissioning of all private switchgear and associated equipment within this facility.

### Energisation success

Despite numerous environmental obstacles, Smith Brothers managed to complete the required cabling, construction, installation and testing on time and within budget.

Commenting on the ICP's efforts, Gavin Jackson, senior engineer at Green Cat Renewables, said: "A project like this is always going to come across challenges – whether it's the adverse weather or difficult terrain because of the remote location – and it is how you overcome these that defines the performance of a contractor. Smith Brothers, along with all the other parties involved, ensured the challenges and risks were managed, in order to deliver the project in advance of the deadline and on budget."

Elaborating on the successful completion, Smith Brothers' project manager Nigel Hillary commented: "This was undoubtedly a challenging assignment for everyone involved, but it's overcoming these obstacles that makes it so rewarding when the energisation date finally arrives. The on-site team certainly deserves recognition for their effort and expertise. It takes a good amount of grit to install 21km of cabling within five months – let alone during a Scottish winter – but they managed it.

"Collaboration was a huge part of this success – and not just within the Smith Brothers team. We worked closely with both the developers and the DNO in order to reach the same end goal, so the communication, organisation and careful management from all parties involved is also worth commending."

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