



“The expertise demonstrated by Royal HaskoningDHV’s multidisciplinary team throughout the design, construction and implementation phases of the project was commendable. The team guided the construction process through complex logistical and legislative issues and the result is a power link that will benefit the energy industry for years to come.”

Nick Pethick, Civil Consultant, BritNed

Undersea cable plugs UK into Netherlands

The UK has taken a step towards securing a sustainable supply of electricity for the future with the construction of the BritNed Interconnector, an innovative development to link electricity supply between the UK and the Netherlands.

The €600 million scheme is a joint venture between the UK’s National Grid and energy transmission company TenneT in the Netherlands, and will create a permanent physical link to transport electricity between the two countries via a 260km cable laid under the North Sea.

As well as ensuring a secure source of electricity, the Interconnector will open up the European energy market by increasing diversity of supply. Electricity can be transmitted in both directions, which will enable energy trading and allow countries to stabilise prices by more efficiently matching supply to demand.

Experts from Royal HaskoningDHV’s Dutch and UK offices were commissioned to work on the BritNed Interconnector. Royal HaskoningDHV Netherlands provided the engineering design and architecture for the substructure, superstructure and infrastructure of the two converter

facilities. These are based at each end of the Interconnector, one on the Isle of Grain in Kent, and one in Maasvlakte in the Netherlands.

Royal HaskoningDHV UK was brought in to oversee the design and layout of the converter facility at Grain, to ensure the site complied with complex UK building regulations and legislation. The Grain site also had specific challenges such as poor ground conditions, which Royal HaskoningDHV’s building and infrastructure consultants were able to use their expertise to overcome.

Carl Jones, Project Manager for Royal HaskoningDHV UK, said: “The integrated approach between the Royal HaskoningDHV teams was key to the success of the BritNed project. Royal HaskoningDHV Netherlands brought extensive experience from working on NorNed, a similar interconnector project in Norway, while the UK team provided construction and legislative expertise to ensure the optimum outcome of the Grain converter facility.”

Preparation of the vast 100 acre site at Grain began in 2008. Although an excellent site from a strategic view, being close to the sea and near to an electricity substation



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to enable connection to the UK electricity network, the site had poor ground conditions – a mixture of loose clay and gravel which was unsuitable for building large structures.

The challenge for Royal HaskoningDHV UK was to ensure the ground was strong enough to support the building footprint for the converter facility, which measures an impressive 140 metres long by 43 metres wide as well as housing six 240 tonne transformers.

The ground was stabilised to withstand the weight of the building using driven cast in-situ piling. Over four months 1250 hollow steel tubes, each one 30 metres long and nearly half a metre wide, were driven into the land and filled with concrete. An effective and economical solution, the tubes distribute the weight of the converter facility towards deeper ground, as well as dramatically compressing the shallower earth above to increase its load bearing capacity.

Grain has a long history of military activity due to its position on the coast and proximity to the Thames, and was used during both World Wars as a defence station and ammunition store. Every pile position across the site had to be carefully investigated by the project team for remains of unexploded ordnance such as bombs, bullets, shells and grenades.

A key feature of each converter facility was the construction of two 20.6 metre high, 45 metre long reinforced concrete walls. Each wall is 40cm deep and their purpose is to separate the transformers from the valve hall, offering blast protection in the event of a catastrophic failure of any of the six transformers. The technique used to build the walls was slip-forming, where concrete is slowly poured in a continuous stream to produce a high-strength, flawless finish. After extensive preparation, the construction of each

wall took a week of continuous concrete pouring, with the height rising at a rate of 15cm per hour.

Minor alterations were also needed to the design and function of the Grain converter facility to comply with UK legislative requirements. Originally identical in layout to the Maasvlakte facility, the team worked to modify aspects such as the staircase design in order to gain Building Control Approval. Changes to the access routes also had to be incorporated into the project to comply with the UK's Disability Discrimination Act.

The outer building and substructures of both converter facilities were completed in 2009 and installation of the processing equipment and commissioning of the building services were complete in early 2011. The 260 kilometre, 1000 megawatt capacity cable is currently being laid at a depth of between one and three metres under the North Sea by a specialist cable-laying vessel, on a route planned to ensure minimum impact on the environment. The BritNed Interconnector has been operational since April 2011.

BritNed forms part of a new era of trans-European energy networks, offering a secure supply of electricity with significant benefits for energy producers and consumers across the UK, Netherlands and Northern Europe. Royal HaskoningDHV is currently working with other European countries to evaluate the feasibility of building future electricity links.

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