

## Salle Electricity Substation

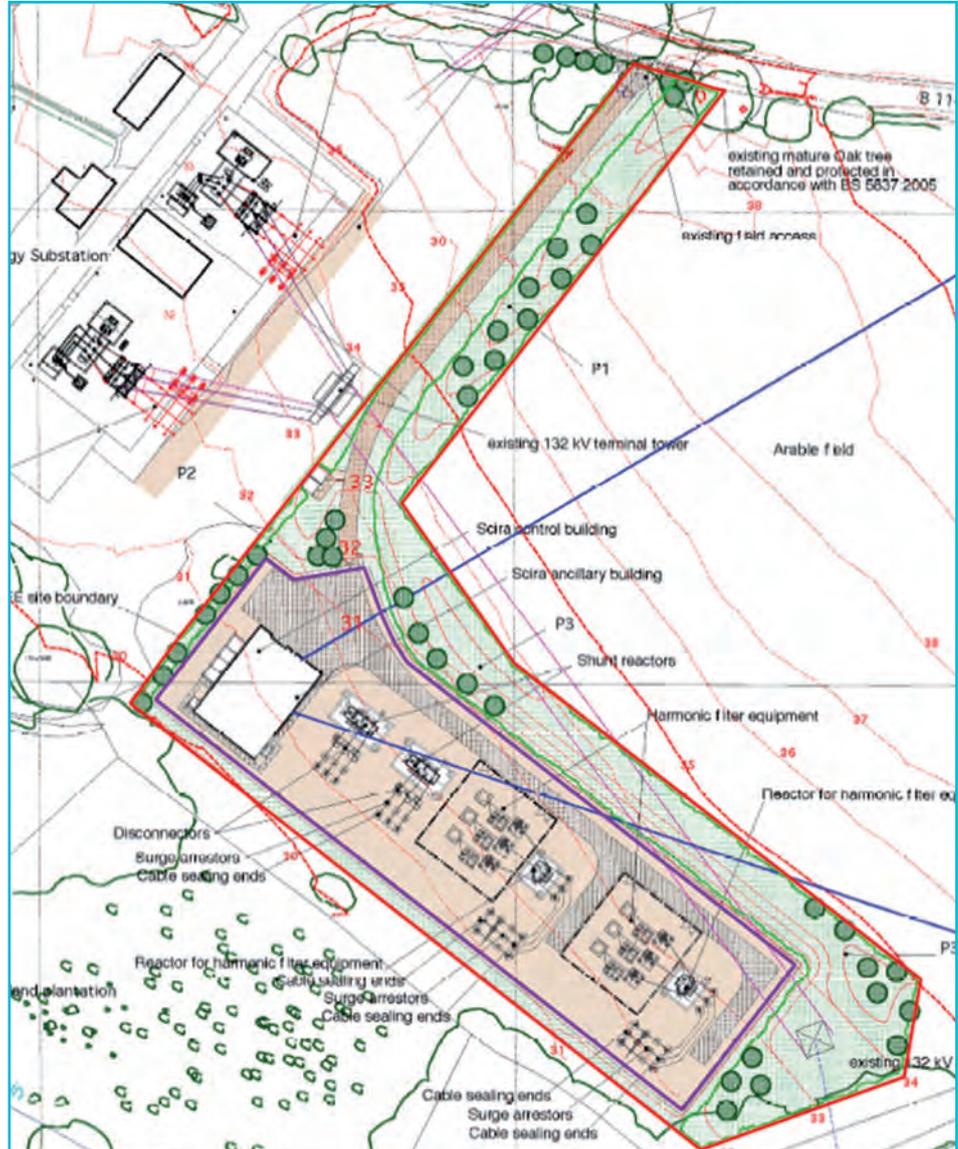
National Grid Compliance project

In order to comply with the requirements of the National Grid, two harmonic filters now need to be fitted to the Sheringham Shoal Offshore Wind Farm's electricity substation at Salle.

The 317MW Sheringham Shoal Offshore Wind Farm, located between 17 and 23 kilometres off the coast of North Norfolk comprises 88 wind turbines and generates around 1.1TWh of green energy per annum.

This is enough clean energy to power almost 220,000 British homes, and when compared to fossil fuels that is a reduction of around 500,000 tonnes of CO<sub>2</sub> emissions every year.

The electricity generated by the Sheringham Shoal Offshore Wind Farm is brought to shore at Weybourne Hope on the North Norfolk coast by two subsea export cables where they connect with two underground transmission cables. The cables carry the electricity to the Sheringham Shoal's electricity substation at Salle, near Cawston in Norfolk, from where it is distributed into the UKPN distribution network.



New equipment positioning in the Sheringham Shoal Cawston substation

## The OFTO Regime

**The Sheringham Shoal Offshore Wind Farm is owned by two Norwegian companies, Statkraft and Statoil, and the UK's Green Investment Bank. It is operated by Statkraft.**

However, Ofgem regulates and licences the transmission of electricity generated in the UK's territorial waters at 132kV or above, and the Offshore Transmission (OFTO) regime means the Sheringham Shoal's transmission assets, including its Salle substation, are independently owned by an investment company, Blue Transmission Sheringham Shoal.

This means that the new harmonic filters which will be installed at Salle will be owned by Blue Transmission Sheringham Shoal.

For further information about this project, visit the Public Drop-In Exhibition at  
**Cawston Village Hall,  
High Street, Cawston,  
Norfolk NR10 4BL**  
**Wednesday 21<sup>st</sup> January 2015  
11:00am – 7:30pm**

# Installation of harmonic filters



Image, for indicative purposes only, courtesy of Renewable Energy Distribution Ltd.

**Harmonic filters are to be fitted at the Salle electricity substation. These are used to “clean” the waveform produced by the wind farm. The electrical system works on the basis of a sinusoidal 50Hz cycles waveform (so called “Alternating Current” or AC). Some elements of the grid disturb such a waveform – e.g. by rippling it with waveforms of higher frequencies – and these are referred to as harmonics.**

Harmonics compromise the efficiency and, in the most serious cases, the functionality of the electrical appliances and machinery. A harmonic filter does exactly what it says ‘on the tin’ – it filters out the harmonics and establishes the original 50Hz waveform. These issues are normally referred to as “power quality” issues.

Two harmonic filters will be fitted at the Salle electricity substation, one for each of the two export cables. Each filter consists of a combination of resistors, capacitors and reactors, and the total height of each filter will not exceed 6.7m above ground level. The filters will each be housed in a compound not exceeding 25m x 25m on the south east side of the substation, and landscaping will be undertaken to reinstate native vegetation.

## Questions & Answers

### Q: Who will undertake the work on site at Salle?

A: The works will be carried out by the contractor Alstom. This contractor will be responsible for the engineering, procurement, construction, installation and commissioning of the plant. Alstom has been selected on the basis of its experience and reputation in similar projects.

### Q: What environmental protection will be taken for flora and fauna during the construction work?

A: In order to protect the flora and fauna, ecological surveys have been carried out to ensure there is no residual impact on potentially sensitive species.

### Q: Will the Sheringham Shoal Offshore Wind Farm have to stop producing electricity while these works are undertaken?

A: Yes, but only for the time necessary to physically connect the new equipment, including preliminary works. The design is such as to minimise the downtime to reduce the related loss of income.

### Q: Why were harmonic filters not fitted when the substation was originally constructed?

A: The potential need for filters was known at the time planning consent for the substation was awarded. Permission was granted on the assumption that the filters may have to be installed at a later stage. This is because it is extremely difficult to predict the harmonic levels and related distortion before the wind farm is connected to the National Grid.

### Q: Will the harmonic filters create audible noise or hum?

A: All working equipment produces noise and the filters are no exception. However, the project has included extremely stringent specifications for the new equipment and it is anticipated that the existing background noise will not be increased.

### Q: What is the construction timetable for this project?

A: The first site access will be during the first week of February 2015. Construction works are scheduled to begin during the last week of April, with the intention of demobilising the site during the last week of November 2015.

## Contact details and more information

Sheringham Shoal Offshore Wind Farm is owned by two Norwegian companies, Statkraft and Statoil, and the UK’s Green Investment Bank through Scira Offshore Energy Limited. Statkraft is the operator for the Sheringham Shoal Offshore Wind Farm. Scira Offshore Energy Limited is the legal entity.

Scira Offshore Energy Limited,  
Wind Farm Place, Edgar Road, Walsingham,  
Norfolk NR22 6EJ  
**01328 824370** [info@scira.co.uk](mailto:info@scira.co.uk) [www.scira.co.uk](http://www.scira.co.uk)