

## Wind Farm Feasibility Study and Site Layout Design United Utilities Green Energy

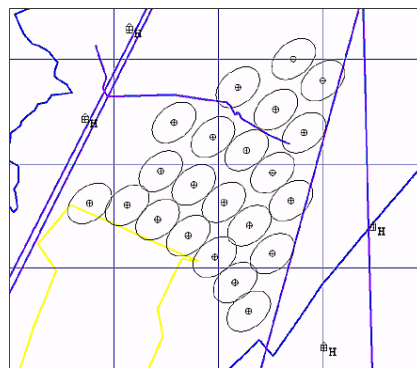
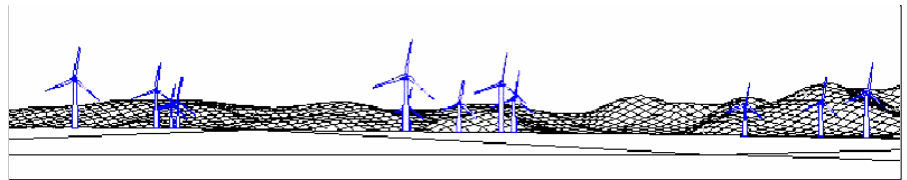
United Utilities Green Energy (UUGE) is entering the wind energy market by developing a portfolio of wind farms throughout the UK.

Through a strategic search exercise for UUGE, Entec identified a series of sites for potential wind farm development. United Utilities commissioned Entec to provide technical and environmental services to progress the priority sites, including a feasibility study for a large site in central Scotland. The viability of the site was known to be dependent on the realistic capacity of the wind farm, due to a major cost anticipated in relation to the required grid connection.

Entec provided an initial estimate of potential wind farm capacity at the site, followed by an in-depth study, which determined the feasible number and location of turbines. This was achieved by investigating the technical and environmental constraints experienced at the site and by developing an appropriate wind farm design in response to the specific features of this site and surroundings.

Our team gave consideration to priority issues, including:

- Selection of suitable wind turbine type
- Researching site constraints including protected designations, dwellings planned land use and infrastructure



such as gas pipelines and microwave links

- Optimisation of energy production based on analysis of wind data from a local Meteorological Station
- Respecting local properties by assessing likely noise levels and occurrence of shadow flicker at occupied dwellings
- Understanding visual impact of the proposed project incorporating advice from our landscape architects regarding sensitive local viewpoints and landscape-related designations noted from the adopted Local Plan.

The project demonstrated our breadth of understanding of key issues at the early stage of a wind farm design and development:

- Appreciation that a proposed wind farm size and shape should be based

on a realistically constrained scenario; this pragmatism was particularly important as UUGE was actively negotiating the lease agreement for the site, using our work as a guide to the available income from the site

- Given that visual impact is a crucial planning consideration for wind farms, we understand the benefit of input and advice from landscape architects at project inception. Entec incorporated aesthetic criteria when positioning turbines at the site, including the use of curved rows of turbines, thus avoiding straight unattractive grids
- The ability to balance technical and environmental concerns when proposing the feasible capacity of a wind farm site. In this instance, 27 turbines of 2MW each were proposed based on the available information. This capacity gave comfort to UUGE that the expected cost of grid connection would be justified
- Identification of priority further work including peat probing, vehicle access study, consultation with signal operators (MOD, CAA, Radiocommunications Agency), and a landscape led design study

Entec's report presented findings and recommendations to United Utilities for the development of a realistically sized wind farm, which would provide income of the order of £7m per year through the sale of green electricity

*Designing an environmentally sensitive  
and highly productive wind farm*

