

Spikers Hill Farm, Cockrah Road, West Ayton, Scarborough, YO13 9LB  
Proposed Wind Turbine  
Design Statement  
August 2011

## Design Statement for C & F 15e KW Wind turbine at Spikers Hill Farm

Proposed location 498190 E 487070 N



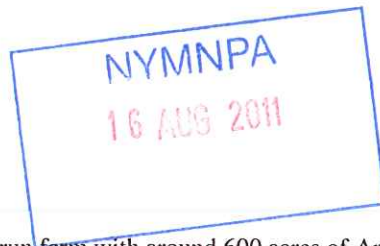
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Spikers Hill Farm  
Cockrah Road  
West Ayton  
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YO13 9LB

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## 1. Requirement

Spikers Hill Farm is a family run farm with around 600 acres of Arable and grass land with a herd 100 beef suckler cows. There is also a holiday cottage enterprise in the farmstead. The Farm provides employment for 2 generations of family plus an additional full time worker and some part time work.

The farm typically uses in the region of 45,000 kwh of electricity and 13,000 litres of oil providing approximately 130,000 kwh of heat. The farm has a three phase electricity supply.

The main uses of Electricity are:

1. Powering Air floor and Mobile Grain driers
2. Lighting and ventilation of Grain Stores
3. Pumping water for Farm and neighbours house and quarry industrial units
4. Heating and Lighting of Holiday cottages
5. Heating and lighting of Managers House
6. Heating and lighting of Main Farm house and Annexe

Spikers Hill is looking to ways of reducing their carbon footprint and has investigated several ways in which this can be done.

1. Installation of 15 KW turbine to provide renewable energy to the site
2. The installation of Photo Voltaic Panels to residential properties
3. The installation of a wood chip boiler district heating project.

Solution 1, the installation of a turbine will provide the largest amount of power in proportion to the initial investment. Solutions 2 and 3 will be reconsidered at a later utilising the income saved by the wind turbine.

**Wind Turbine:** The CF15e is a 15 KW wind turbine which will stand on a 15 meter high mast, providing approximately 43,000 kwh of free energy per year. This energy will be utilised by the farm with surplus energy being made available to the local grid.

**Carbon footprint:** Given the formula adopted by the Carbon Trust, 0.544 KgCo<sub>2e</sub> per Kwh. I 1838 Kwh equals one tonne of carbon, the current power required is 175,000 kwh the current carbon footprint can be calculated to 95 tonnes.

The CF15e will generate approximately 43,000 kwh of renewable electricity per annum equating to a saving of around 25 tonnes of CO<sub>2</sub> per year.

## **2. Pre-Application discussions.**

Pre application discussions and site visits have taken place between Mr Mark Hill (NY Moors Development Control Manager) and the owners of Spikers Hill Farm. Mark Hill highlighted the following areas of concern for the National Park:

### **1. Visual Impact**

#### **Location:**

Various locations for the proposed turbine were shown to Mr Hill, but the one which he felt would have least visual impact was in the field to the south of the farm. He felt in this location it would be classed to be in the curtilage of the farm and the trees and hedges surrounding the field would minimise visual impact.

The location of the turbine in the field is restricted to being more than 50 meters from the edges of any hedges and trees (for protection of Bats and birds), the site chosen is 51 meters from the edge of the trees to the south of the house (see section 3.0).

#### **Turbine Size:**

The height of the turbine tower and tip height of the turbine were also of concern. Initially Mr Hill indicated a 12 meter maximum tower height would be acceptable, however the only turbine available on market in this category has an exceptionally high noise, which would not receive approval from Environmental Health for the location approved. Especially as the Farm has members of the public staying in holiday and tenanted cottages.

The option of installing two lower turbines instead of one larger one was also investigated however guidelines state that they need to be spaced around 5 times rotor diameter apart which due to the hedges on either side of the field would mean the second turbine would be outwith the curtilage of the farm. Also the higher noise and lower power production of smaller turbines would rule out this option.

#### **Summary of discussions**

The CF15 turbine would be the most suitable option to produce a reasonable percentage of renewable energy for the farms energy consumption. The low noise of the machine allows it be located nearer to the farm to the area deemed acceptable as part of the farm curtilage.

Following a request from Mr Hill a forklift was located at the site with a ladder raised to the proposed tip height, pictures were taken to demonstrate the visual impact from different angles on the farm.

Following the discussion and site visits Mr Hill felt the CF15 proposal could receive his support in an application.

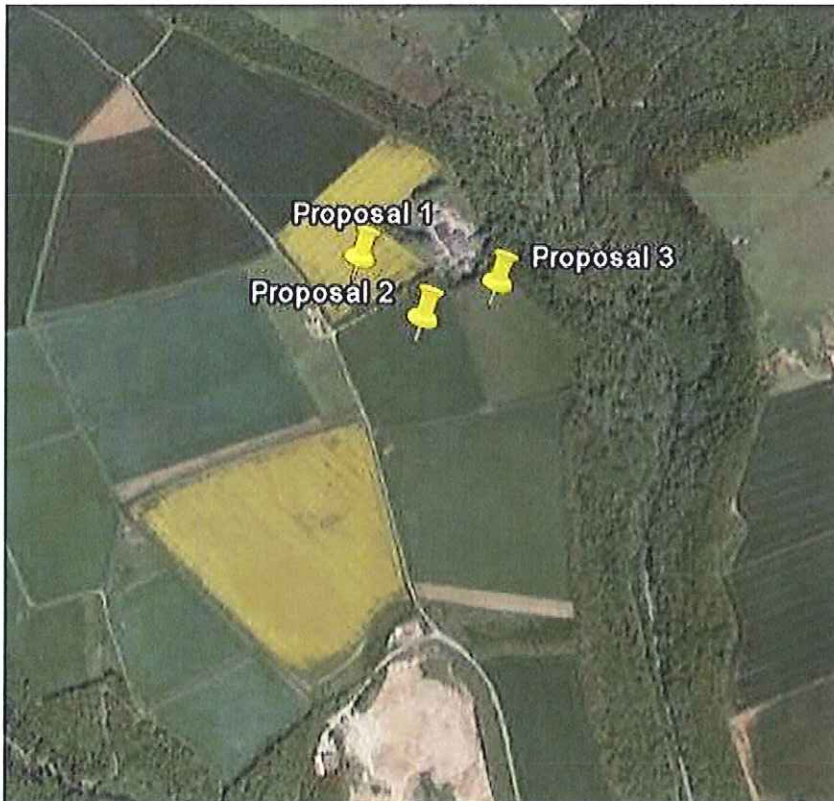


### 3. Site Evaluation:

Spikers Hill farm is situated within 600 acres of Arable and grassland, the proposed site is 100 meters from the main farm house, 140 m to the holiday and residential cottages in the farmyard, and the nearest property not owned is Spikers Hill Grange which is 330 m from the proposed site.

Two alternative sites suggested are shown on the image below (Proposal 1 and Proposal 2), however these were ruled out as the Development officer felt they did not lie within the curtilage of the farm.

When considering the pre application advice from the planning department it was decided that Proposal site 3 was the most appropriate site for the turbine.



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#### 4. Wind Turbine Specification

The wind turbine is the CF 15e, it has a free standing 15 m mast with a 3 bladed propeller. The blades are 6m long. The mast requires a reinforced concrete pedestal foundation with stabilising concrete support. The fully galvanised mast is in several sections. The colour of the mast is a light grey. There is no gearbox; therefore the noise generated by the turbine whilst in operation is minimal.



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## 5. Planning Policy

Spikers Hill Farm lies within the North York Moors National Park and the site is nearby a SSSI in woodland located to the East.

The National Park Local Development Framework Core Strategy D deals with Climate change and renewable energy.

The following extracts are taken from the North York Moors Local Development Framework Submission Core Strategy and Development Policies.

- 5.2 Planning Policy Statement 22 (NCD24) which states "(In National Parks)...planning permission for renewable energy projects should only be granted where it can be demonstrated that the objectives of the designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits." (paragraph 11). It goes on to state "Small scale developments should be permitted within areas such as National Parks...provided that there is no significant environmental detriment to the area concerned." (paragraph 12). Further, in 2005 a study was commissioned by planning authorities in North Yorkshire to identify how the targets for renewable energy in the Regional Spatial Strategy might be met in the county (CSD19). This identified that within the North York Moors National Park domestic scale wind turbines, smaller biomass plants and small scale hydro schemes (using existing structures) would be likely to be appropriate, whilst almost the whole of the National Park landscape would have a high sensitivity to wind farm development. It is considered that this approach is sufficiently provided for within criterion 2 and within the accompanying Renewable Energy Supplementary Planning Document (CSD22a).
- 5.3 It is considered that criterion 2 is sufficiently flexible so as not to stifle any appropriate schemes, particularly as technology develops. This is consistent with Planning Policy Statement 22 (NCD24) which states that "Planning policies that rule out or place constraints on the development of all, or specific types of, renewable energy technologies should not be included in...local development documents." For this reason it was decided to base decisions upon the impact of a proposal upon the locality, rather than to try to define what appropriate scale might be for example through the imposition of height, area or generating capacity limitations. The only exception is in the supporting text in relation to wind turbines where it is considered that one turbine is the most appropriate

The Wind turbine application can be seen satisfy these two extracts as it is classified as a small scale wind turbine which has been located to minimise the visual effect to the locality and it is for a single turbine which better satisfies 5.3.



## 6. Economic and Social Benefits

PPS 22 Highlights the Economic and Social benefits of a development of this type.

### 2.8

Local economic benefits of renewable power generation can be identified, especially in relation to small and/or rural communities. These include:

- job creation: direct (e.g. installing and servicing solar panels; management and operation of biofuels supply chains), indirect (e.g. making components for renewables installations – both for use in local areas and additional employment benefits from manufacture for export) and induced economic multiplier effects (e.g. re-circulating income in local area);
- increased security and reliability of supply: through more distributed generation, closer to the point of use; more diverse sources and technology types; domestically available feedstocks. In addition, localised generation means less power is wasted in transmission over long distances;
- cheaper fuel bills: integrating renewable energy generation offers the double benefit of supplying site-generated power which will recoup installation costs before the lifetime of the equipment expires, thus reducing the requirement to buy power from commercial utility companies;
- possibilities of indirect benefit through marketing of the local area as forward-looking and 'green' (e.g. inward investment by related technologies, or those attracted by improved image of area)<sup>15</sup>;
- increased income for landowners (and potential for recirculation of wealth in local community);
- farm diversification/revitalisation of rural economies.

### 2.9

The social benefits of renewable power generation are likely to be less tangible than the economic benefits, but may be most obvious in remote rural areas with small populations and low levels of employment. Social benefits may include:

- direct employment enabling retention of population in remote areas, contributing to social stability;
- expansion of community capacity to participate in planning system (e.g. through involvement in preparation of planning briefs, or in negotiations relating to individual planning applications), and increasing individuals' skills and knowledge which may in some cases result in improving their employment opportunities;
- longer term health and quality of life benefits and protection of properties through mitigation of the effects of climate change.

The proposed development would provide several economic and social benefits,

- The generation of renewable energy to be used in the existing business for corn drying, heating and lighting. The reduction in energy costs associated with the Farm and Holiday cottages will help boost profitability and employment.
- The income generated will allow further investment within the business providing job opportunities and further renewable energy enhancements.
- The development will contribute to the health of the nation by reducing the burden upon fossil fuels and the impact upon air quality due to the use of fossil fuels.

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## 7. Environmental Benefits

The Environmental benefits are;

- The wind turbine will produce approximately 43 MW of renewable electricity per annum equating to saving 25 tonnes of CO2 per year.
- The commitment of the farm towards reduction of carbon use and renewable energy generation will help it to play its part in tackling climate change, which is predicted to be the greatest threat to the environment in the coming years.

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## 8. Noise

Table 1 below indicates the noise generated by wind turbines, compared with other every day activities. (extract from companion guide to PPS22)

Source/Activity Indicative Noise Level	dB(A)
Threshold of Pain	140
Jet aircraft at 250 m	105
Pneumatic drill at 7 m	95
Truck at 30 mph at 100 m	65
Car at 40 mph at 100 m	55
Wind farm at 350 m	35-45
Quiet bedroom	20
Rural night-time background	20-40
<b>Proposed turbine over 100m away</b>	<b>32 dB (A)</b>

The CF15e is one of the quietest turbines available and has been chosen as the location deemed suitable to planning is within 100m of the farm house and 147m to holiday/letting cottages. The Acoustic report from the turbine has been reviewed by Graham Middleton of Scarborough Borough Council Environmental Health and confirmed to meet the local requirements.

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## 9. Ecology

The installation of a wind turbine will have a minimal impact upon the ecology of the area. During the installation the area will be fenced off and farm animals will have no access to the site. Once the installation is complete the wind turbine will only require access during maintenance and servicing. The ground around the turbine will recover quite quickly.

The British Wind Energy Association Website (<http://www.bwea.com>) States "Experience and careful monitoring by independent experts shows that birds are unlikely to be damaged by the moving blades of micro wind generators. More information about this can be found from BWEA Best Practice Guidelines and the Royal Society for the Protection of Birds, whose view is that "Climate change is the most significant, long term threat to biodiversity worldwide. To help meet this threat, the RSPB also strongly supports moves to increase energy efficiency, reduce energy demand and supply more of our energy needs from renewable sources, including wind power, provided they do not harm birds or their habitats." Studies of birds increasingly show that the risk from wind turbines to most species is very low, far greater risk exists from overhead cables and moving cars.

Advice from the Bat Conservation Trust and the Wildlife Trust regarding domestic scale installations on other similar turbine applications states that it is good practice for the siting of turbines to avoid close proximity to trees hedgerow and water bodies, which could be used as foraging and commuting routes for bats, and away from buildings where bats may be roosting. They recommend siting of domestic scale turbines 50m away from any such feature.

The site chosen meets the recommendations, as no hedges or trees are within 50 meters of the site.

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### 10. Photomontage

A telescopic forklift with a ladder in was used to illustrate the height of the nacelle and the tip. The Basket is at the height of the nacelle and the top of the ladder at the tip height.

Photo showing forklift from farm:



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Photo showing forklift from quarry.



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Photo showing forklift from road up to farm.



Photomontage replacing forklift with CF15e Turbine:



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## 11. Conclusion

It is clear that the proposal;

- Meets the requirements of the national park guidelines and contributes towards the governments targets for the provision of on-site energy renewal.
- Demonstrates that the visual impact upon the character of the landscape is minimal and is offset by the social, economical and environmental benefits afforded by the generation of renewable energy that the wind turbine can provide.
- Is sufficiently far away from the residential properties to ensure that noise levels are maintained at an acceptable level.
- The wind turbine is required to provide power for the use of the farm and reduce their reliability upon the national grid. The reduction in carbon footprint of 25 tonnes will help in the marketing of the crops and cottages. The extra income provided will help in the profitability and sustainability of the farming operation.

