Wind Turbine Site Survey

Customer:

Address:

Post Code:

Email:

Phone Number:

Survey Date:

Technical Documentation Prepared by:

An introduction.....

The purpose of our site surveys?

In order to maintain our high standards and obligations to getting the best turbine in the best place for our customers it is important to conduct and asses the following criteria:

1. What are the pros and cons of the turbines on the market? Which one should be recommended as the best machine for your needs?
2. Which location on your property is the most suitable? A visual assessment needs to be undertaken for the best possible site.
3. Sufficient information needs to be taken to ensure that we make an accurate estimate of installation costs.
4. And all the relevant information required for permitting phase of planning application, grid application, MOD and CAA approval needs to be collected.

How we do this....

On site, the ground is walked to select the best site using the following criteria:

1. Airflow - Access to smooth laminar airflow and distance from trees, buildings and complex terrain which can create turbulence
2. Viewpoints and Key Visual Receptors – both from Clients property and also from neighbouring viewpoints should photo montages be required for a Landscape and Visual Impact Assessment
3. Noise – to ensure that you and your neighbours will not be affected by noises from the turbine(measure distances)
4. Shadow Flicker – to ensure that you and your neighbours will not be affected by shadows of the blades(measure distances)
5. Access – to ensure that the plant and machinery required for the installation and any maintenance through the life of the machine can easily reach the site at any time of year and in any ground condition

The best machine for your needs.....

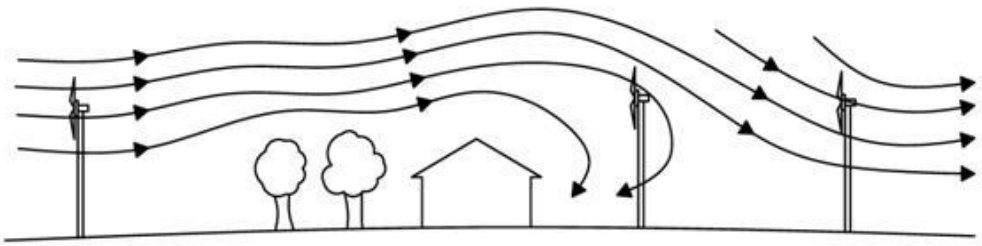
Which location on your property is the most suitable?

Choosing the site

How many sites:

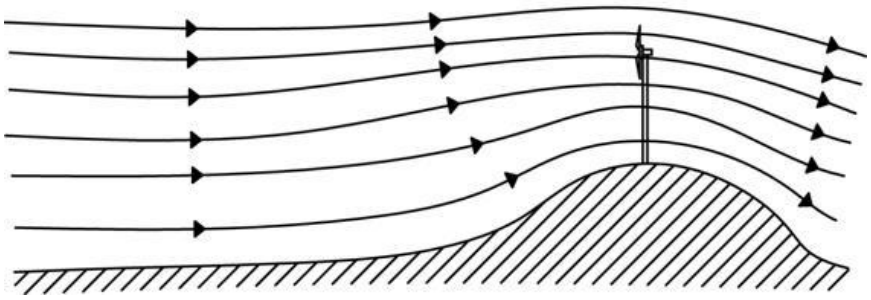
A turbine should be located wherever the highest constant wind speed can be captured, and with as little turbulence as possible. An increase, in the average wind speed, as little as 25% can nearly double the power output of the turbine. There are considerable differences in component life for different locations. Gusts can put a large strain on blades.

Figure 1 : The wind turbine should be sited away from obstructions such as trees and buildings.



Acceleration of wind over ridges can be exploited in order to generate more power from the turbine, although the shape of the ridge is, of course, important. A smooth ridge will not produce turbulence, whereas a sharp change in terrain, a bluff or a cliff will do.

Figure 2 : Wind speeds are strongest on the tops of ridges.



It is preferable to locate the turbine at a point where the wind is perpendicular (ie. at right angles) to the side of the ridge (as in Figure 2). A turbine positioned on a ridge at which wind blows at a different angle – such as diagonally or long-ways - will be less effective.

Wind Resource at your site

Important! While there is data available from the NOABL UK wind speed database our onsite monitoring and experience of actual turbine operation has shown that this can be up to 30% inaccurate and so significantly affect estimates of energy output. This is particularly the case in areas of complex terrain, areas with sea breezes and rough land where an accurate understanding of the shear (i.e. the relationship between the wind speed at 10m and hub height) factor and local turbulence become increasingly important.

There is enormous variation in the wind resource from month to month and year to year, but long term trends in the local wind resource are identifiable. In order to understand the local wind resource, we recommend on site wind monitoring at hub height from 3 months with correlation to a 60m geotropic mesoscale wind model, or at least 12 months and ideally 36 months with no correlation. This will give you a long term “hind cast” which will give you an indication of what has happened over recent years at that location. This is not a wind forecast for the future, and although past performance is not a guarantee of future performance is gives you the best indication possible of the viability of a site.

Measuring the wind

When assessing accurately the wind speed of a site it is useful to have some record of wind speed in the location, ideally for the last twelve months. There is a range of measurement equipment that can be used. Some instruments are used with data loggers that record wind speeds over long periods of time. The most commonly used measuring device is the cup anemometer.

Does the client have an anemometer up:

Notes:

It should be emphasised that, for large wind installations, it is very important to conduct detailed evaluation. It is therefore necessary to collect other clues about wind speed by analysing available date (if it exists), by talking to local residents and asking about past experiences, and even by looking at the trees themselves to see by how much they lean:

Figure 3: The strength of the wind can be estimated by the shape of the trees in the area.
Illustration: practical Action/Neil Noble

Average wind speed data is sometimes available from existing sources, such as wind maps or the meteorological office, although wind regimes are much localised, so data may be misleading. Anemometers are often set at a standard height of 10m: this height is too low for wind turbines. Furthermore, they are often positioned in places unsuitable for wind turbines - airport wind-speed monitoring -, providing poor information on wind speeds

TAKE A PHOTO OF TREES AT SITE IF POSSIBLE

Energy yield estimates

Electricity Usage

Approximate annual bill of kWh usage:

Notes:

Onsite/Export

"The performance of wind turbine systems is impossible to predict with any certainty due to the variability in the wind from location to location and from year to year. This estimate is based upon the best available information but is given as guidance only and should not be considered as a guarantee. For a greater level of certainty, it is recommended that on-site wind speed monitoring is undertaken for at least a year." (MIS 3003 issue 2.0

For energy Production see relevant payback grid

Planning Permission

Council:

Parish:

Distance to Neighbours:

Any consultation with council or neighbours already?:

Biodiversity

In or near Area of Outstanding natural Beauty (AONB)? Tower heights may be limited to 15m and landscape and visual impact assessments may be required.	
In or near Areas of Great Landscape Value (AGLV)?	
Within 2km of a site designated by Europe as rare or especially important (SAC, SPA or Ramsar)?	
Within 500m of a site of special scientific interest (SSSI)?	
In or near Green Belt?	
Within 100m of broad-leaves woodland / Veteran trees/ Water courses/ Wetlands/ Flower- rich	

meadow/grassland/ heath land/ Mature Hedgerow?	
Known bats/ Barn owls/ breeding birds/ door mouse or other protected species? This may require additional biodiversity studies.	
Affect existing structures with ANY of the following features? Clay-tiled pitched roofs, Loft spaces, hanging tiles, Wooden cladding, open soffits, Underground structures such as cellars, air raid shelters, ice-houses, tunnels, bridge structures, aqueducts or viaducts especially over water or wet ground, dense climbing plants	
Are there streams, rivers, ponds, lakes or other watercourses/ aquatic habitat on or within 200m/500m of the proposals?	
Will the proposals affect any areas of mature deciduous woodland, field hedgerows over 1m all and over 0.5m thick or scrub well-connected to woodland or hedgerows on or adjacent to the site?	
Will the proposal affect any of the following: Old and veteran trees/Trees with obvious holes cracks, cavities or heavy vegetation/Trees with a girth greater than 1m at chest height. Any tree preservation orders?	
Is it in a conservation area?	
Adjacent to historic Monuments?	
Is it inside the boundary of any listed buildings?	

Shadow Flicker

There is no risk of shadow flicker as there are no properties within 200m. There are no obvious neighbours whose amenity would be affected by the noise, flicker or visual impact of the turbine in the proposed site.

Ministry Of Defence & Civil Aviation Authority RADAR

Any Airports or military bases within 26km?

Grid Connection

DNO:

Electricity supply and voltage:

Who do you buy from?:

Notes:

Grid Connection Type:

Please take photos of connection and transformers

Does the client have a 3phase connection if not what?:

Does the client have a 100kva transformer if not what?:

Notes:

Your DNO has the right to charge you to reinforce or upgrade your lines should that be required for the installation of a turbine in order to prevent overvoltage situations which would cause the turbine to cut out. We recommend that the DNO is asked to monitor the grid voltages in order to identify if there is any risk of overvoltage which will cause the turbine to cut out.

Installation Considerations

A geotechnical study will be required

Ground type:

Top soil?:

Notes:

Trenching

If trenching route is known please draw on Google image:

Distance of turbine base to MCU is 10ft.

Trenching Distance:

Ground types to be excavated:

Any underground services/highways/other to be disturbed?:

Notes:

On road: Off road:

Site Access from Yard

Is there hard standing and road:

Electrical Installation

How long is the cable run from the MCU to the control panel	
What type of installation is it?	
Is the system off grid?	
Is the location damp/hot/exposed to elements?	
Are there sufficient spare ways in the current MCU?	
Can the supply be isolated to install an additional MCU?	
Have these spare ways been reserved for the turbine and is the client aware that they must remain available?	
Will an export meter be fitted?	
Has the electrical installation been recently inspected by a qualified electrician and any remedial work carried out?	
Do you have reason to suspect that the existing installation may be unsafe?	
What type of wall will the control units be mounted on?	

Health and Safety

Onsite risk assessment:

Copies of Aeolus Powers Health and Safety Policy, Risk Assessments and Method Statements can be provided on request.

Aeolus cannot accept liability for damage to undisclosed underground services. If there are any underground services, ensure full maps are provided by the client to Aeolus.

Photographs

Photograph checklist

Existing electrical supply	
Space for turbine control systems	
Overhead supply and transformer	
Visual impact photographs (photos from prominent view points, public rights of way and key visual receptors within 2km)	
Turbine site 360˚ from site	

What Happens Next

1. Following the survey we will send a screening letter to your local planning authority to identify what objections they may come up with.
2. Whilst waiting for a screening response we would also recommend you organise your grid connection with your DNO. We also recommend you carry out wind monitoring.
3. Once the screening opinion is back from the council and you are happy to proceed with planning. We recommend you place your deposit in order to secure the turbines place on the manufacturing line and to fix the price of the turbine as we will forward purchase currency. The lead time of the turbine is between four- six month.
4. Once you get planning approval complete the ground works allowing time for concrete to set, this will take about four to six weeks.
5. Your turbine will be delivered, installed, tested and commissioned over the period of around a month.
6. Your final stage payment will then be due following commissioning.

N. B. You can fix the price of your turbine and accelerate your delivery times by placing your turbine order at the same time as submitting your permitting applications. Should you be unsuccessful with your permits we would resell the turbine to the next customer and reimburse your deposit.

Any other note that may be important to the installation: