Farm Wind Overview

Turbine Selection and Siting for Medium & Smaller Projects

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Sustainable Energy & Water

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Why Renewable Energies?

- Sustainable development
- Attenuate climate change
- A step into the low carbon economy

  (carbon footprint of the installation is neutralised in the first year)

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Why Wind Energy?

Large amounts of wind are delivered free of carbon and financial cost. The UK is the windiest part of Europe.

Farmers with wind turbines have a new attitude to the weather. When the wind is blowing they are smiling. When it is not blowing they are spraying.

Project Considerations

Available Sites
Wind Speed – *matching turbine to available wind*
Distance from ‘hurdles’ and blockers
Grid connection
Planning
Ecology
Heritage
Access
Financial

The Social Landscape

- 75-80% of UK population are in favour of wind turbines
- Tourism has increased in areas with wind farms
- 5-7% of UK population are against wind turbine, they make a lot of noise and try to recruit the neutrals and weaker in favours
- Strong political commitment

Consult neighbours early in the project

Available Sites – location?

- Ideally on high ground, open to prevailing and other winds, surrounded by short grass, water or level paving
- For the rest of us avoid screening and turbulence
- Owned or permission needed?
- Permission needed for access or cable routes?
- Distance to connection point

Wind Speed

- National database for smaller project

  NOABL is recognised for MCS certified installations
- Bench mark monitoring for medium scale

  3 months mast results compared with local database
- Full monitoring

  12 – 24 months mast monitoring at multi levels

Distance from Hurdles and Blockers

- Nearest independent dwelling? Acceptable noise and shadow levels. 110m, 300m, 500m?
- Hedgerows and habitats, usually 50m min.
- Roads, pipelines, overhead & underground cables?
- Airports, Radar, Low flying aircraft?
- Grade 1 listed and heritage sites?
- Transmission masts and stations?

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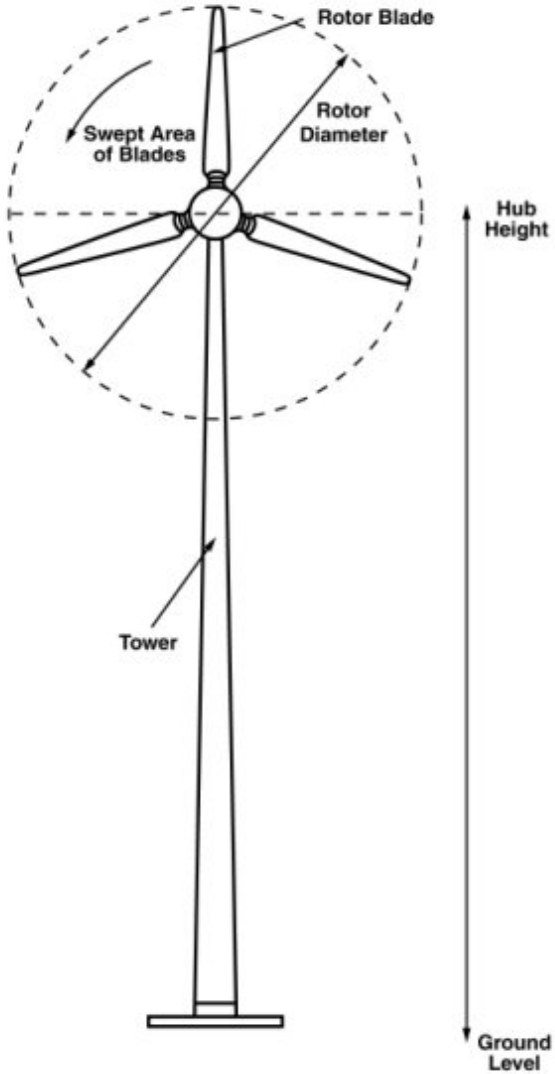
Which Wind Turbine?

- Matching output to requirement
- Energy, Carbon Offset or Financial criteria?
- Own use plus export connects your side of the meter
- Export only from larger turbines
- Specify kWhrs/year not kW rating!!!!!!!

Maximum Yield – The Basics

- Wider rotor diameter = more swept area = more energy
- Taller mast = higher wind speed = more energy
- Durable design = more time at work = more energy
- Match turbine/s to wind speeds
- More energy = more income



Grid Connection

- Smaller projects connect client side of meter

Save on what is used, remainder sold to the grid,

Zero or low connection charge, 3 phase assumed

- Larger projects connect direct to grid

District network operator gives permission and passes on cost of additional infrastructure

Financial

Costs

- Feasibility and Enabling
- Installation
- Upkeep

Benefits

- Energy used - costs saved
- ROC's & FIT's
- Export
- Being in the low carbon supply chain

Initial Proposed Generation Tariff

Technology	Scale	Proposed FIT Rate - July 09	Annual Degression
Wind	<1.5kW	30.5	4
Wind	1.5–15kW	23	3
Wind	15–50kW	20.5	3
Wind	50–250kW	18	0
Wind	250–500kW	16	0
Wind	500kW–5MW	4.5	0

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Feasibility & Enabling Costs

- Initial desk study to identify probable sites and possible limitations
- Formal site survey report to inform all stakeholders
- Preparation and submission of planning case
- Informing communities and officials
- Answering issues arising from consultations
- Grid connection protocols

Feasibility & Enabling Costs

These are risk costs that increase with the size of the project. As a general guide:

- Small turbine £2 – 5,000
- Medium turbine £ 5 – 25,000
- Larger turbines £25 – 250,000

Planning decision appeal from £2,000

Financial Illustration - Small

Gaia-Wind 11kW Turbine

Guide price fully installed £52,000

30,000kWhrs/year from 5.5m/s average annual wind speed at 18.3m hub height saving around 17t of CO2 emissions.

Savings generated for own use: 12p/kWhr

Income from export to grid: 5p/kWhr

FIT: 23p/kWhr

Annual maintenance cost : £600

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Payback Illustration – Gaia-Wind

If all exported:

30,000 x £0.28 = £8,400 /year

Or if all used:

30,000 x £0.35 = £10,500 /year

Subtract £600/year maintenance

Simple Payback

years = Installed cost / net income

All exported:

£52,000/£7,800 = 6.67 years

All used:

£52,000/£9,900 = 5.3 years

Payback Illustration – Medium

WES 30 250kW Turbine

Guide cost £500,000 installed

352,000kw/hrs/year from 5.4m/s

Saving 197t CO2

FIT rate 18p/kWhr

All exported:

352,000 x (18p + 5p) = **£80,960**

All used:

352,000 x (18 + 12p) = **£105,600**

Subtract maintenance : £1,200/yr

Simple payback **4.8 to 6.3** years

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Payback Illustration – 1mW

Nordic Wind N1000 Turbine

FIT 4.5p/kWhr, export 5p/kWhr

Guide prices – yet to be confirmed

Installed £1.25m

Annual Income £250,000

Maintenance, year 1&2 £25,000

Maintenance, year 3&4 £35,000

Payback in 6th year

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More Information?

- Professional and trade organisations:

  BWEA, CLA, NFU, REA etc

- Suppliers
- Existing users
- Internet and reading
- Independent Advisor

www.farm-wind.co.uk
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