

Wind Power – Getting it Right

**The Business Case for
Wind Energy**

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Outline Of Presentation

Presentation will address 3 issues: Why? / Where? / What?

Or in other words:

1. Why consider wind power?
2. Where is appropriate?
3. What can I expect from an installation?



Why Consider Wind Power?

1. Resource Availability:

Northern Ireland has one of the best wind resources in Europe

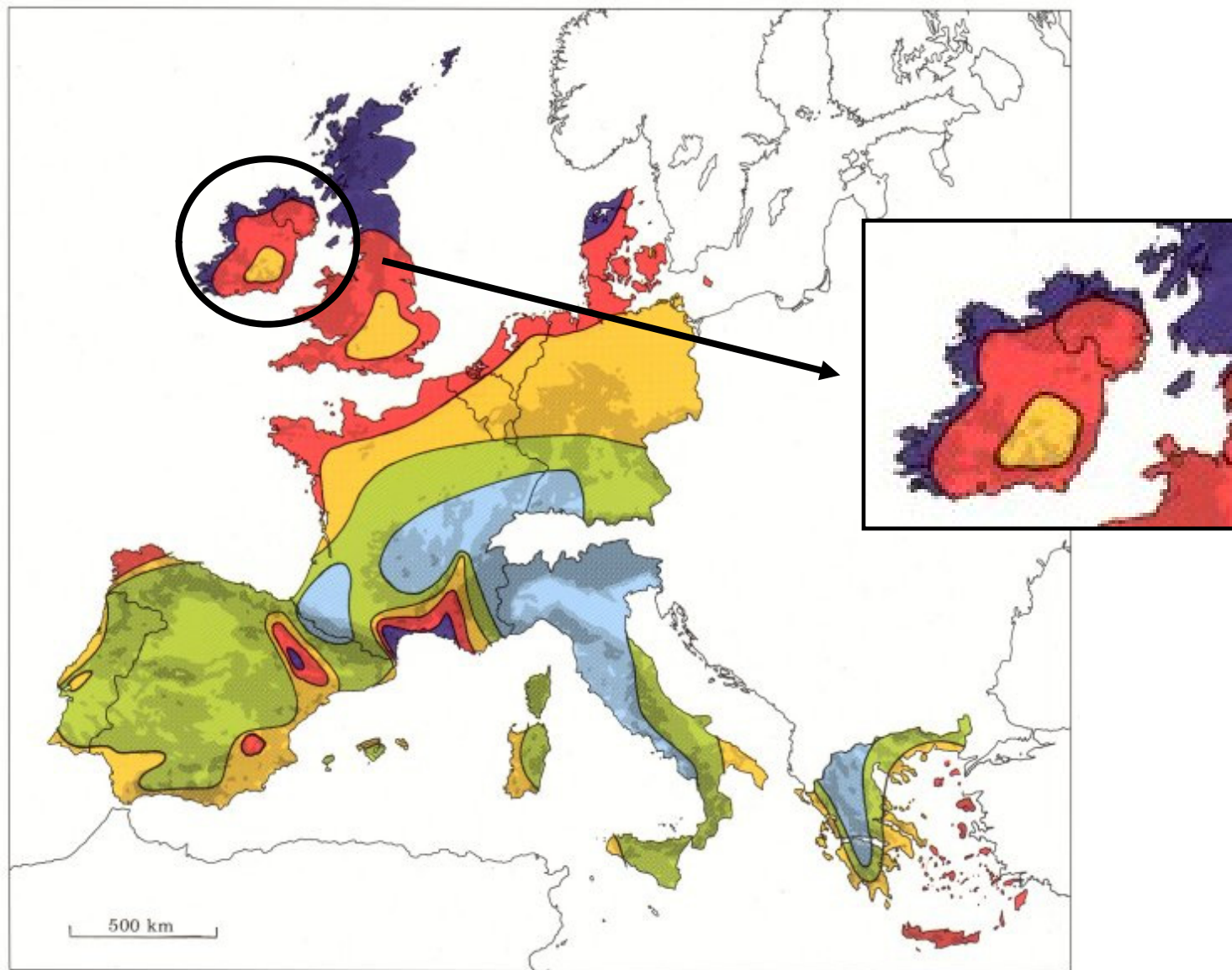
2. Availability of Government Support Mechanisms:

ROC system

3. Proven Technology with Decades track record

4. Carbon Savings & Reduction of Environmental impact of Local Authority





Wind resources¹ at 50 metres above ground level for five different topographic conditions

	Sheltered terrain ²		Open plain ³		At a sea coast ⁴		Open sea ⁵		Hills and ridges ⁶	
	m s ⁻¹	Wm ⁻²	m s ⁻¹	Wm ⁻²	m s ⁻¹	Wm ⁻²	m s ⁻¹	Wm ⁻²	m s ⁻¹	Wm ⁻²
Dark Purple	> 6.0	> 250	> 7.5	> 500	> 8.5	> 700	> 9.0	> 800	> 11.5	> 1800
Red	5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
Yellow	4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
Green	3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0- 8.5	400- 700
Blue	< 3.5	< 50	< 4.5	< 100	< 5.0	< 150	< 5.5	< 200	< 7.0	< 400

Where is the Most Suitable Location for a Wind Turbine Installation?

The most suitable sites for Wind Turbine Installations will have a favourable combination of the following elements on site:

1. Suitable Wind Speed
2. Minimum obstructions to prevailing wind (Usually SW)
3. Availability of 3-phase electricity
4. Suitable access to site location
5. Minimum potential planning restrictions present
 - *Third party houses*
 - *AONB / ASSI etc*



What is Suitable Wind-Speed?

Turbine output will be determined by the on site wind-speed
Wind-speed therefore directly impacts on financial feasibility

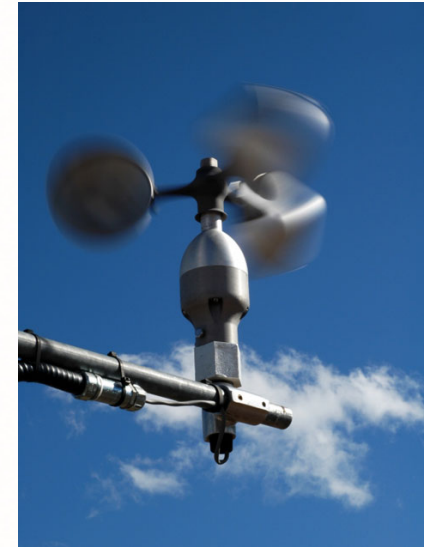
Commercial viability is usually ensured if onsite wind-speed is in
excess of 6 m/s *(provided other factors are not affecting capital costs)*

It is essential to determine onsite wind-speed prior to investing in
medium or large sized turbines



How to determine Wind-Speed?

Only 100% method to determine actual wind-speed onsite is to undertake an Anemometer study and measure wind-speed at hub height. Deemed essential in all large scale commercial wind farm installations.



Action Renewables Wind Map can help you gain an initial understanding of the potential wind speed on site



Map Legend

Layer Info

On-Shore (Unconstrained)

- 30m Wind Speed
 - Lower : 6.75 m/s
 - Upper : 7 m/s
- 75m Wind Speed
 - Lower : 8 m/s
 - Upper : 8.25 m/s
- 100m Wind Speed
 - Lower : 8.25 m/s
 - Upper : 8.5 m/s

Off-Shore (Constrained)

Other Layers

- Counties

Name : Tyrone

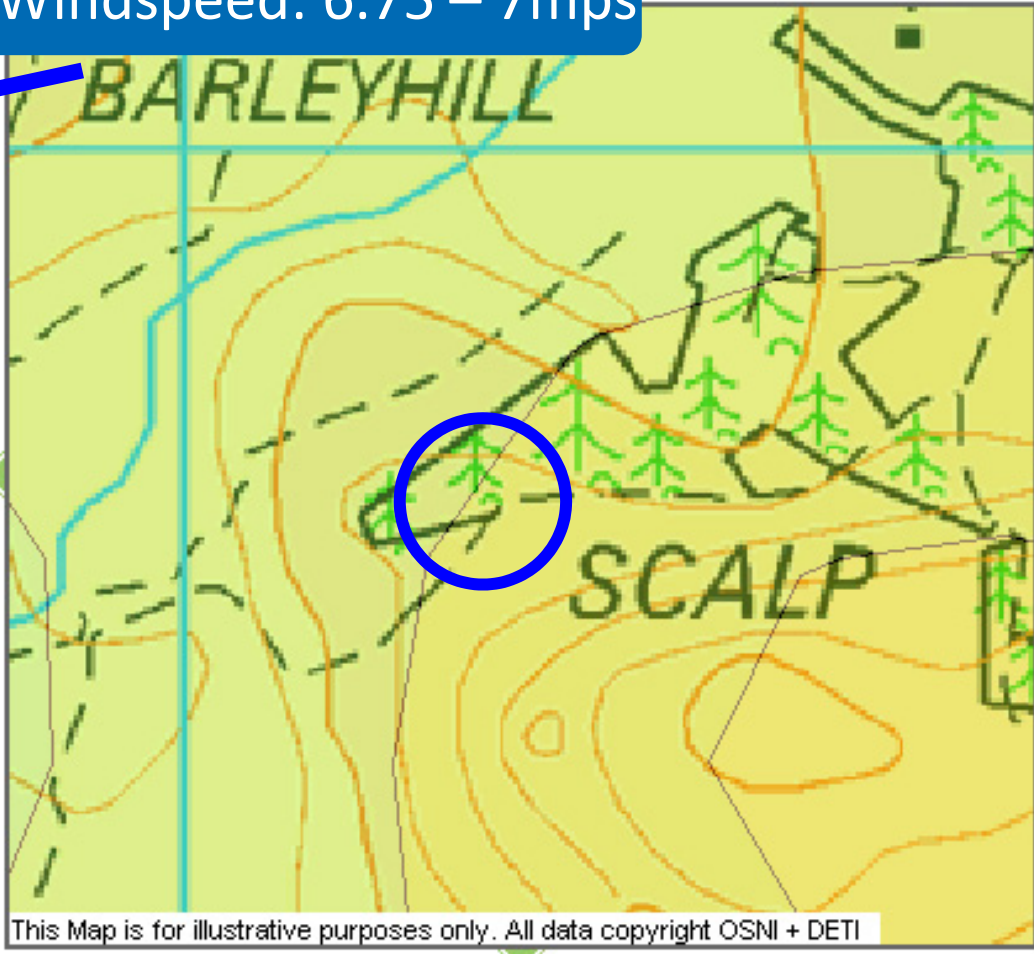
Measure Info

Windspeed: 6.75 – 7mps

Map Tools

Click on the Map to get Info

Info Measure



Search by Postcode

Enter Postcode

BT79 9BS Find

1 result found.

BT79 9BS

Map Layers

Developed by [ESBI Computing](#)

This Map is for illustrative purposes only. All data copyright OSNI + DETI

What output can I expect from My Installation?

Depends on size and type of installation and on-site Wind speed.

- Load Factor issues – common misunderstandings
- Windfarms can achieve load factors of up to and above 30%

For Example: a 10MW windfarm could ‘in theory’ generate:

$10\text{MW} \times 8760 \text{ hours per year} = 87,600\text{MWh per year}$

HOWEVER

On average windfarms operate at 30% load factor and therefore the typical 10MW windfarm will generate:

$87,600 \text{ MWh} \times 30\% = 26,100 \text{ MWh per annum}$

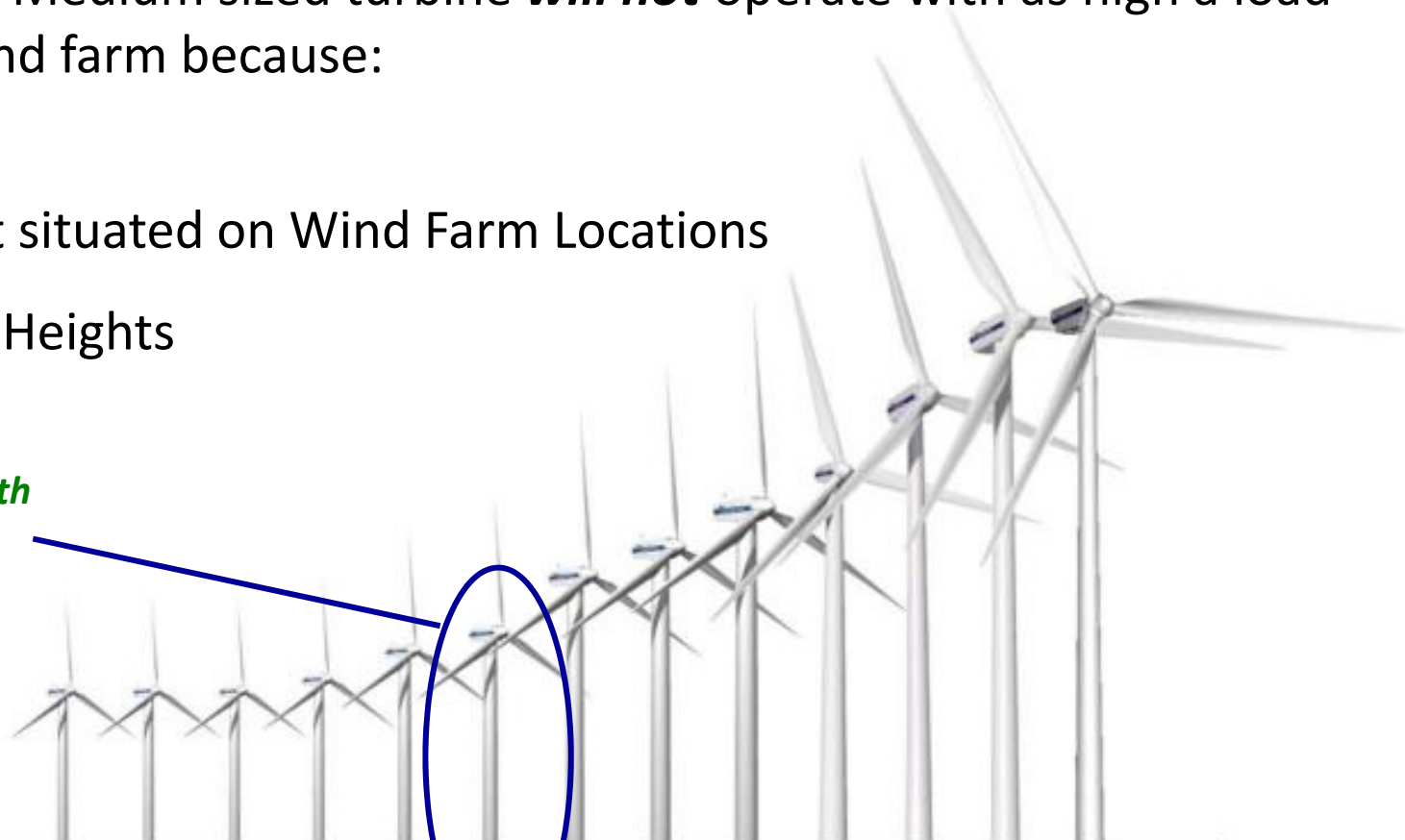


What output can I expect from My Installation?

Typical 'Farm' Medium sized turbine **will not** operate with as high a load factor as a wind farm because:

1. Usually Not situated on Wind Farm Locations
2. Lower Hub Heights

**225kW Turbine with
30m Hub Height**



Product/Rotor diameter (m)	V15	V17	V19	V20	V25	V27	V39	V44	V47	V52	V66	V80	V90
Capacity (kW)	55	75	90	100	200	225	500	600	660	850	1750	2000	3000

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..you hold the power

Example Scenario



Map Legend

Layer Info

- On-Shore (Unconstrained)
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- Other Layers
 - Counties
- Name : Tyrone

Map Tools

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Map Layers

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Windspeed: 6.75 – 7mps

Proposed Turbine Location

This Map is for illustrative purposes only. All data copyright OSNI + DETI

What output can I expect from an Installation?

At our example location a load factor between 15% and 22% would be more realistic (*based on a wind-speed of 6.75m/s*).

Utilising a 250kW Wind Turbine a realistic medium annual output would be: **405,150kWh per annum @ 18.5% Load Factor**

Income will be derived from both exported electricity and ROCs

- ***4 ROCs per MWh = 1,620 ROCs x £45/ROC = £72,900***
- ***100% electricity export = 405,150 x 5p/kWh = £20,257.50***

Total = £93,157.50 per annum income



Typical Installation Costs

Costs can be broken down into the following categories:

1. Planning & Technical Advisory Costs	£5,000
2. Equipment Costs	£500,000
3. Grid Connection Costs (inc. SCADA)	£100,000
4. Civil Works	£25,000
TOTAL = £630,000	

For the installation of a New 250kW Turbine the following costs have been assumed...



Simple Payback Scenario:

Turbine Size	250kW
Estimated Annual generation (kWh)	405,150kWh
Installed Cost	£630,000.00
Assumed Maintenance and Insurance Cost	£10,000.00
Annual Income	£93,157.50
Total Value per year minus Maintenance and Insurance	£83,157.50
Simple Payback*	7.6 years

NOTE:

Simple Payback does not take into account interest incurred on loans or possible inflation on the price of electricity or ROCs



Other Scenarios:

Costs in our example are for new equipment.

Reconditioned equipment is also available and great savings can be made (approx. 50% cost on capital equipment) however...

- *Potential to result in shorter life-span*
- *Increased maintenance costs*
- *Insurance issues*
- *Potential Financing Issues*
- *Limited warranty / guarantee on equipment*
- *Potential for higher noise levels*



Other Scenarios:

Rental Agreement from Wind Turbine Installation Companies:

Many Wind Turbine Companies will rent suitable sites from land owners, including Local Authorities, to erect wind turbines.

Typical agreement allows 3 year option for company to get planning & grid agreement

Potential rental of between £7,000 - £14,000 per year (typically reviewed every 5 years) depending on the quality of the site.

Very Low Risk Option



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ANY QUESTIONS?

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Please Feel Free To Contact

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For Any Information on

Renewable Energy

**Thank You
For Your Time**

