

## Humshaugh Neighbourhood Plan

### Policy 1 - what is the evidence for the statement in paragraph 4.12 that wind turbines up to 25m in height "*would not be economically viable*"?

- 1 Humshaugh Net Zero commissioned a report in 2010 to identify the potential for wind energy within Humshaugh parish (Humshaugh) for wind energy.  
<https://humshaughnetzero.org/reports>
- 2 This was in the context of reaching Net Zero by 2030 which was calculated as over 5300 tonnes of CO<sub>2</sub> each year for just domestic emissions.
- 3 A single 1 MW of wind energy generates savings of over 2000 tonnes of CO<sub>2</sub>. This is almost 38% of domestic carbon emissions in Humshaugh.
- 4 Maximum turbine generation size for a 25m tip height wind turbine is 11 kW. These turbines are typically used in remote locations for self use, not for commercial generation of scale.
- 5 To achieve an output of 1 MW using wind turbines with a tip height of 25m would require 90 x 11kW wind turbines.
- 6 Each of these wind turbines would cost £80,000 (budget price according to market leader manufacturer Ryse <https://www.ryse.energy/> ) or £7,200,000 for all 90 wind turbines plus grid cost of £200,000. To achieve a suitable Internal Rate of Return (IRR) of 10 % would require a selling price of 38p/kWh – or nearly 5 times the current achievable sales rate. This assumes no array losses.
- 7 The 90 x 11kW wind turbines would require a significant area as each wind turbine needs to be at least 130 m apart. A 10 x 9 matrix for these WTs would therefore cover an area of approximately 900 m x 800 m instead of a single tower for a larger wind turbine.
- 8 A single 1 MW wind turbine would cost £1,200,000, and using same size grid connection, would generate electricity at a cost of 8p/kWh, and would be a commercial project.
- 9 Commercially, for grid connected wind projects, the smallest wind turbines currently installed are sized at 1 MW. The nominal tip height for these wind turbines is a minimum of 67 m.
- 10 The economics are as follows to achieve an Internal Rate of Return of 10% for a 11kW wind turbine:
  - a. 11kW WT requires selling price for power generated of £0.38/kWh
  - b. 1 MW requires selling price for power generated of £0.08/kWh
  - c. The current market price for selling electricity is £0.08/kWh
    - i. See market price update below
- 11 A detailed IRR calculation is shown below for a single 11kW wind turbine, with a tip height of 25m.

**MARKET PRICING UPDATE – NEW STREAM – 09/07/2024**

<https://www.newstreamrenewables.com/new-stream-renewables/>

*Despite the risk to LNG supply from Hurricane Beryl in the US this week, Gas and Power markets continue to decline.*

*Weak demand and high renewable output also push contracts lower, mostly at the front end.*

*NBP front month gas at 73p per therm.*

*NBP Winter24 gas is at 94p per therm.*

***April25 annual baseload power at £79/MWh.***

*This note has been prepared by David Still CBE*

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*9<sup>th</sup> July 2024*

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## Financial Analysis 25 m tip height Wind Turbine

No of WTs	1	
WT size	11	kW
Blade tip	25	m
WT output (annual)	38000	kWh
PPA price	£ 0.38	/kWh
WT price installed	(80,000)	£
Grid connection cost	(20,000)	£
Annual operation costs	(3,000)	£
IRR	10%	

Target IRR for investment is 10%

Current export power price is £0.08/kWh

To achieve target IRR, PPA price is        **£ 0.38**    /kWh

IRR CALCULATION	
Year	£
0	(100,000)
1	11,440
2	11,440
3	11,440
4	11,440
5	11,440
6	11,440
7	11,440
8	11,440
9	11,440
10	11,440
11	11,440
12	11,440
13	11,440
14	11,440
15	11,440
16	11,440
17	11,440
18	11,440
19	11,440
20	11,440
21	11,440
22	11,440
23	11,440
24	11,440
25	11,440