



‘Wind on a pole’ - Project Report

Alison Kidd

[Talybont on Usk Energy](#)

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Introduction

This research project set out to explore the feasibility, acceptability and ROI of single pole wind turbines on farms and other upland businesses in the Bannau Brycheiniog National Park.

We had 2 goals: (i) to identify the critical characteristics necessary for a successful micro wind turbine installation and (ii) to use an emerging case study to motivate and inform further such installations from the perspective of both a potential property owner and a National Park policy perspective.

In summary, we learned a great deal about the critical characteristics and challenges for a successful installation (outlined below) but haven't managed (at least so far) to generate a viable case study for others to follow.

The process

[Ryse Wind Energy](#) is a UK manufacturer of wind turbines in a range from 160W to 60 kW capacity. Ryse also manufactures battery and solar systems alongside wind. Andrew Foster, Technical Sales Support at Ryse Energy, proved a very helpful advisor to our project at all stages.

For cost and visibility reasons, we elected to focus our research on Ryse's smallest grid-tied turbine, [the E-5](#), at a projected cost of ~£35k to £39k (plus VAT). The E5 (shown below) is rated at 4kW with a peak of 5.5kW. It has a 4.3m diameter, a height of 9m and a 3.0 m/s start up speed.



E-5 Micro Turbine 5.5 kW

The next model up is the G-11 which generates up to 13kW with a 13m diameter, a minimum height of 15m and a 3.0 m/s start up speed. Its estimated cost is ~£75k to £80k. While the G-11 capital cost is higher, the £ per annual kWh generated is typically more favourable compared to the E-5 in the UK. The G-11 can offer stronger economies of scale. It is MCS-certified which allows access to the [Smart Export Guarantee](#) (where applicable), improving its ROI.

The latest technical data sheets for each model can be found on the [Ryse Energy website](#).

Andrew pointed us to <https://www.rensmart.com/Information/NOABLModel> as the tool Ryse currently use for initial m/s wind readings for potential sites. Andrew said it's not worth considering a site with a lower than 4 m/s average wind speed for a grid tied turbine. If a property has an annual average windspeed of 5 m/s, a 5.5 kW micro turbine, mounted on a single

pole, could generate 6,900 kWh/year or 10,000 kWh/year with an average windspeed of 6m/s.

On initial investigation around local windy spots, we found the Rensmart readings (at 10m height) were mostly 4 m/s or below. This was disappointing. These readings are estimates generated from an underlying NOABL model. We tried obtaining readings from the only alternative source, the [Global Wind Atlas](#) (GWA) and found these correlated poorly with the Rensmart [readings](#) - they were mostly higher (by a factor of 4 in one case!) apart from a couple which were lower. Andrew said GWA is more accurate than Rensmart but both tools, we learned from an academic study, only [act as a guide](#) prior to installation of actual on-site wind measurements over a suitable period of time which is obviously a cost (albeit a more minor one) in itself.

Our next step was to advertise for property owners within Bannau Brycheiniog National Park interested in participating in a micro wind turbine research project. Applicants completed a survey with their names and contact details, their type of property (farm, other business or domestic), its long and lat location, m/s wind speed readings from both Rensmart and GWA, an estimate of its annual electricity consumption and whether it had other generation capacity like solar PV or batteries.

9 property owners responded, their average annual wind m/s readings varied between 3 and 7 m/s and their estimated annual electricity consumption varied between 5,000 kWh and 85,000 kWh. We asked Andrew Foster to help us select the most promising 3 sites to take forward to the next step. He reviewed the applicants' data, collected his own wind speed readings and studied each location via satellite maps.

This initial desktop analysis helped us learn about the significant issues in the assessing the viability of a site:-

1. Even where there's a reasonably high wind speed average, any nearby trees, hedges, steep ridges or surrounding buildings will reduce the turbine's efficiency by creating local turbulence.
2. The ROI of purchasing a wind turbine is unlikely to make sense unless the property consumes sufficient energy to make full use of the energy that the turbine generates. Obviously, a suitably sized battery is also critical in this equation.
3. Installation costs and challenges can be significantly increased by several issues: if road access is problematic; how far the turbine would be located from the grid entry point to the property; whether the property is at the end of the line on the grid network; and what other energy generating capacity is already installed at the property which could affect a DNO application.

From this desktop analysis, we selected 3 sites with the most promising profiles which consisted of 2 farms and 1 domestic property.

Site Research Results

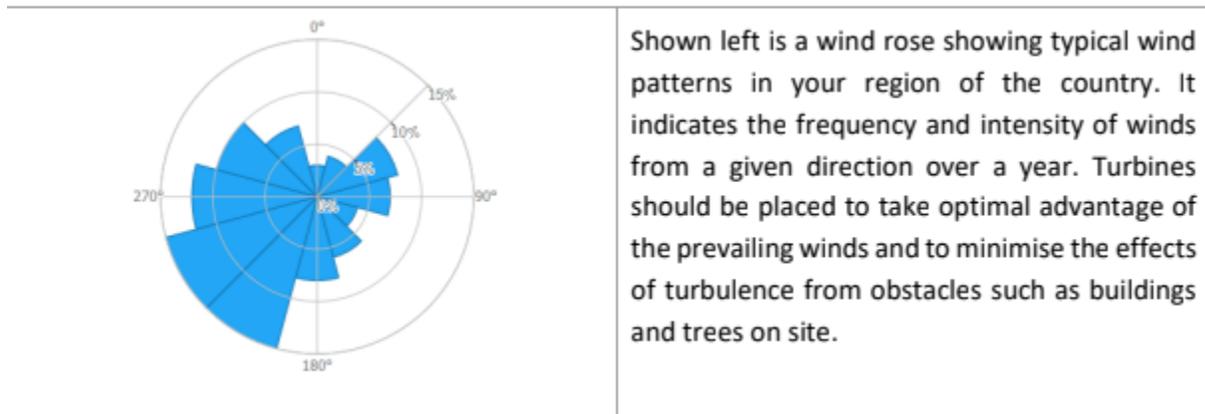
In November 2025, Andrew Foster visited the area to perform site assessments (funded by Talybont Energy) at each of the 3 properties.

This resulted in 23 page individual site reports covering:-

- Average annual wind speed data from NOABL database.
- Potentially relevant landscape details and suggested siting of the turbine clear of hedges, trees and other buildings and creating least noise or visual impact.
- Installation feasibility including road access, cable length¹, steep ground, etc.
- Details of current electrical installations and supply issues, possible DNO connection issues
- Energy consumption of the property relative to likely wind generation output.

¹ If owners are able to do their own trench and cable laying, this lowers installation costs.

- Providing a working document to support early feasibility and planning. A full planning application would require additional technical documentation.²
- A diagram in the reports showed the prevailing wind directions for the Bannau Brycheinog region



Significantly, no estimates of likely annual kWh generation figures were included in the reports because the wind speed estimates generated by NOABL and GWA estimates failed to agree and the following important caveat was stated in all 3 cases: *“Wind speed database values are derived from mathematical models and are not measurements taken at your site and as such should be regarded with a degree of caution. If you require further reassurance of site wind conditions it is recommended that you conduct on-site wind monitoring. In addition, please be aware that wind conditions at a particular site can vary by as much as 20% from one year to the next”*.

Without such on site wind speed measurements taken over a prolonged period, it is not possible to predict accurately the likely annual kWh generation. This makes it very difficult for owners to assess the likely ROI of a wind turbine for their particular case.

² Ryse offers a consultancy service for help with submitting planning applications.

Site 1 : Domestic property

The estimated NOABL average wind speed was 5.8 m/s for this site. That suggests sufficient wind but the main concern with this property was the steep hillside and nearby ridge being likely to create turbulence, which would negatively impact the turbine's performance. The magnitude and exact effect of such turbulence is very difficult to predict.

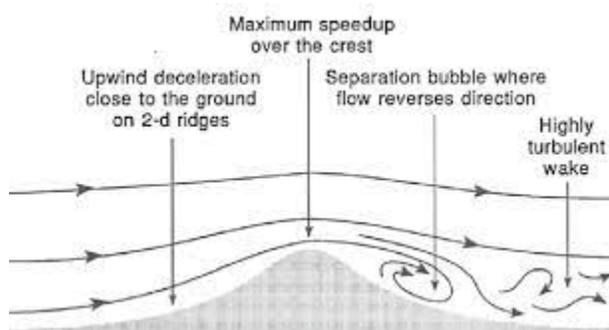


Diagram provided by Ryse

Steep access via a track to the site is challenging and the turbine location is also on a slope.

The estimated cost for installing an E-5 5.5kW turbine at this site was around £45,000 plus VAT. The quote included the supply of cabling but excluded trenching and cable laying.

After further discussion and reflection, the owner decided against the wind turbine compared to an option (also quoted by Ryse Energy) of a 4.5 kWp ground mounted solar plus 19.kWh battery storage at an estimated price of ~£22,000.

Site 2 - Farm

NOABL gave a low average annual wind speed of 3.8 m/s for this site. GWA gave a much higher average wind speed of 6.08 m/s.

The site offers a good installation spot centred in a field clear of any nearby obstructions. 240 m of cabling would be required to reach the grid

connection but costs could be reduced by the farmer doing their own trench and cable laying.

Access may be challenging as the only route to the site is a long, single track road. This site already has 8kW of solar on a single-phase system, the DNO may stipulate upgrades or that some export limitations are put in place.

After due consideration, the owner responded that he found the exercise very useful but decided not to pursue the opportunity because the likely ROI at a probable installation cost of ~£40k plus wasn't sufficiently attractive in offsetting his property's energy costs.

Site 3 - Farm

NOABL gave a low average annual wind speed of 3.7m/s for this site but, again, the GWA gave a much higher average wind speed of 7.25 m/s.

This farm has holiday accommodation on site, extensive PV panels and a heat pump installation. It had the highest annual energy consumption of the 3 properties studied (85,000 kWh/year). The owner is in the process of exploring a new leisure business facility open to the public on the site. Ryse reckoned that, if and when this new facility is realised, then its energy consumption could probably merit the larger G-11 turbine which generates up to 13kW with a 13m diameter, a minimum height of 15m and a 3.0 m/s start up speed. The approximate cost for installation might be in the region of £80k.

The recommended site for such a turbine is ~300m distance from the main property at a high point in the middle of an open field to keep it clear of other farm properties and neighbourhood buildings. It would need a direct ~350m cable link to the new proposed facility.

The owner of this site has not yet made a decision about going ahead with plans for installing a G-11 turbine. It will likely be contingent on the plans for the new leisure facility.

Conclusions

The study achieved its first objective of learning about the significant characteristics and challenges in assessing whether a micro turbine installation makes sense for any particular site or business. In particular:-

1. The variability of the national wind speed estimates mean that it's risky creating meaningful ROI estimates of annual electricity generation from a single turbine. It seems that the only way to reduce the risk is to measure on site wind speed measurement in the precise proposed location for a prolonged period.
2. Even given an average wind speed above 4 or 5 m/s, generation is highly sensitive to local turbulence from nearby trees, buildings, hedges or hill ridges.
3. The ROI of a single turbine only really makes sense if the property is already a high enough electricity consumer to make use of all the energy generated by the turbine with the aid of large battery storage.

Unfortunately, as none of the 3 sites either definitely decided on or were ready to take the next steps of applying to the National Park for planning, we haven't (as yet) been able to generate a viable case study to follow through the planning, installation, operation and actual ROI .

We have noted that far more farms in West Wales have single pole micro turbines. This could be because they are often dairy farms with much higher electricity use than the mainly sheep and cattle farms local to here. According to [government statistics](#), dairy, poultry and horticulture are the biggest users of electricity. The West Wales terrain is also much more open with less hilly terrain.

We'd like to thank Ryse Energy and our 3 property owners for participating in this research.