HUMSHAUGH NET ZERO

ASSESSMENT OF OPPORTUNITIES TO DEPLOY WIND ENERGY
Stage 1 Report

THE ENERGY WORKSHOP 2020

DECEMBER 2020

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1 Introduction

1.1 Background

This report has been commissioned by Humshaugh Net Zero who wish to identify and assess opportunities to site wind energy projects within and potentially in the vicinity of the Parish.

The report represents the first phase of a two-part exercise which seeks to initially areas where wind projects of various scales could potentially be sited through the identification of technical/economic, environmental and planning constraints.

The report also falls naturally into two parts, with the first part seeking to identify development constraints to, and potential opportunities for deployment. The second part assesses the relatively extensive planning policy framework as it relates to Humshaugh, which determines the likelihood of particular development options receiving planning consent. Opportunities for the local community to influence the future deployment of community energy schemes through the Neighbourhood Plan process are also described.

1.2 Local Context

To provide some useful local context for the decarbonisation target, there is a wealth of useful data in the "Humshaugh Carbon Footprint Household Survey 2020 Summary Report". The following table from the Report relates to current (2020) electricity consumption within the Parish:

Estimated Electricity Consumption 2020		
Power	1,375,233	kWh pa
Heat	96,694	kWh pa
BEV	9,497	kWh pa
Total	**1 ,681,425**	**kWh pa**

Table 1

Assuming, however, that the electrification of heat through, for example, heat pump technology and the electrification of transport via battery and fuel cell electric vehicles ramps up in response to Government Policy drivers, Humshaugh's electricity consumption in 2050 is likely to resemble the figures in the table below:

Estimated Electricity Consumption 2050		
Power	1,375,233	kWh pa
Heat	928,631	kWh pa
BEV	1,190,026	kWh pa
FCEV	1,000,987	kWh pa
Total	**4,494,877**	**kWh pa**

Table 2

The increase in electricity consumption from 1,681,425kWh per annum in 2020 to circa 4,494,877 by 2050 represents a threefold increase, a figure likely to be replicated across the UK.

1.3 Decarbonisation through wind generation:

As shown above, Humshaugh residents consume circa 1,700,000 kWh of electricity per annum at present. This is forecast to increase to circa 4,500,000 kWh per annum by 2050.

To relate this to actual wind turbine options, of various scales, this would require deployment of the scale set out below:

1.3.1 RYSE G11 wind turbine (Gaia G11)

A G11 turbine, based in a circa 25m tip height, located at Humshaugh, would produce around 22,000 kWh of generation per annum. **77** of these turbines would be required to meet current electrical demand in the parish, and **206** would be required to meet anticipated 2050 demand!

1.3.2 RYSE E60 wind turbine

A RYSE E60 turbine, on the lowest available tip height of just over 25m, would produce circa 120,000 kWh of generation per annum. **15** of these would be required to meet Humshaugh's current electricity demand and **38** would be required to meet the anticipated 2050 figure. It should be noted that the E60 would produce around 145,580 kWh per annum with a circa 40m hub height.

1.3.3 Larger turbines

A larger turbine such as the EWT range of 500kw to 1MW turbines sited at Humshaugh would potentially generate between 1,300,000 and 2,600,000 kWh per annum, meaning that a single turbine would generate enough power to supply Humshaugh at present, with spare generation, while two machines would more than meet 2050 demand, potentially supplying a neighbouring community as well.

WT Model	Hub Height(m)	Annual Production (kWh)	Turbines needed to meet 2020demand	Turbines needed to meet 2050 Demand
G11	20	21,861	77	206
G11	25	27,502	62	164
G11	33	32,731	52	138
E60	25	119,121	15	38
E60	33	145,580	12	31
EWT	80 to 100 approx	1,300,000 – 2,600,000	0.8	2

Table 3

2 HNZ Project Plan

As requested by HNZ, the project falls into two stages. This report represents **Stage 1** of the exercise and presents the findings of a preliminary desktop study of the feasibility of installing wind turbines between circa 5kw and 2MW within or close the Parish. The exercise has sought to assess the likely constraints affecting the deployment of wind energy in the Parish and has identifies areas within which it may be possible to site turbines of various sizes.

An indication of the potential costs of several deployment scenarios has also been provided, based on anticipated grid costs and the predicted wind resource.

The Stage 1 part of the exercise provides an indication of the range of specific issues which will need to be assessed in order to progress with any subsequent planning applications for wind turbines

It has also assessed the current planning policy environment in relation to Humshaugh and the surrounding area and identifies how potential development can be sited and designed to accord with extant and emerging policy, while also identifying opportunities, chiefly through the Neighbourhood Plan preparation process, to open up wider deployment opportunities, potentially outwith the Parish.

It should be noted that the emerging Northumberland Local Plan will, on its imminent adoption, be the prime 'material consideration' in the consideration by the Council of any planning applications for wind energy development. It is anticipated that the Local Plan will include the majority of Humshaugh Parish within an area where it is considered that wind energy proposals with a tip height of up to 25m will potentially be acceptable, but not taller turbines. The local community does, however, have the opportunity to identify locations for larger turbines and to then designate these as part of a Neighbourhood Plan. Within the parish this appears to be the only currently available route to securing planning consent for larger wind turbines.

3 Constraint Plotting:

3.1 Wind Resource

An estimation of the potential wind resource in Humshaugh can be obtained by accessing the former UK Department of Trade and Industry database of average wind speed data for every 1km grid square in the country, referred to as the NOABL database. The database no longer appears on what is now the BEIS website, but a version of it can still be accessed via an organisation named Renew-Reuse-Recycle (click here for NOABL database). This data is estimated rather than measured, and takes no account of local topographical and built features at the sub 1km scale, which can be locally significant.

Nonetheless, the database still provides a useful indicative guide to likely annual average wind speeds in a given location.

In the identified locations within Humshaugh (Figure 1) where it may be feasible to erect larger wind turbines, the estimated (NOABL) wind speeds are calculated to be around 5.8 to 6 m/s at a height of 45m. While such wind speeds are on the low speed, they would not preclude the installation of wind turbine typed engineered for lower wind speed sites, which generally have larger rotors on taller towers.

Ryse have taken these predicted wind speeds into account in calculating predicted yields in relation to some smaller scale turbines as set out in the report and Appendix 1

3.2 Larger Scale Wind Turbines

Key to the identification of potential locations for wind turbines of all scales is the need to safeguard residential amenity from potential effects, primarily relating to noise and visual impacts. Generally in quiet rural locations, such as Humshaugh, large wind turbines of circa 250kW and above, equating to tip heights of around 60m and above, should be sited at least 500m from residential properties to ensure compliance with noise and shadow-flicker guidance.

With regard to smaller turbines in the 15 to 60kw range, separation distances can be reduced to potentially 50m although this is very site-specific. Interested properties, i.e those occupied by the owners of turbines, can be located closer to turbines as potential noise effects etc are considered to be less of an issue for those who own and control their own wind projects.

Wind turbines should also be sited a distance equivalent to their tip height plus 10% from roads, overhead powerlines and other sensitive infrastructure.

There are three areas in Humshaugh which lie over 500m from residential properties and which could, therefore, potentially accommodate larger wind turbines, of circa 0.5 to 2 Megawatts in installed capacity. These three areas are shown outlined in red on the plan below. The pursuit of any such development in these areas is clearly reliant on landowner support and if this is not forthcoming, there would be no potential to site larger turbines within Humshaugh. This potentially significant barrier to deployment should be determined as a priority.

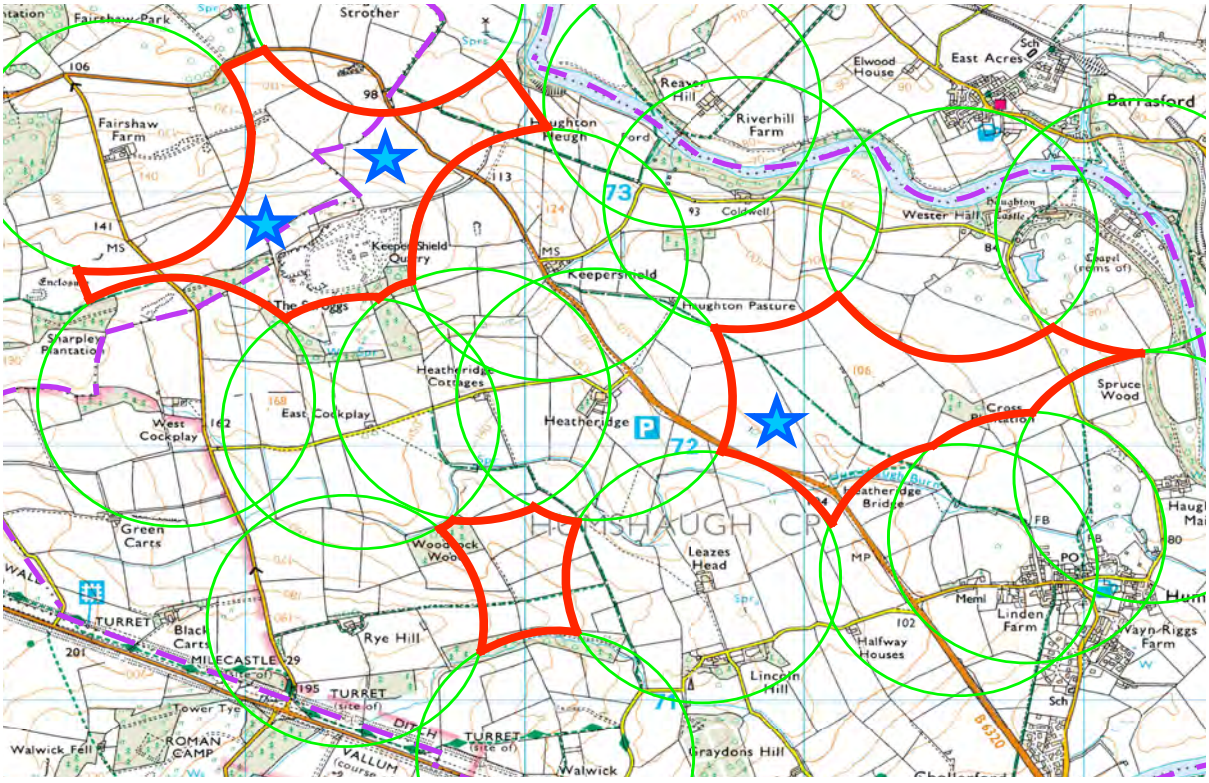


Figure 1

Further constraints include the potential landscape and visual effects of large turbines in or near the Parish, principally on the Hadrian's Wall World Heritage Site or the Northumberland National Park. The assessment of such landscape and visual effects should be undertaken on a case-by-case basis.

The blue stars illustrate potential turbine locations which seek to avoid roads and public rights of way, as well as existing woodland. The north-eastern area extends beyond the Parish boundary and the southern area is considered to be too close to the Hadrian's Wall World Heritage Site to be suitable for a larger scale turbine.

Another option worth exploring further would be to site larger turbines outwith the Parish in a more 'remote' location with a better wind resource. If such a site could be identified in proximity to the existing large wind farms at Green Rigg or Ray, then the planning and technical constraints would be significantly reduced. This would require cooperation with the relevant Parish Councils, in this case Chollerton and/or Bavington,

As mentioned earlier, however, there is currently no route to planning consent for turbines of this scale in the above areas, in the absence of enabling policies in the Draft Northumberland Local Plan, or a Local Neighbourhood Plan.

3.2.1 Aviation

It is likely that large wind turbines located in Humshaugh would be detectable by some or all of the military air traffic control and training radars at Spadeadam, Deadwater Fell and Great Dun Fell, and possibly by the Air Defence Radar at Brizlee Wood near Alnwick. This may result in an objection to any planning application by the MOD, although it is emphasised that the MOD only accurately assess the operational impacts of such developments when they are formally consulted on planning applications by the planning authority.

It is not anticipated that wind development s of the scale proposed would have any significant effect on radar systems operated by Newcastle international Airport or National Air Traffic Services en-route Limited.

The MOD typically expresses concerns with regard to wind turbine developments as wind turbines can create radar returns mimicking those of aircraft, and excessive wind turbine proliferation within a specific locality can, therefore, result in an unacceptable degradation in the operational integrity of affected radars as the latter.

The MOD may also have concerns with regard to low flying, which takes place within and around the Spadeadam ranges, which is likely to result in requests that any consented wind turbines above a certain height are equipped with aviation warning lights although these can utilise the infrared spectrum reducing their visual impact.

Whether or not the operational impact of a development is deemed to be acceptable or unacceptable by the MOD is dependent on a variety of constraints including, but not limited to, the number of other actual and potential turbine developments in the vicinity at that time.

It should be noted that the developers of the large Green Rigg and Ray wind farms to the north in Bavington Parish both overcame aviation objections with regard to significantly larger projects. With reference to the suggested co-location referred to earlier, a project sited in

close relationship to these existing schemes would probably benefit from extant measures to address aviation issues in relation to these operating schemes.

3.3 Smaller turbines:

The emerging Northumberland Development Plan includes allocated areas where wind turbines up to 25m in height are potentially acceptable (Policy REN2). An extract from the Plan's online interactive map is reproduced below:

Figure 2

As can be seen the identified area washes over the majority of the Parish with the principal exceptions of settlements, the immediate designated parts of the Roman Wall and Public Rights of Way. It is interesting to note that the allocation does not seem to include any buffer along the line of the Wall, suggesting that turbines up to 25m in tip could potentially be acceptable just to the north of the wall ditch or just to the south of the Vallum, although this is unlikely in practice.

The emerging plan also identified areas where turbines up to 40m may be acceptable (Policy REN20). No parts of Humshaugh are included but areas to the North in Chollerton Parish are.

The deployment of turbines of a scale compatible with the emerging Development Plan would still need to be sited at an appropriate distance from houses, with separation distances of around 50 to 100m being required according to turbine type.

3.4 Case Studies

TEW have worked with RYSE Energy to generate some Energy Resource Assessments in relation to the potential siting of turbines from their product range in Humshaugh, with the

assessments being based on the location of turbines within the areas outlined in red on Figure 1. These are reproduced in full as Appendix 1.

With regard to the G-11 Turbine, based on an 18M Tower and a 6.5M Blade Length to deliver a tip height of 24.5M, and to therefore comply with Policy REN2 in the emerging Development Plan, the estimated annual energy production per turbine would be 28,548kWh.

With regard to the larger E-20 Turbine, based on an 18M Tower and a 4.5M Blade Length, giving a tip height of 22.5M, again therefore according with Policy REN2, the estimated annual energy production per turbine is 33,760kWh.

Finally, with regard to the E-60 Turbine, again based on an 18M Tower but with a 7.4M Blade Length and a total tip height of 25.4M, the estimated annual energy production per turbine is 124, 396kWh. It should be noted that the output of an E60 on a taller tower, to give a tip height of up to 40m would be considerably greater. At present the closest identified areas in the Local Plan which could accommodate turbines up to 40m are in Chollerton Parish to the North.

The predicted generation figures provided by Ryse would be significantly higher if the modelled turbines, particularly the E60, were not restricted to a circa 25m tip height.

RYSE have also provided some useful information relating to the potential co-locating of Solar PV with wind turbines in a hybrid configuration. RYSE calculate that a 250kW installation comprising of 340Wp panels with 735 to be installed on a ground mount covering 1,176m2 of surface area would have an estimated Annual Energy Production of 225,660 kWh AC Output. Such co-location is clearly worth investigating further.

Decentralized power can also be installed with rooftop solar on individual buildings within the Parish Councill area to minimise the demand from a centralised facility.

4 Planning policy

The first part of this report has focussed on both the physical and technical issues which relate to the ability to site wind energy developments in Humshaugh. This second section now focusses on the National and Local planning policy framework in relation to wind energy. The planning framework has a major impact on project delivery as it sets very strict criteria as to what types of wind energy scheme are potentially acceptable in particular areas.

4.1 National Policy

National planning policy in England is currently set out through the following documents:

- National Planning Policy Framework 2019 (NPPF)
- National Policy Statements

In addition, Written Ministerial Statements further clarify and set policy, with such a statement dating from 2015 having a significant influence on planning policy in relation to onshore wind in England.

This section initially seeks to provide an overview of the relevant parts of the National Planning Policy Framework (NPPF), as updated in 2019, explaining how plans to develop wind energy in Humshaugh should be considered in this context. These focus on:

- the extent to which such development is consistent with Government policies for conserving and enhancing the natural environment (NPPF Chapter 15);
- the extent to which such development is consistent with Government policies relating to noise (NPPF Chapter 15, para 180);
- the extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change (NPPF Chapter 14);
- the extent to which the proposed development is consistent with Government policies for supporting Economic Development; and
- the extent to which the proposed development is consistent with the Department's amended online guidance on renewable and low carbon energy;

4.2 Written Ministerial Statements

4.2.1 The Written Ministerial Statement of June 2015

The Written Ministerial Statement (WMS) on local planning was published by the Secretary of State for Communities and Local Government on 18 June 2015 and is a material consideration in the determination of planning applications for all wind energy proposals in England.

The WMS states that:

"When determining planning applications for wind energy development involving one or more wind turbines, local planning authorities should only grant planning permission if:

- *the development site is in an area identified as suitable for wind energy development in a local or neighbourhood plan; and*
- *following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.*

In applying these new considerations, suitable areas for wind energy development will need to have been allocated clearly in a local or neighbourhood plan. Maps showing the wind resource as favourable to wind turbines, or similar, will not be sufficient. Whether a proposal has the backing of the affected local community is a planning judgement for the local planning authority.

Where a valid planning application for a wind energy development has already been submitted to a local planning authority and the development plan does not identify suitable sites, the following transitional provision applies. In such instances, local planning authorities can find the proposal acceptable if, following consultation, they are satisfied it has addressed the planning impacts identified by affected local communities and therefore has their backing."

With regard to the stated requirement to identify areas suitable for wind energy development in Local and Neighbourhood Plans, the emerging Northumberland Local Plan, under Policy REN 2, does, as highlighted earlier, identify areas as suitable for wind energy development. In Humshaugh this relates to turbines that are up to 25 metres in height, and turbines of this scale are, therefore, supported in principle by the emerging plan.

4.3 The Emerging Northumberland Local Plan

Policies **REN1** and **REN2** in the emerging Northumberland Local Plan are highly relevant to any proposals to develop wind energy proposals in Humshaugh. As stated, these policies limit wind development within and around Humshaugh to turbines with a maximum tip height of 25m, although there is a route to delivering taller turbines if sites can be identified and approved through Neighbourhood Plans, a route also identified in the WMS.

Policy **REN 1**: Renewable and low carbon energy and associated energy storage states that:

1. *Proposals for renewable energy and low carbon energy development will be supported including where decentralised, renewable or low carbon energy supply systems are to be used to supply energy to a development.*
2. *Proposals for energy storage units associated with a proposed or an existing renewable energy and low carbon energy development will be supported where:*
    1. *they will improve the efficiency of the development; and*
    2. *it can be demonstrated that the effects of the proposal, individually and cumulatively, are acceptable or can be made acceptable with regard to the criteria under part 3 of this policy.*
3. *Applications will be supported where it has been demonstrated that the environmental, social and economic effects of the proposal, individually and cumulatively, are acceptable or can be made acceptable. In considering applications, appropriate weight will be given to the following:*

    a. *Landscape character and sensitivity and the sensitivity of visual receptors;*
    b. *The special qualities and the statutory purposes of the Northumberland National Park, the North Pennines Area of Outstanding Natural Beauty and the Northumberland Coast Area of Outstanding Natural Beauty;*

c. *Internationally, nationally and locally designated nature conservation and geological sites and features, and functionally linked land, and protected habitats and species;*
d. *Hadrian's Wall World Heritage Site and other internationally, nationally and locally designated heritage assets and their settings and non-designated heritage assets;*
e. *Air, and ground and surface water quality;*
f. *Hydrology, water supply and any associated flood risk;*
g. *Highways and traffic flow, transport networks, Public Rights of Way and non-motorised users, including the effects upon well-used recreational routes such as the National Trails, long distance routes and the national cycle network;*
h. *Amenity due to noise, odour, dust, vibration or visual impact;*
i. *The openness of the Green Belt and whether very special circumstances have been demonstrated to justify otherwise inappropriate development;*
j. *The impact of any new grid connection lines and any ancillary infrastructure and buildings associated with the development; and*
k. *The impact on the safety of aviation operations and navigational systems, with proposals within Aerodrome Safeguarding Areas giving consideration the requirements of Policy TRA 7.*

4. *Applications will not be supported unless an assessment of cumulative impacts has been undertaken, and taking account of any mitigation measures, the impacts are found to be acceptable.*
5. *Where relevant, applications will not be supported unless appropriate provision is made for decommissioning and removal of temporary operations once they have ceased.*
6. *Positive weight will be given to proposals where there is clear evidence of them being community-led.*

The emerging plan recognises that onshore wind energy is now an established and common technology for generating renewable energy in the UK. The availability of this technology for deployment, the previous availability of financial incentives and the presence of a wind resource in Northumberland has resulted in considerable development pressure for onshore wind turbine development in the County in recent years.

Again, the plan recognises the requirement in the WMS and NPPG that potentially suitable areas for wind energy development will need to have been clearly identified in a Local Plan or Neighbourhood Plan. To identify suitable areas in Northumberland an exercise was undertaken to map identifiable environmental and planning constraints to wind turbine development. This included mapping constraints relating to residential amenity, physical infrastructure, designations relating to nature conservation, geology and the historic environment, landscape sensitivity, natural features, Green Belt and wind speed.

Landscape sensitivity refers to the extent to which a particular landscape character type or area is vulnerable to change due to potentially significant effects on its character, including views, or overall change of landscape character type. It is based on a range of considerations including the physical nature of the landscape, visual, perceptual, qualitative, historic and

cultural, and contextual considerations including the cumulative effects with other development. The mapping exercise which identified potential sites in the Local Plan was informed by a study that assessed the relative sensitivity of each of the Landscape Character Areas in Northumberland to wind energy development using the following five different wind turbine typologies, which are based on their height of the turbine to the tip of the blade:

- Under 25 metres;
- 26 to 40 metres;
- 41 to 65 metres;
- 66 to 100 metres; and 101 to 135 metres.

For each character area the assessment categorised the sensitivity to each of the above wind turbine typologies as either 'high', 'moderate-high', 'moderate', 'low-moderate' or 'low'. Where a character area was assessed as having a 'high' landscape sensitivity or a 'moderate-high' landscape sensitivity to a particular scale of wind turbine development, those areas are considered to be ‘unsuitable’ or ‘unsuitable in principle’, respectively, to wind energy development and therefore a strategic constraint to development in policy terms.

The result of the mapping exercise was the identification of areas at a landscape character area scale where there are identified strategic constraints to wind energy development of the heights of turbine considered. Areas without identified constraints at this strategic scale were, therefore, potentially suitable for wind turbine development of the specified height and are shown on the Policies Map. Potentially suitable areas have been identified across relatively large parts of Northumberland for smaller wind turbines with a height of less than 25 metres , including Humshaugh, and 26 to 40 metres in height including an area to the North in Chollerton Parish.

The Council’s mapping exercise concluded that there are no *significant sized* areas in the County without identifiable constraints to larger scale wind turbines over 40 metres in height in this context, and no such areas have been identified as such in the Local Plan. The plan does state that proposals for t larger scale wind turbines would potentially be permitted where it involves the repowering of existing wind turbines and where the impacts of such development, including cumulative effects, are considered acceptable.

4.3.1 Assessing proposals for onshore wind energy development, including impacts on affected local communities

Policy REN 2 reflects NPPF, in stating that new wind turbine development proposals, except in the case of proposals for repowering, should be located within areas identified as being potentially suitable for wind energy development, while also reiterating the requirement to fully address the planning impacts identified by affected local communities.

As described above, areas identified as potentially suitable for wind turbine development in Northumberland are shown on the Policies Map but may additionally be identified in neighbourhood plans in the future. Being located within a potentially suitable area is the first consideration for any proposal involving one or more wind turbines but the criteria in Policy REN 1 and Policy REN 2 must also be addressed as well as any other material considerations.

4.4 Public Consultation

In relation to wind turbine proposals over 15 metres in height to the tip of the blade, there is a requirement for the applicant to undertake consultation with the local community before submitting a planning application. The circumstances where pre-application consultation is required, and the nature of the requirements, is set out in the Council's planning application validation checklist.

The required consultation exercise should be proportionate to the scale of the proposed development and should identify the planning impacts that may affect local communities. The planning impacts are generally those identified in Policy REN1 and Policy REN 2, but may also extend to other relevant policies in the plan. In liaison with the local community, applicants should address concerns and seek to mitigate any impacts. If such impacts can be addressed to a point at which they can be considered to be 'acceptable' then this is the basis for demonstrating community backing. Planning Practice Guidance is clear that whether a proposal has community backing is a major planning consideration.

Policy REN 2 recognises that the NPPF takes a different policy approach to the repowering of existing wind turbines. Proposals for the repowering of wind turbines do not need to be located within an area identified as suitable for wind turbine development, as the principle of acceptability for the use has already been established, with applications for the repowering of existing wind turbines being assessed against the criteria in Policy REN 1 and Policy REN 2, and against other policies in the plan.

The plan also states that across Northumberland a significant amount of wind turbine development has either already taken place or been consented therefore cumulative effects are a key issue, and this is a matter that will require careful consideration. In considering cumulative effects, account should be taken of existing development, including development under construction; approved development awaiting implementation; and proposals submitted as planning applications awaiting determination.

Policy REN 2 relates specifically to onshore wind energy development, and states that:

1. *Proposals for the development of one or more wind turbines, except for proposals for the repowering of existing wind turbines, will not be permitted unless:*
    1. *The development site is in area identified as potentially suitable for wind energy development of the same scale as that proposed, as identified on the Local Plan Policies Map or in a Neighbourhood Plan; and*
    2. *Following consultation it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and the proposal has their backing.*
2. *Where the criteria in Part 1 are met, proposals for the development of one or more wind turbines will be supported where the applicant can demonstrate that the planning impacts, both individually and cumulatively, are, or can be made, acceptable. The planning impacts will be assessed against the criteria in Policy REN 1 and the following criteria:*

    a. *There is sufficient separation from the proposed wind turbines to protect residential amenity as a result of noise, shadow flicker and visual intrusion. To protect visual amenity, there will be a presumption against development within a distance of six times the turbine blade tip height of residential properties unless it can be demonstrated that the presence of turbines would not have an unacceptable impact upon living conditions;*

b. *The proposals have addressed any potential adverse effects on the safety of aviation operations and navigational systems;*
c. *Potential interference to television and/or radio reception and information and telecommunications systems will be avoided and/or mitigated;*
d. *The proposed site access arrangements and access routes will be suitable for the construction phase, including the delivery of turbine components and construction materials, the operational phase, and the decommissioning of the proposed wind farm;*
e. *The proposed wind turbines are located appropriate distances from highways, and railway lines to provide a safe topple distance. A minimum topple distance of the turbine height plus 10% is recommended as a starting point;*
f. *Provision has been made for the satisfactory decommissioning of the turbines and associated infrastructure once the operations have ceased and the site can be restored to a quality of at least its original condition;*
g. *The proposal will not result in unacceptable harm to the character of the landscape and the landscape has capacity to accommodate the proposed development;*
h. *There are no unacceptable adverse effects on long and medium range views to and from sensitive landscapes, such as the Cheviot Hills, Northumberland Sandstone Hills, Northumberland Coast AONB, North Pennines AONB, the Northumberland National Park and the Hadrian's Wall World Heritage Site, and lines of sight between iconic landscape and heritage sites and features, particularly where one or more feature is within the Northumberland Coast AONB, the North Pennines AONB or the adjoining Northumberland National Park;*
i. *There are no unacceptable adverse effects on sensitive or well used viewpoints; and*
j. *There are no unacceptable adverse effects on important recognised outlooks and views from or to heritage assets where these are predominantly unaffected by harmful visual intrusion, taking into account the significance of the heritage asset and its setting.*

4.5 Local Neighbourhood plans:

Neighbourhood planning was introduced through the Localism Act in 2011 and gives communities the opportunity to shape and define how their area should grow and change in the future. In Northumberland, the process is led by parish councils. There is a significant volume of material on the Northumberland Council website to assist with the process, which is summarised below in relation to Humshaugh.

There are two main parts to neighbourhood planning:

1. Neighbourhood development plans;
2. Neighbourhood development orders (including community right to build orders).

These can be combined or used individually.

4.5.1 Neighbourhood development plans (NDPs)

These are usually simply referred to as 'neighbourhood plans'. In Northumberland, they are published by parish or town councils and set out planning policies for the development and use of land in their area, such as identifying sites or renewable energy projects. These can be either general or site-specific policies and cannot block development already agreed through the Northumberland Local Plan.

Once a neighbourhood plan is in force, planning decisions for that area must be taken in accordance with its policies, as well as those set out in the Northumberland Local Plan.

Neighbourhood development orders (NDOs)

These are prepared in a similar way to neighbourhood plans. They grant permission for development without the need for further planning applications. They can grant planning permission for an individual development or for types of development across a whole neighbourhood area. These could include:

- major development schemes, (such as wind turbines)
- new houses
- a new shop or pub
- permitted extensions of a certain size or type

A community right to build order is a special kind of NDO, granting planning permission for small, community development schemes, such as housing or new community facilities which, again, could include renewable energy related proposals.

There are five main stages in creating an NDP or NDO:

Stage one: area designation
Neighbourhood planning activity can only take place in areas specifically designated 'neighbourhood areas'. The Parish Council must submit an **area designation application** to the County Council.

Stage two: preparing and the NDP or NDO
The way in which NDPs / NDOs are prepared will be decided by the relevant parish council. In most cases, a steering group will be established to lead preparation of a plan or order.

For an NDP, this stage would typically involve: gathering information about the neighbourhood area, and engaging with the community to identify local aspirations and priorities; identifying a

vision for the neighbourhood area; setting out a clear purpose for a plan including identifying or objectives to be achieved through the plan; drafting planning policies to help deliver the objectives of the plan; and seeking a screening from the County Council to determine if the plan would require strategic environmental assessment and habitats regulations assessment.

For an NDO, the process would be fairly similar and would involve: gathering information about the neighbourhood area, and engaging with the community to identify whether there is a need for an NDO and the kinds of development that it should permit; drafting an NDO proposal; and seeking a screening from the County Council to determine if the order would require environmental impact assessment.

Once prepared, the draft plan or order must be subject to a six-week period of consultation (Regulation 14). This will include consulting national bodies as set out in the Neighbourhood Planning Regulations.

Following the consultation period, representations must be considered, and any amendments thought to be necessary must be made to the plan or order before it is submitted to the County Council.

Stage three: submit the plan or order
Once the plan or order has been submitted to the County Council, we will check it meets legal requirements.

The submission must include:

- a map of the area
- the draft plan
- a statement outlining how the proposal meets the 'basic conditions' (see below)
- a consultation statement which must set out who was consulted and how, the issues raised and describe how they were resolved

This information will be publicised for a minimum of six weeks and any comments submitted will be sent directly to the independent examiner. The basic conditions of the plan are that it:

- must have regard to national planning policy and guidance
- must be in general conformity with strategic policies in the development plan and contribute to sustainable development
- must be compatible with EU obligations and human rights requirements

Stage four: independent examination
The independent examination will consider whether the plan or order meets the basic conditions (set out in paragraph 8(2) of Schedule 4B to the Town and Country Planning Act 1990). They will produce a report detailing their findings and make recommendations about the draft plan or order including whether it should be put to referendum in the local area.

Stage five: referendum
The County Council will publish the examiner's report and, where recommended, will organise a local referendum. For the plan or order to be adopted, it must receive majority support from the local community. If more than 50% vote in favour, the County Council must bring it into force.

4.6 Summary

It is clear that the emerging policy framework in the Northumberland Local Plan does not allow the erection of large wind turbines anywhere in the county, with the exception of repowering projects or possibly very small extensions to existing wind farms. In Humshaugh, most of the Parish is considered suitable for turbines up to 25m in height.

If wind energy is to play more than a token part of the move to decarbonise the Parish, then either a very large number of small wind turbines (Up to 25m tip) would be required, with between 15 and 100 turbines being required to supply half of Humshaugh's predicted 2050 electricity demand. The clear alternative is the development of a single large turbine such as an EWT or Enercon machine, which it could be reasonable argued would have a significantly overall impact, simply due to the significantly reduced space it would require in comparison to a very large number of smaller turbines, with a tip height not exceeding 25m.

5 Overall Conclusions

There is clearly a significant opportunity to deploy small scale wind turbines in Humshaugh as the majority of the Parish is considered to be potentially suitable for such schemes, subject to other technical and environmental criteria.

A very significant deployment of such turbines would, however, be required to even come close to meeting a significant of existing and predicted electricity consumption in the Parish, which is considered to be undeliverable in practice given the potential landscape and visual effects of erecting such machines in the required numbers.

The same output and potential delivery of sufficient generation to meet both the current and future electricity requirements of the Parish could, however, be delivered through the deployment of a single large wind turbine with an installed capacity or around two megawatts, or two one megawatt turbines such as those manufactured by EWT, Vensys and Enercon.

There are a limited number of potentially suitable locations for wind turbines of this scale in the Parish, given the need for appropriate separation distances from residential properties.

Wind speeds in the Parish are relatively low in comparison with more elevated areas to the North in Chollerton and Bavington Parishes and the deployment of a turbine in partnership with these neighbouring communities would be a preferred solution in technical terms, particularly if a turbine or turbines could be located in close proximity to existing wind developments of a comparable scale, such as the Green Rigg or Ray wind farms.

To deliver planning consent for a turbine of this scale, or any turbine over 25m in the Parish, the only available route to securing planning consent at present would be through the identification of site (s) through the preparation and adoption of a Local Neighbourhood Plan.

It is strongly recommended that Humshaugh Net Zero should explore this option as a priority, with a view to securing community approval for potential sites for larger turbine, within or outwith the Parish in which a potential Energy-specific Local Neighbourhood Plan would be a collaboration with neighbouring parishes.

Energy Resource Assessment for Humsaugh Parish Council

A study into Wind and Solar resource in multiple locations to determine the possible generation from renewable options

Date	4 December 2020
Revision	1
Reference	Humsaugh Parish
Prepared By	Roneit Punamiya

WIND RESOURCE – G11

SITE DETAILS

Name		Humsaugh Parish Council	
Install Type		G11 turbine (3ph) inc. tower	
Location 1 (red pin, below)		55.048923 , -2.1628685	
Adjusted annual Mean Wind Speed	5.3 m/s	Estimated Annual Energy Production	30,639 kWh
Location 2 (yellow pin, below)		55.046763 , -2.1441418	
Adjusted annual Mean Wind Speed	5.1 m/s	Estimated Annual Energy Production	28,548 kWh
Estimated Project Cost (ex. VAT)*		£TBC	

Site Plan with suggested turbine location (red pin & yellow pin) *Wind distribution rose*

**This assessment has been conducted based on the information available and figures should not be taken as exact. For more accurate information, a site survey will be required.*

WIND RESOURCE – E20

SITE DETAILS

Name		Humsaugh Parish Council	
Install Type		E20 turbine (3ph) inc. tower	
Location 1 (red pin, below)		55.048923 , -2.1628685	
Adjusted annual Mean Wind Speed	5.3 m/s	Estimated Annual Energy Production	36,880 kWh
Location 2 (yellow pin, below)		55.046763 , -2.1441418	
Adjusted annual Mean Wind Speed	5.1 m/s	Estimated Annual Energy Production	33,760 kWh
Estimated Project Cost (ex. VAT)*		£TBC	

Site Plan with suggested turbine location (red pin & yellow pin)

Wind distribution rose

**This assessment has been conducted based on the information available and figures should not be taken as exact. For more accurate information, a site survey will be required.*

WIND RESOURCE – E60

SITE DETAILS

Name		Humsaugh Parish Council	
Install Type		E60 turbine (3ph) inc. tower	
Location 1 (red pin, below)		55.048923 , -2.1628685	
Adjusted annual Mean Wind Speed	5.3 m/s	Estimated Annual Energy Production	134,975 kWh
Location 2 (yellow pin, below)		55.046763 , -2.1441418	
Adjusted annual Mean Wind Speed	5.1 m/s	Estimated Annual Energy Production	124,396 kWh
Estimated Project Cost (ex. VAT)*		£TBC	

Site Plan with suggested turbine location (red pin & yellow pin) *Wind distribution rose*

**This assessment has been conducted based on the information available and figures should not be taken as exact. For more accurate information, a site survey will be required.*

WIND RESOURCE

These calculations have been undertaken by following the guidelines in the UK Business Enterprise and Regulatory Reform (BERR) standard for small wind turbines (formally the Department of Trade and Industry (DTI)). The latest copy may be downloaded from: https://mcscertified.com.

This energy performance estimate is based upon a standardised method using publicly available information and assumes a Rayleigh wind speed distribution. It is given as guidance only and should not be considered to be a guarantee. The energy performance of wind turbine systems is impossible to predict with a high degree of certainty due to the variability in the wind from location to location and from year to year.

For a greater level of certainty, it is recommended that on-site wind speed monitoring is undertaken ideally for at least a year. Note: it may be useful to monitor for shorter periods, especially if the acquired data is then correlated with other sources in order to estimate an annual mean wind speed. A site and hub height specific Met Office Virtual Met Mast dataset could be produced for this site upon request.

ESTIMATED ENERGY CAPTURE

Wind speed varies with time, from nothing on calm days to occasional violent gusts. If the wind speed at a site is recorded over a year, it will be seen to vary about a mean wind speed value. This is the annual mean wind speed (AMWS) and is an indication of how much wind energy is available. In the UK, AMWS could be as low as 4 m/s (9.0 mph) for an inland site to around 8 m/s (18 mph) or higher on the most exposed sites.

The database of wind speeds used by Ryse Energy was developed by the DTI and is called the UK NOABL Windspeed Database. It does, however, have some limitations, and the average wind speed and energy estimates produced from it, are subject to a number of potential inaccuracies:

1. It is based upon a 1 km square grid and depending upon the topology of the area in which the site is located, there can be significant differences between local areas within the 1 km grid.
2. Sites on the top of hills, especially with southwest-facing slopes, could be expected to have a significantly higher AMWS than other sites.
3. The NOABL database does not take account of the impact of "sea breezes", and therefore may significantly under-estimate the AMWS in coastal regions.
4. The NOABL database records are for a height of 10 m, but Ryse has adjusted the expected energy generation to apply to the tower height(s), as a low tower, e.g. 9 m, may be expected to produce less energy than a high tower, e.g. 18 m, but the actual differences, however, are highly dependent upon the local conditions.

Ryse Energy, therefore, cannot accept responsibility for the AMWS and resultant annual energy generation estimates as they are subject to many factors beyond Ryse Energy's control. Any provided estimates should only be used as a general guide to what you might expect at this site.

SOLAR RESOURCE

PROPOSED SOLAR PV SYSTEM

Install Details	
Orientation	South
Size of array	1,180 m^2
Install Type	Ground mounted
Roof Access	N/A
Shading	None

Panel Details	
Panel Type	JA Solar
Panel Rated Power (Wp)	340
Number of Panels*	735
Total Surface Area of Panels**	1,176 m^2
System Rating (Wp)	249,900
Estimated Cost***	**£135,460 (ex. VAT)**

* *A site survey will be required to determine how many panels will fit in the area available.*
** *Based on external dimensions published on the datasheet of the panel listed; excludes spacing between panels.*
*** *The price quoted is an estimate. For an accurate quotation for works, a site visit will be required. This estimate assumes:*

- *Structural report to confirm loadings is provided to Ryse Energy prior to works commencement.*
- *Suitable access and regress including cargo netting and edge protection will be provided by the customer.*
- *Suitable electrical supply is already installed in the building with access to a spare way on the distribution board. This costing doesn't allow for any additional connection works should they be required.*
- *Single/Three-phase connection. Should a single/three-phase connection equipment be required, installation will need to be re-quoted.*
- *Any grid connection costs, should they be applicable, will be paid for by the customer.*
- *Purlins are assumed to be wood, should this be inaccurate the installation will need to be re-quoted with suitable fixings.*
- *A full quotation will be issued upon completion of a full site survey.*

SOLAR RESOURCE

ESTIMATED ANNUAL ELECTRICITY GENERATION

A. Installation Data	
Installed Capacity of PV System - kWp (stc)	250
Orientation of the PV System - Degrees from South	0°
Inclination of System - Degrees from Horizontal	35°
Postcode Region	Location- 9E
B. Calculations	
kWh/kWp (Kk) from MCS Irradiance Datasets	903
Shade Factor (SF)	1.00
Estimated Annual AC Output (kWp x Kk x SF)	**225,660 kWh**

The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the standard MCS procedure and is given as guidance only. It should not be considered as a guarantee of performance.

This system performance calculation has been undertaken using estimated values for array orientation, inclination or shading. Actual performance may be significantly lower or higher if the characteristics of the installed system vary from the estimated values.

GRID CONNECTION (3 PH. SUPPLY ON-SITE)

PV systems rated up to 3.68 kW on single-phase and 11.04 kW on three-phase (up to and including 16 A per phase) can be connected under G98 with only post-notification being required by the District Network Operator (DNO). An application will need to be made to the DNO to determine the costs associated with connecting a 250 kWp solar PV array at your property.

Your MPAN (Meter Point Administration Number) is needed for a DNO application. This is used along with details of the proposed installation to obtain permission to connect the solar PV array to the grid. The MPAN is your unique meter point reference within the electricity system and is typically printed on your electricity bill.

SOLAR RESOURCE

PLANNING PERMISSION

Permitted Development Rights apply to solar PV systems installed onto domestic and non-domestic roofs providing the array does not protrude more than 200 mm above the roofline. For non-domestic installations the array must not be within 1 m of the external edge of the roof. It is recommended that formal confirmation that the solar PV system is classed as Permitted Development is obtained from the Local Planning Authority (LPA) for non-domestic roofs. The LPA should also be consulted if the property is a listed building, within the grounds of a listed building or if the site is designated as a scheduled monument. Additionally, for non-domestic installations in National Parks, Areas of Natural Beauty, conservation areas and World Heritage Sites, the array must not be installed on a roof which fronts a highway

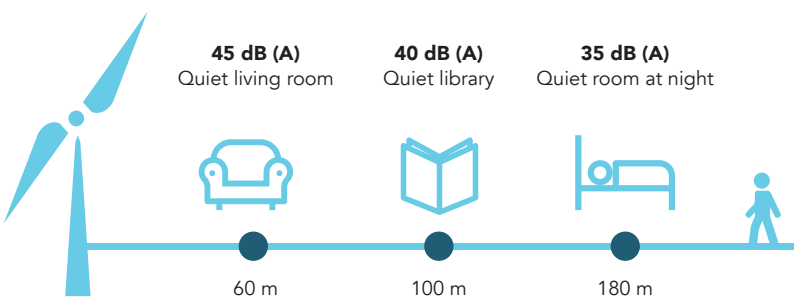
G-11

DATA SHEET

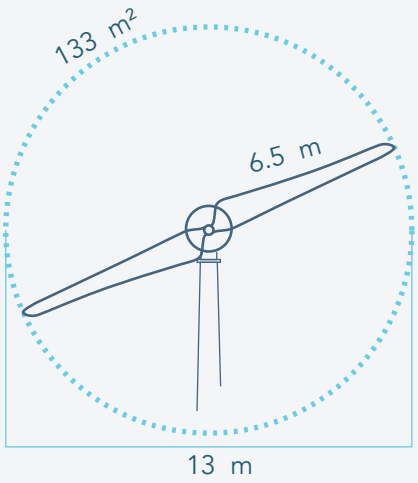
The G-11 is capable of displacing greenhouse gas emissions from 15,000 litres of fuel each year.

GENERATOR	Type	Induction
	Maximum Power	13 kW
	Rated Power	11 kW
ROTOR	Configuration	Horizontal Axis
	No. of Blades	2
	Blade Material	Glass fibre
	Blade Length	6.5 m
	Rotor Diameter	13 m
	Swept Area	133 m^2
	Nominal Rotor Speed	56 rpm
	Pitch/Yaw	Downwind fixed pitch with passive yaw
WIND	Cut-In Speed	3 m/s
	Rated Wind Speed	11 m/s
	Cut-Out Speed	25 m/s
	Survival Speed	52.5 m/s
WEIGHTS	Hub	900 kg
TOWERS	Lattice	15 – 36 m
	Monopole	18 – 27 m
	Tilt-Up	18 – 27 m
DESIGN PARAMETERS	Turbine Design Class	IEC 61400-2 Class III
	Temperature Range	-20° to 50°C
	Lifespan & Servicing	20 years, subject to regular maintenance

NOISE



TECHNICAL PROFILE



CLASS III

PASSIVE REGULATION

MCS APPROVED DATA

SAFETY

- Base Level: Passive stall of blades limits power output.
- Second Level: Electronic control system activates mechanical brake.
- Third Level: Passive centrifugally activated aerodynamic brakes, concealed in the rotor tips, release, spoiling the rotor aerodynamics and subsequently its ability to rotate.

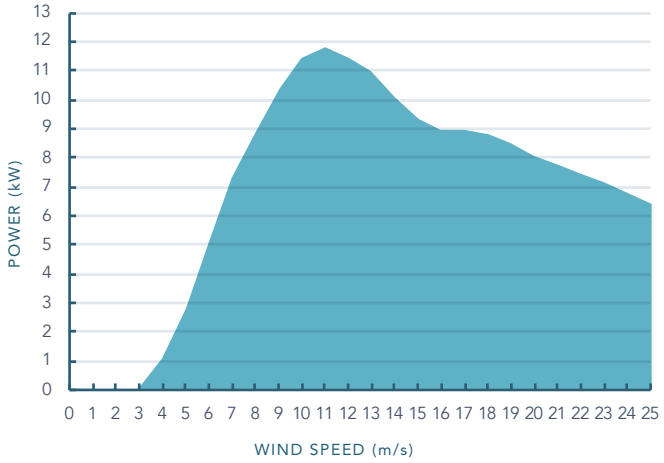
DATA INPUT & MANAGEMENT

- Integrated microprocessor with multiple sensor inputs: wind speed, power, voltages, currents and phase, rpm, vibration and temperature alerts.
- LCD display in control box. Can output to local PC or be monitored remotely via the internet.
- Remote Monitoring: Allows remote monitoring of the wind turbine in order for Ryse to ensure the turbine is operating at its peak performance.

CONSTRUCTION & MAINTENANCE

- Limited plant requirement for installation.
- The bottom of the tower is bolted onto a reinforced concrete base with dimensions 5.2 x 5.2 x 0.6 m. This is set in a 1 m deep hole with a 0.4 m layer of hard-packed earth on top.
- Online store for easy purchase of spare parts & equipment: *ryse.energy/shop*
- Ryse service contract available.

POWER CURVE



ENERGY OUTPUT

Annual Mean Wind Speed (m/s)	Estimated Annual Output (kWh)
4.0	16,220
4.5	21,861
5.0	27,502
5.5	32,731
6.0	37,959
6.5	42,243
7.0	46,527
7.5	49,655

MCS APPROVED DATA

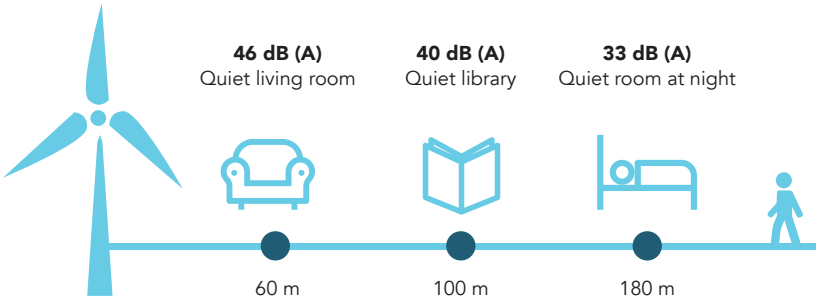
E-20

DATA SHEET

The E-20 is capable of supplying electricity to 13 homes each year.

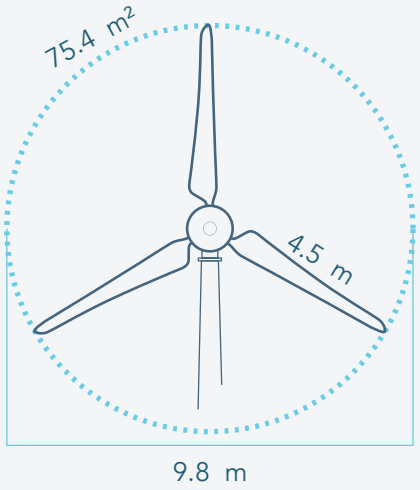
GENERATOR	Type	Permanent Magnet
	Maximum Power	20 kW
	Rated Power	18 kW
ROTOR	Configuration	Horizontal Axis
	No. of Blades	3
	Blade Material	Glass fibre
	Blade Length	4.5 m
	Rotor Diameter	9.8 m
	Swept Area	75.4 m^2
	Nominal Rotor Speed	120 rpm
	Pitch/Yaw	Downwind active pitch with assisted yaw
WIND	Cut-In Speed	2 m/s
	Rated Wind Speed	11 m/s
	Cut-Out Speed	30 m/s
	Survival Speed	70 m/s
WEIGHTS	Nacelle/Rotor	1,000 kg
TOWERS	Lattice	15 – 36 m
	Monopole	18 – 27 m
	Tilt-Up	18 – 27 m
DESIGN PARAMETERS	Turbine Design Class	IEC 61400-2 Class I
	Temperature Range	-20° to 50°C
	Lifespan & Servicing	20 years, subject to regular maintenance

NOISE



Approx. Data

TECHNICAL PROFILE



CLASS I

ACTIVE REGULATION

SAFETY

- Base Level: Active blade pitch control, with 90° of movement, limits power output and can put blades in a total stall position.
- Second Level: Electronic control system activates mechanical brake with shaft lock and electromagnetic induction brake.
- Third Level: Passive springs deploy, putting the turbine blades in a stall position, spoiling the rotor aerodynamics and subsequently its ability to rotate.

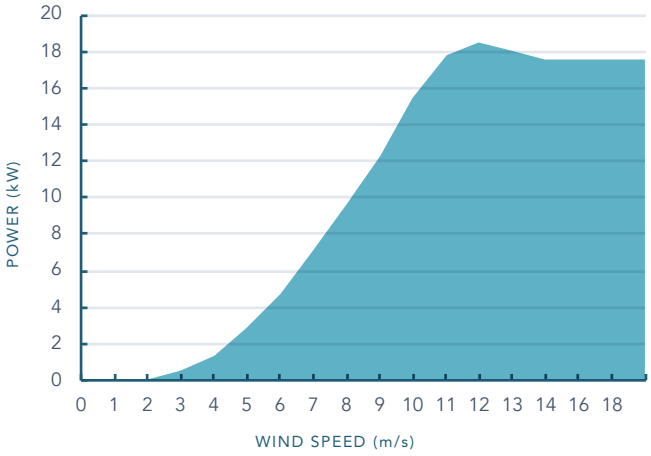
DATA INPUT & MANAGEMENT

- Remote Control: Allows the remote customization of the wind turbine in order for Ryse to provide optimum performance in every site.
- Storm Detection: Intelligent storm detection algorithm and automatic safety lock protect the turbine in the event of dangerous gusts/hurricane weather.
- LCD display in control box. Can output to local PC or be monitored remotely via the internet.

CONSTRUCTION & MAINTENANCE

- Anti-Corrosive Blades: The blades and nacelle are treated with epoxy paint and hermetically sealed. This gives corrosion and saline protection, making the turbine ideal for island, coastal or desert deployments.
- Ryse service contract available.
- Online store for easy purchase of spare parts & equipment: *ryse.energy/shop*

POWER CURVE



ENERGY OUTPUT

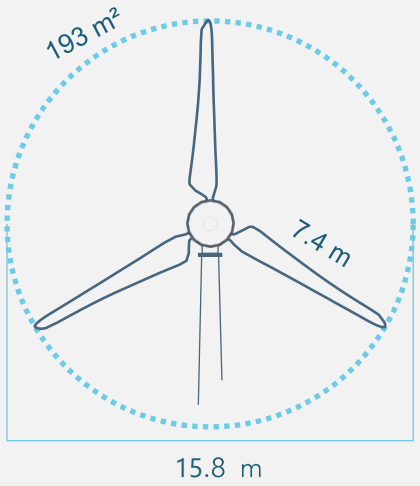
Annual Mean Wind Speed (m/s)	Estimated Annual Output (kWh)
2	4,080
3	10,700
4	20,500
5	32,200
6	47,800
7	64,800
8	81,300
9	95,900
10	107,800

E-60

DATA SHEET

GENERATOR	Type	Permanent Magnet
	Maximum Power	62.5 kW
	Rated Power	60 kW
ROTOR	Configuration	Horizontal Axis
	No. of Blades	3
	Blade Material	Glass fibre
	Blade Length	7.4 m
	Rotor Diameter	15.8 m
	Swept Area	193 m^2
	Nominal Rotor Speed	60 rpm
	Pitch/Yaw	Downwind passive pitch
WIND	Cut-In Speed	2 m/s
	Rated Wind Speed	11 m/s
	Cut-Out Speed	30 m/s
	Survival Speed	59.5 m/s
WEIGHTS	Nacelle/Rotor	6,000 kg
TOWERS	Lattice	18 – 36 m
	Monopole	18 – 27 m
	Tilt-Up	18 – 27 m
DESIGN PARAMETERS	Turbine Design Class	IEC 61400-2 Class II
	Temperature Range	-20° to 50°C
	Lifespan & Servicing	20 years, subject to regular maintenance

TECHNICAL PROFILE



CLASS II

PASSIVE REGULATION

SAFETY

- Base Level: Active blade pitch control, with 90° of movement, limits power output and can put blades in a total stall position.
- Second Level: Electronic control system activates mechanical brake with shaft lock and electromagnetic induction brake.
- Third Level: Passive springs deploy, putting the turbine blades in a stall position, spoiling the rotor aerodynamics and subsequently its ability to rotate.

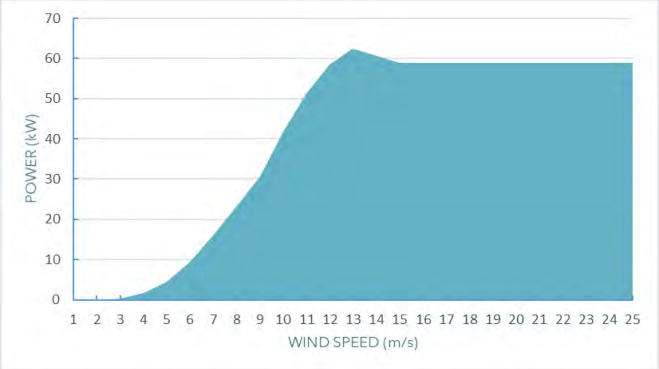
DATA INPUT & MANAGEMENT

- Remote Control: Allows the remote customization of the wind turbine in order for Ryse to provide optimum performance in every site.
- Storm Detection: Intelligent storm detection algorithm and automatic safety lock protect the turbine in the event of dangerous gusts/hurricane weather.
- LCD display in control box. Can output to local PC or be monitored remotely via the internet.

CONSTRUCTION & MAINTENANCE

- Anti-Corrosive Blades: The blades and nacelle are treated with epoxy paint and hermetically sealed. This gives corrosion and saline protection, making the turbine ideal for island, coastal or desert deployments.
- Ryse service contract available.

POWER CURVE*



** Indicative power curve and estimated energy output. Based on ongoing testing.*

ENERGY OUTPUT*

Annual Mean Wind Speed (m/s)	Estimated Annual Output (kWh)
5.0	119,121
5.5	145,580
6.0	171,886
6.5	202,278
7.0	221,466
7.5	243,979
8.0	264,856