

INITIAL FINDINGS ON THE VIABILITY OF A WIND ENERGY PROJECT IN BAYDON

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INTRODUCTION

This report documents the initial findings on the viability of a wind energy project in Baydon, a large village in Marlborough Community Area of Wiltshire Council in the south west region of England. This project has been named Baydon Wind Energy and will be comprised of two 900 kW wind turbines for a total installed capacity of 1.8 MW. A desktop wind site self-assessment was carried out some months ago using a web-based tool^[1] and the result is fairly encouraging. A number of issues relating to change of land use and environmental impact were also looked into, as well as, financial issues.

DESKTOP WIND SITE ASSESSMENT

The desktop wind site assessment revealed the following:-

1. Wind Speed: The average wind speed for the site, based on the old UK Government NAOBL database, is 7 m/s at 45 m above ground level. Renewables First, a specialist renewable energy consultant, claims to observe an error margin in the range of +/- 0.5 m/s. Thus, the wind speed at the site is above, or equal to at a minimum, the recommended average of 6.5 m/s for economic viability of a wind energy project which is really good. In addition, it is very helpful to site a wind turbine on elevated ground such as a hill. The site is on the top of a moderately hilly terrain and Baydon itself lies on highland which is good and probably the reason for the high average wind speed at the site. It is also advantageous if there are no obstructions such as trees and buildings as these would cause turbulence which negatively impacts power output and subsequently the level of income realised. Power output from a wind turbine is proportional to the cube of the wind speed so it is critical to have a clear area for harvesting wind energy. The site is pasture land so there would be no issues

1 [Renewables First Desktop Wind Site Assessment Tool](#)

with turbulence as may be observed in woodland for instance and there are no buildings in the vicinity either which is good.

2. Residential Properties: Nearby residential properties are between 1 and 2 km away from the site which is good. The recommended minimum distance is 0.4 km to ensure that the impact of noise and closeness of structure are at a minimum. Modern wind turbines are very quiet especially those that use direct drive technology in place of gearbox. Hence, the site is very much suitable for wind turbine installation.
3. Turbine Selection and ROI: The recommended scale of wind turbine for this project is 900 kW considering the wind speed and proximity to residential areas. This recommendation was made by Renewables First. The specific wind turbine selected is the EWT DW61-900kW and is the latest model of EWT wind turbines introduced recently into the market.^[2] It features direct drive technology meaning that it is not noisy compared to gearbox technology. The rotor diameter is 61 m which is the longest length available in EWT wind turbine range. This significantly increases power output because power output is proportional to the length of the blade in a ratio of 1:4. The estimated return on investment for a wind farm using this turbine is 24% as calculated by Renewables First. This is based on inputs from annual gross income, project cost and annual operations and maintenance (O&M) cost. The annual gross income was given as £260,000 which was calculated from a total value of 10.46 p/kWh made up of Feed-in Tariff effective from 8 February 2016 (5.46 p/kWh) and export price (5 p/kWh), while ignoring any offset value. The project cost was given as £1.4m per wind turbine although this may have increased to £1.5m due to increases in prices for specialist consulting services. The annual O&M cost is in the region of £50,000 or more per wind turbine. The actual figures in a live project would depend on the prevailing wind speed, Feed-in Tariff, agreed O&M cost and any other factors that bear on the economic outlook of the project.
4. Statutory Designations: It is important to make a note of whether the proposed land for a wind turbine lies within a designated area such as a National Park, Green Belt or Area Of Outstanding Natural Beauty (AONB) so as to properly address issues that may potentially make planning permission difficult to obtain or that may inform the final location of the wind turbine. Consideration was given to whether the land lies within a designated area and it was recently discovered that

2 [EWT DW61-900kW Wind Turbine](#)

the land lies within the North Wessex Downs AONB which traverses the English counties of West Berkshire, Hampshire, Oxfordshire and Wiltshire. This means that landscape issues would need to be taken into account.

5. Site Access: Wind turbines of the scale of 900 kW are very large equipment and they are equally delivered by large heavy duty vehicles. It is absolutely essential to ensure that these large vehicles can gain access to the wind site. The turbine blades are the longest pieces of equipment and the tower base or generator are the widest and heaviest pieces of equipment. Weak bridges and tight corners would be impractical to use without expensive upgrades and the road width has to be a minimum of 3 m to be useable. No site access problems have been identified for this wind site when considered. The access route identified goes through the main roads from the M4 motorway through Hungerford Hill (A338), through Ermin Street (B4000) and through Baydon road (not through the village centre) to the site. This access route meets all the requirements for a problem-free access and will not require any site access upgrades.
6. Grid Connection: It is essential to have a grid connection for exporting power to the grid. A small wind energy project (1 or 2 turbines) would require an 11 kV three-phase grid power line nearby to grid-connect the project to the local distribution network. For this project, the distance from where the wind turbines will be located to the nearest 11 kV three-phase power line is 405 m. This means that there is suitable grid infrastructure nearby and obtaining connection permission from the local Distribution Network Operator (DNO) should not pose a problem especially as there are no other renewable energy projects in the vicinity to raise congestion issues.
7. Next Steps: It is necessary to subcontract a specialist renewable energy developer to carry out a formal landscape and visual impact assessment, obtain grid connection permission and handle planning permission application with the local authority.

CHANGE OF LAND USE

The land to be used for the wind energy project is pasture land and as such, it would be necessary to obtain planning permission from the local authority for change of land use. It is pertinent for an application for planning permission to demonstrate sufficient merit in order to be approved. The following is an initial assessment which adds to the merit of the project:-

8. Agricultural Needs: Wind turbines work perfectly with farming so a wind energy project on pasture land would be viewed favourably. There is no negative impact on livestock as animals such as cattle and sheep can continue to feed without showing any awareness of the presence of wind turbines. Arable farming can also continue around wind turbines without any inhibitions. ^[3] Wind energy projects last for around 20 – 25 years after which the project is decommissioned or a fresh planning application would have to be submitted if continuation is sought. Decommissioning involves completely removing all equipment from the site and restoring the foundation to its pre-construction condition. Thus, there will be little or no impact on the land or environment.
9. Landscape Issues: As previously noted in paragraph 4 above, the land lies within the North Wessex Downs AONB. Wind turbine development within AONBs are constrained to a degree in order to protect specific sensitivities and values that may be adversely affected. It is, therefore, essential to properly assess the impact of this project on the landscape in order to take appropriate steps to minimise or eliminate any negative impact the wind turbine development may have on the landscape. The website of the National Association of AONBs describes the primary purpose of an AONB designation as that of conserving and enhancing the natural beauty of the landscape. It also describes two secondary aims that complement the primary purpose namely to meet the need for quiet enjoyment of the countryside and to have regard for the interests of those who live and work there. ^[4] The question of whether or not wind turbines have a negative effect on the enjoyment of the countryside depends on individual perception. Some see it as a graceful and attractive sight that complements the beauty of the landscape while others may perceive it as a nuisance possibly because they do not enjoy any personal benefit. ^[5] There is also a recommendation that in pursuing the primary purpose of AONB designation, account should be taken of the needs of agriculture, forestry, and other rural industries; and of the economic and social needs of local communities. Furthermore, it is recommended that particular regard should be paid to promoting sustainable forms of social and economic development that in themselves conserve and enhance the environment. ^[6] Wind turbine development promotes sustainable forms of social and economic development and as such should be encouraged. Also, it would not impact negatively on the agricultural use of land as has been explained in paragraph 8 above. Interestingly, agriculture is

3 [Wind turbines on farms 'can help UK meet food and energy needs'](#)

4 [Further Information about AONBs](#)

5 [Wind farm brings out 'nasty side' of Cornish community](#)

6 [What we do](#)

described as the major use of land within the North Wessex Downs AONB so it is clear that the primary purpose of its designation will be preserved.^[7] In terms of climate change, wind turbines help conserve and enhance the environment by reducing dependence on fossil fuel derived energy which produces carbon and contributes to global warming problems due to Green House Gas (GHG) emissions from human activity. Thus, wind turbines contribute towards achieving a greener society. Finally, the website of the National Association of AONBs mentions that the responsibility for care of an AONB lies with the local authority and the local community so their support is needed for this wind energy project to be feasible.^[8] There is currently one operational wind turbine within the AONB. It is located at Facombe, Hampshire SP11 0DS and features a Vestas V39 250kW wind turbine that was consented in 1993 at a time when climate change and renewable energy were not making headlines.^[9] So, it is possible to have one wind energy project in Baydon even though the site lies within an AONB. It is encouraging to note that there is nothing as yet to suggest adverse impact on the landscape.

10. Wiltshire Council Requirements: Wiltshire Council has recently made a policy shift in favour of renewable energy projects to cut carbon emissions with a view to meeting targets set by the UK Government. The relevant policy document is known as the Wiltshire Core Strategy and was adopted in January 2015.^[10] It specifically addresses climate change as a core objective and will contribute towards tackling climate change through a number of policy areas including ensuring that development contributes towards standalone renewable energy installations. The UK Government has pledged to reduce the UK's total carbon emissions by at least 34% in 2020 (with 15% derived from renewable sources) and at least 80% in 2050 from 1990 levels. In line with national targets, Wiltshire needs approximately 376 MW installed capacity of renewable energy to meet nearly 30% of its projected electricity demand by 2020. As of 2013, only 61.9 MW of renewable electricity installed capacity was available in Wiltshire. This implies that Wiltshire will need over 300 MW installed capacity by 2020 to meet the target. In order to achieve this, three key actions have been outlined in the Core Strategy as necessary in Wiltshire, one of which is to commission large-scale, renewable, decentralised energy generation technologies. The Core Policy 42 identifies how standalone renewable energy installations of all types, including wind turbines, would be encouraged and supported. It requires that proposals for development

7 [North Wessex Downs AONB](#)

8 [AONB designation](#)

9 [Facombe Estate, Hampshire \(DG001 – Vestas V39\)](#)

10 [Wiltshire Core Strategy](#)

need to demonstrate how visual and landscape impacts have been assessed, to a satisfactory level, and taken into account. The Core Policy 51 relates to landscape and is meant to protect, conserve and enhance Wiltshire's distinctive landscape character. Developments along the edges of towns and villages are broadly controlled in line with the Core Policy 3, which relates to infrastructure requirements, wherein renewable energy is considered a top priority under essential infrastructure. Where an AONB is involved, there is the need for a development proposal to demonstrate that the objectives, policies and actions set out in relevant management plans have been taken into consideration. There is also a requirement to protect the distinct character and identity of the villages and settlements in Wiltshire. The Baydon Village Plan ^[11] has been evaluated and it appears to be that the character and identity of the village is concentrated around the village centre. The countryside is considered valuable, but it does not appear to be accessible. Many residents do not know where the local footpaths are located and need a helpful guide. Some footpath users think that many of the footpaths are rough, unkempt and hazardous in wet weather. From an initial assessment standpoint, it does not seem like the presence of wind turbines away from the village centre across the M4 motorway would have adverse landscape or visual impact. However, the fact that Baydon is currently part of Berkshire and Marlborough Downs and lies within the North Wessex Downs AONB calls for a more detailed assessment. As such, it would be necessary to carry out formal Landscape and Visual Impact Assessment to meet the standard required by Wiltshire Council. Nonetheless, it is worth noting that a wind energy project is considered essential infrastructure that would be supported and encouraged in view of urgent need to tackle climate change plus the economic and social benefits it can bring to the local community.

11. Benefits to the Community: A wind energy project will bring low carbon or green electricity to the local community as electricity suppliers would be able to supply electricity directly from a nearby renewable energy generator to customers. Renewable energy contributes directly towards preserving the environment by reducing GHG emissions which is the cause of global warming that is changing the climate. The defining characteristics of the seasons are gradually changing such as lack of snow in winter or rainfall occurring in summer. If the trend in climate change continues unabated, life on earth as we know it will cease to exist from

11 [Baydon Village Plan](#)

the effects of global warming. So, it is a huge benefit to the local community to have green electricity supply. However, this should not be the only benefit available to the local community. It is essential to demonstrate regard for the interests of those who live and work in the local community. An important AONB related point is that the ability to enjoy the countryside may be put to question by a wind energy project although it is possible to mitigate this, as seen in the story of a Cornish community referenced in paragraph 9 above, by providing some economic and social benefits that individuals can identify with. To achieve this, attention has first been given to making financial contributions towards meeting the needs of charitable organisations in Baydon village. Top on the list is Baydon St. Nicholas Church which has been part of the community for centuries providing spiritual and related social services. St. Nicholas Church is currently facing increasing financial problems, which is a progressive cash shortfall, and needs to be able to pay its Parish Share in order to retain the church in the community. ^[12] A commitment would be made, from income realised on the wind energy project, to support Baydon St. Nicholas Church with a regular standing order in the range of £250-300 per month to make up the cash shortfall being experienced and ultimately eliminate the threat to its future existence in the community. It may also be possible to overhaul the church building in a matter of months with funding meant for such purpose from other sources. Other charitable organisations that have been selected for financial support include Friends of Baydon School and Baydon Link Scheme. ^[13] The total financial support earmarked at the initial stage will be in the region of £5,000-6,000 per annum. After the project has paid for itself, which may take up to seven years, more can be done towards meeting the needs of the community. In view of calls for new facilities and clubs as documented in the Baydon Village Plan, it is highly probable that a tennis court would be donated to the community in due course after the wind energy project has paid for itself. Furthermore, to sustain the regular financial support for charitable organisations in the community beyond the life of the wind energy project and to contribute towards meeting the housing needs in Baydon, investment in the wind energy project will be diversified into the area of family and low cost housing at the appropriate time. Consideration has also been given to the possibility of providing cheaper electricity to consumers in Baydon community through a deal with an energy supplier. The fact is that energy supply is a competitive business

12 [Baydon St. Nicholas Church supporters letter](#)

13 [Baydon Clubs and Associations](#)

run by energy supply companies, not energy generators, and it is always possible to switch to a cheaper energy supplier on the basis of tariff comparison. However, some research has revealed that a new web-based marketplace has been introduced that connects customers directly to renewable energy generators. ^[14] Hence, it would be possible to offer discounts directly to renewable electricity consumers in Baydon community. This means that a Power Purchase Agreement would have to be secured with the relevant energy supply company and this is currently only possible with Good Energy, a renewable energy supply company based in Wiltshire. ^[15]

CONCLUSION

The viability of a wind energy project depends on a varied mix of factors, but there appears to be a fair chance that Baydon Wind Energy project would be feasible. The wind site is of 'commercial grade' and would make for a very good investment once planning permission is obtained. Landscape issues have been assessed and steps that could be taken into account have been identified although a formal assessment would be in order. The local authority currently operates a favourable policy towards the development of wind energy projects and the benefits earmarked for the local community should endear support for the project. There are still other factors that could affect the viability of the project such as clearance from the Ministry of Defence on air safety and defence interests, and availability of risk capital. At this stage though, Baydon Wind Energy looks very promising as a viable wind energy project that should be developed.

14 [Open Utility unveils the power of Piclo, Britain's first online peer-to-peer marketplace for renewable energy](#)

15 [Generators on Piclo](#)