



# **Sustainable Energy Systems Ltd**

**Supporting Planning Statement for the siting of one 11kW Gaia small-scale  
wind generators at Bullhouse Mill, Millhouse Green**

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## 1. Application Description

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Planning permission for the installation of one 11kW Gaia small-scale wind turbine on land to the rear of Bullhouse Mill house. The turbine is sought to enable the applicants to reduce their carbon emissions and energy bills and to increase their self sufficiency in terms of electricity production. Once local obstructions have been taken into account, the sites predicted annual average wind speed at 10m of 4.9m/s results in an estimated output of 26.3MWh of electricity per annum. This represents an annual CO2 saving of 14.9 kgs. This installed capacity will be used at the farm and will also help to contribute towards regional and sub regional targets for renewable energy generation for 2020.

Planning permission was granted in 2010 for 2 x 11kW wind turbines of the same design, at pre application stage the applicant sought to install three turbines as they have an high energy demand at site and three turbine were considered essential, however at the time of this application the planner had concerns over visual impact and as such one turbine was removed from the scheme. The turbines have been in situ for some considerable time now and it is clear that their impact of the landscape and visual amenity of the area is acceptable. It is also clear that there is scope for an additional turbine of the same scale sited in the fields adjoining Bullhouse Mill. The application is submitted on this basis.

## 2. Pre-application discussions

Sustainable Energy Systems Ltd spoke with Barnsley Council who advised to submit the application with the standard information required including forms, fee, site and location plan, Planning Statement, elevations and manufacturers specification. SES have also reviewed the planning history of the site and have provided a copy of the initial LVIA carried out for this site.

## 3. Turbine Use

The primary use of the turbine will be to power to Bullhouse Mill in addition to the other renewable technologies that exist at site.

## 4. Site Location

Bullhouse Mill is a rural enterprise which comprises of the main residential property and a number of warehouse buildings set within the greenbelt. The application is for an additional turbine located in the vicinity of Bullhouse Mill. Two existing turbines are present at site of the same design and scale as the turbine proposed as part of this application. The turbine will be located in the agricultural field to the west side of Bullhouse Mill house. The boundaries of the fields are made up of stone walls mature trees and some hedgerow, to the east is the main mill complex, to the north of the site are some industrial works and to the north west is Catshaw Cross Farm. The closest main road to the site is the B6016 to the north.

## 5. Proposal

The installation consists of one 11kW Gaia turbine, mounted on a 18m galvanised steel masts on approximately 5.5 m<sup>2</sup> concrete bases. The turbine is of twin-bladed design and is manufactured as a single composite unit 13m in diameter. All non galvanised elements of the turbines will be coloured pale grey.

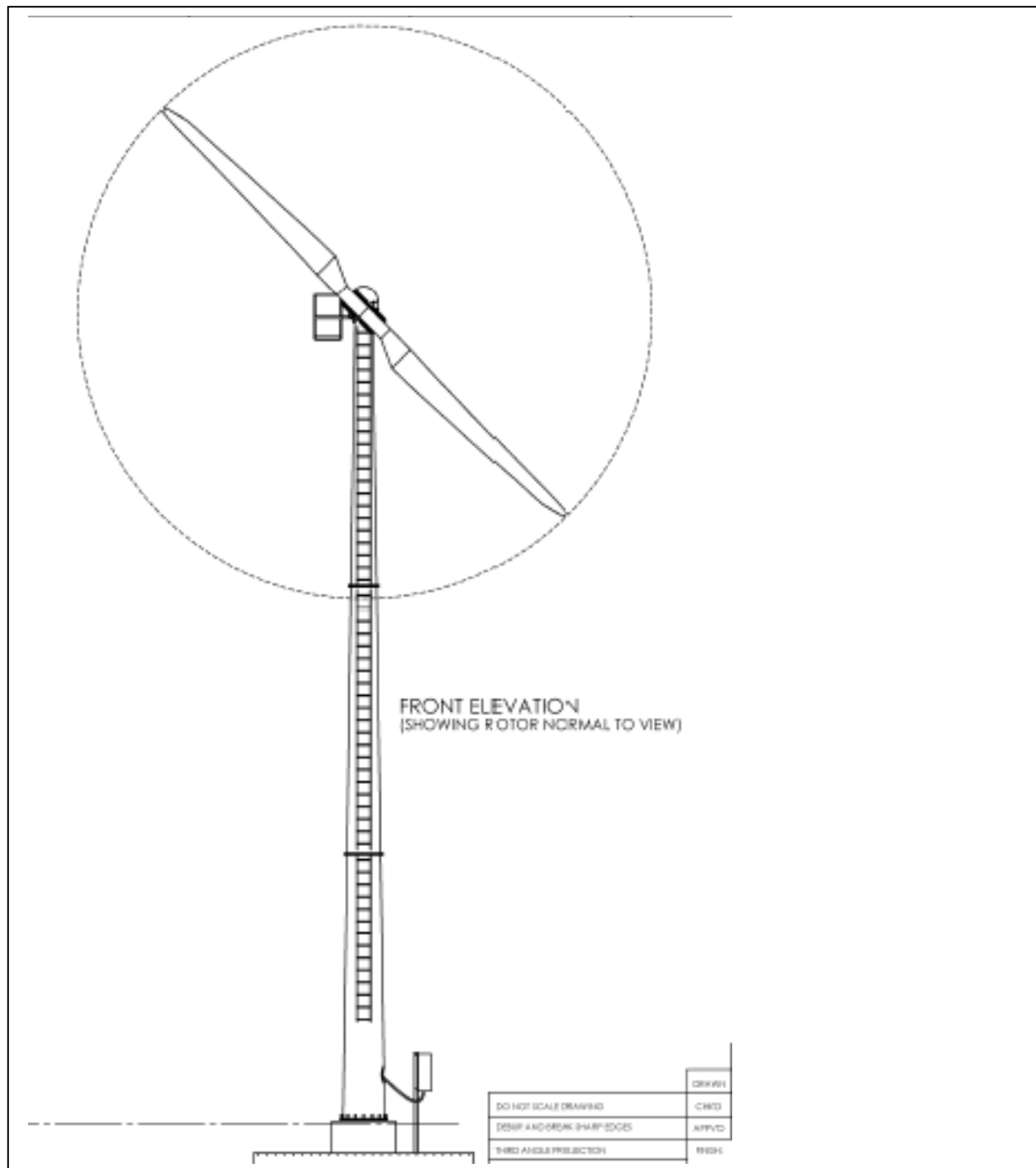
## 6. Aerial photos of the site



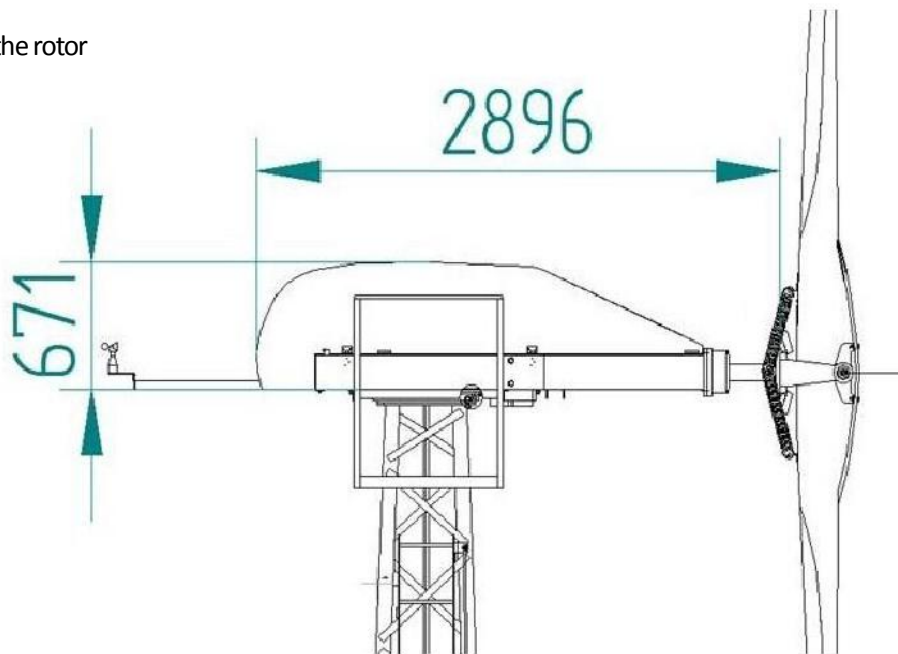
Turbine Easting 420978 and Northing 403042

Aerial Photo of the site with the proposed Gaia turbine location marked. [www.google.earth.co.uk](http://www.google.earth.co.uk), 2013

## 7. Gaia11 Dimensions & Technical specifications



## Cross Section through the rotor



Dimensions of the turbine nacelle (mm)

**Assembly Height** - The turbine assembly is mounted on an 18m high tower. The hub of the rotor is at 18.3m. The rotor is a twin blade design and is manufactured as a single composite unit 13m in diameter. When in the vertical position, the tip of the rotor extends to a height of 24.8m and the lowest point is 11.8m above the ground. This is around 1/5th the height of a typical turbine found on a modern wind farm.

**Foundation** - The bottom of the tower is bolted onto a reinforced concrete base with dimensions 5.5 x 5.5 x 0.4m. This is set in a hole 1m deep with an 0.6m layer of hard packed earth on top.

**Cabling** - The turbine is connected to the building power supply at the main fuse box via an armoured cable buried at a depth of 0.75m.

**Rotor** - Slow turning at nominal speed of 56 rpm (independent of wind speed). Light grey, reflection free fibreglass blades.

**Mast Design** - Gaia turbines can be installed on either a solid or lattice tower structure. In this case it is our preference to install the turbine on a tubular tower rather than to match existing. Please see below diagram for comparison.



Solid Tower



Lattice Tower

**Wind Turbine Colour**

Blade and Nacelle - Finished Pale Grey/ off White RAL 9002 as shown on the colour sample panel below:



**RAL 9002**

Mast- Finished metal grey on the colour sample panel below:



**Metal**

## 8. Planning Policy Overview

### 8.1 National Planning Policy Framework

The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The NPPF is a material consideration which must be taken into account in planning decisions.

Paragraph 187 of the NPPF states that **LPAs should look for solutions rather than problems, and decision takers at every level should seek to approve applications for sustainable development where possible**. LPAs should work proactively with applicants to secure developments that improve the economic, social and environmental conditions of the area.

At the heart of the NPPF is the **presumption in favour of sustainable development**, which gives rise to the need for the planning system to perform a number of roles:

- An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and
- An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

For decision taking, the presumption in favour of sustainable development means:

- Approving development proposals that accord with the development plan without delay; and
- Where the development plan is absent, silent or relevant policies are out-of date, granting permission unless:
  - Any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or
  - Specific policies in this Framework indicate development should be restricted.

The NPPF sets out 12 core planning principles which should underpin both plan making and decision-taking. One of these principles is that the planning system should;

***“Support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)”***

The NPPF replaces all PPS and PPG documents formerly in use. Instead, the issues dealt with in the PPS and PPG documents are addressed within the NPPF as individual topic headings. The sections considered relevant to this application are as follows:

### **Building a strong, competitive economy**

NPPF sets out that the Government is committed to securing economic growth in order to create jobs and prosperity, building on the country's inherent strengths, and to meeting the twin challenges of global competition and of a low carbon future. Planning should operate to encourage and not act as an impediment to sustainable growth. Therefore significant weight should be placed on the need to support economic growth through the planning system.

### **Supporting a prosperous rural economy**

Planning policies should support economic growth in rural areas in order to create jobs and prosperity by taking a positive approach to sustainable new development. Plans should support the sustainable growth and expansion of all types of business and enterprise in rural areas and promote the development and diversification of agricultural and other land-based rural businesses.

### **Requiring good design**

The Government attaches great importance to the design of the built environment. Good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people.

Planning policies and decisions should not attempt to impose architectural styles or particular tastes and not stifle innovation, originality or initiative through unsubstantiated requirements to conform to certain development forms or styles. However, local distinctiveness should be sought and promoted.

LPAs should not refuse planning permission for buildings or infrastructure which promote high levels of sustainability because of concerns about incompatibility with an existing townscape, if those concerns have been mitigated by good design.

### **Protecting Green Belt land**

The NPPF position on Green Belt land, set out in section 9, reflects the now replaced 'PPG2: Green Belts'. The five purposes which Green belt serves are as follows:

- To check the unrestricted sprawl of large built-up areas;
- To prevent neighbouring towns merging into one another;
- To assist in safeguarding the countryside from encroachment;
- To preserve the setting and special character of historic towns; and
- To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

As with previous Green Belt policy, inappropriate development is, by definition, harmful to the Green Belt and should not be approved except in very special circumstances.

When considering any planning application, LPAs should ensure that substantial weight is given to any harm to the Green Belt. 'Very special circumstances' will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations.

**When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.**

### **Meeting the challenge of climate change, flooding and coastal change**

The NPPF sets out that to increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:

- Have a positive strategy to promote energy from renewable and low carbon sources;
- Design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including landscape and visual impacts;
- Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;
- Support community led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning; and
- Identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

When determining planning applications, local planning authorities should:

- **Not require applicants to demonstrate the overall need for renewable or low carbon energy** and also recognise that **even small scale projects provide a valuable contribution** to cutting greenhouse gas emissions; and
- **Approve the application if its impacts are (or can be made) acceptable.** Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

### **Conserving and enhancing the natural environment**

Paragraph 118 addresses the approach to be applied to biodiversity in determining planning applications. It states that when determining application, LPAs should aim to conserve and enhance biodiversity by applying the following principles:

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort, compensated for, then planning permission should be refused;
- Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a SSSI (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the sites notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts

that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs;

- Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- Opportunities to incorporate biodiversity in and around developments should be encouraged;
- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside of ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- The following sites should be given the same protection as European sites;
  - Potential Special Protection Areas and possible Special Areas of Conservation;
  - Listed or proposed Ramsar sites; and
  - Sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

### **Conserving and enhancing the historic environment**

The NPPF replaces PPS9 which dealt with all aspects of planning for the historic environment. The NPPF states that in determining planning applications, LPAs should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. LPAs should identify and assess the particular significance of any heritage asset that may be affected by a proposal taking account of the available evidence and any necessary expertise.

In determining planning application, paragraph 131 states that LPAs should take account of:

- The desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- The positive contribution that conservation of heritage assets can make to sustainable communities including their economic viability; and
- The desirability of new development making a positive contribution to local character and distinctiveness.

### **National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011)**

This NPS taken with the Overarching National Policy Statement for Energy (EN-1) provides the primary basis for decision by the Infrastructure Planning Commission (IPC) on applications it receives for nationally significant renewable energy infrastructure. For wind turbine proposals this means schemes above 50 MW. Although not directly relevant to this application, there is case law to suggest that this NPS can be used as a material consideration to demonstrate the Government's commitment to electricity generation from renewable sources. This NPS reiterates the important role of on-shore wind and deals with issues including landscape and visual impact, noise, biodiversity and the historic environment.

## **Overarching National Policy Statement for Energy (EN-1) (DECC, 2011)**

This NPS highlights that in order to meet stringent emissions targets, the consumption of electricity will need to be almost exclusively from low carbon sources. This NPS again reiterates the Government's commitment to renewable energy development and can also be used as a material consideration in the determination of planning applications for renewable energy developments.

### **8.2 The Carbon Plan: Delivering Our Low Carbon Future**

The Government published the Carbon Plan in December 2011. The plan sets out how the UK will achieve decarbonisation within the framework of energy policy. The plan notes that emissions are down by a quarter since 1990 and current policies are on track to cut emissions by over a third on the 1990 levels by 2020. In the next ten years there is a need to develop and deploy the technologies that will be needed to halve emissions in the 2020s to put the UK on the path towards an 80% reduction in emission by 2050.

The plan states that to make the transition to a lower carbon economy there will need to be "a continuation of previous trends in the coming years: more switching from coal to gas-powered generation, and renewable electricity rising to 30% of electricity generation by 2020".

### **8.3 The Coalition Programme for Government**

The Coalition Government has indicated an ongoing commitment to tackling climate change and support for renewable energy provision. The Coalition Programme for Government includes a commitment to reviewing the Country's overall target for energy from renewable sources, subject to the advice of the Climate Change Committee.

In addition to this, the programme also sets out a number of objectives in relation to energy and climate change that the Government seek to implement over the next five years, including the following which are relevant to onshore wind energy:

- Supporting an increase in the EU emission reduction target to 30% by 2020.
- Establishing a full system of feed-in tariffs in electricity - as well as the maintenance of banded Renewables Obligation Certificates.
- Reform energy markets to deliver security of supply and investment in low carbon energy.
- Production of an Annual Energy Statement to Parliament to set strategic energy policy and guide investment.
- Encouraging community-owned renewable energy schemes where local people benefit from the power produced.

The commitment of the Coalition Government to the importance of saving energy and delivering a secure green economy is reflected in the publication of the first Annual Energy Statement in December 2010, which sets out a range of actions to help deliver these aims. Action 16 of the Statement set out a commitment to achieve greater reductions in emissions than outlined under the Kyoto Protocol (pressing for the EU to move from the current 20% target to a 30% target for greenhouse gas emission reductions by 2020).

The new Government is very supportive of attempts to increase renewable energy provision. However, there is uncertainty how this support will be translated into detailed policies (and the timescale for the creation of this policy). In the interim, in 2010 the UK signed up to the EU Renewable Energy Directive which includes a UK target of 20 percent of energy from renewables by 2020. This directive therefore provides sufficient justification for the need to increase renewable energy capacity significantly across the UK.

## **8.4 Ministerial Statement July 2013**

Appropriately sited onshore wind, as one of the most cost effective and proven renewable energy technologies, has an important part to play in a responsible and balanced UK energy policy. It is low carbon and brings new growth, investment and jobs to the UK economy. It reduces our reliance on imported fossil-fuels and helps keep the lights on and our energy bills down. The UK has some of the best wind resources in Europe, and the Government is determined that the UK will retain its reputation as one of the best places to invest in wind energy and renewables more generally. We have also legally committed to ensure that 15 per cent of our energy will come from renewable sources by 2020. Over 10GWh of renewable electricity was generated from onshore wind in 2011 which is enough to meet the average electricity consumption need of almost 2.5 million households. In addition since 2010 DECC has recorded announced investments in onshore wind energy totalling over £3.4billion, with the potential to support around 5,400 jobs.

## **8.5 Local Plan policies**

Core Strategy Policy CSP1 relates to climate change and expects development to reduce or mitigate carbon emissions and harness the opportunities that growth and its associated energy demands bring by increasing the use of renewable technology.

Core strategy policy CSP1 relate to development of renewable energy and states that the council will allow development that produces renewable energy as long s there is no significantly harmful effects on;

- The character of the landscape and appearance of the area
- Living conditions
- Biodiversity geo diversity and water quality
- Heritage asset, their setting n cultural features
- Highway safety
- Infrastructure including radar

Within the Unitary Development Plan the site is allocated as within the Greenbelt and in an area of landscape value.

## **9. Economic, Social and Environmental benefits of the proposed development**

The Economic, Social and Environmental benefits of this proposal should be considered as material when determining the application. This proposed wind turbine will use wind energy - this is an abundant natural resource. It is non-polluting, clean and sustainable. The UK has one of Europe's windiest climates and therefore wind energy is an important element in achieving the UK Government's commitment to reduce carbon dioxide emissions to 20% below 1990 levels by 2020. More specifically, it is Government policy to achieve 80% reduction in emission by 2050; this proposal will help to move towards these targets.

The development will generate electricity for Bullhouse Mill in addition to the existing renewable technologies. The applicant is committed to reducing their fuel costs as well as their environmental and carbon footprints. This application is an essential element in achieving this ambition.

The UK has the best wind resource in Europe. This site has a good wind speed from which a Gaia turbine would produce on average an additional 26.3MWh of electricity per year. This will allow further green improvements to be made reducing the reliance of the property on grid sourced energy.

Further benefits in favour of the development include:

Environmental Benefits - these will be local as well as contributing more broadly to global carbon emissions targets. The benefits with relevance to this wind turbine include the following:

Reducing carbon emissions: in the long term, reduced carbon emissions are expected to contribute to a deceleration in the rate of global climate change; and

Air quality improvements: renewable schemes may have indirect benefits in this regard through the contribution to reduced fossil fuel emissions.

Economic Benefits: Local economic benefits of renewable power generation can be identified, especially in relation to small and/or rural communities. These include:

Business diversification: the electricity generated will reduce energy bills and surplus electricity generated at time of low energy demand will be fed back to the grid providing additional income stream for the business. Income from the scheme will help to make on site improvements and will provide surety of energy prices which will enable the business to make long terms plans to grown moving forward.

Job creation: Direct impacts, e.g. installing and servicing renewable energy projects). Indirect – e.g. making components for renewable installations – both for use in local areas and additional employment benefits from manufacture for export).

Induced – economic multiplier effects (e.g. re-circulating income in local area);

Increased security and reliability of supply; through more distributed generation closer to the point of use; more diverse sources and technology types. In addition, localised generation means less power is wasted in transmission over long distances.

Increased income for land owners, and potential for recirculation of wealth in local community; and

Social Benefits: The social benefits of renewable power generation are likely to be less tangible than the economic benefits, but may include longer term health and quality of life benefits and protection of properties through mitigation of the effects of climate change

## **10. Siting**

Small wind generators are generally linked with a property and as such are rarely in 'prime wind' sites as sought by commercial power generators. Nevertheless, if care is taken with regard to selection and positioning, a small wind generator can make a significant contribution to greenhouse gas reduction as well as being an economically attractive proposition for the owner. The following rules of thumb apply:

- There should be no, or minimal, obstructions in the direction of the prevailing wind. For most sites in the UK the prevailing wind is South West.
- Obstacles such as buildings and trees degrade wind quality by producing turbulent zones in their vicinity. These can significantly reduce the output of a turbine. It is important, therefore to select a tower of sufficient height to allow the rotor to sit above any potentially turbulent zones.
- Wind speed tends to increase with height in most locations, a phenomenon known as wind shear. This variation in velocity with altitude is most dramatic near the surface. Further, the energy in wind is proportional to the cube of the wind speed. Consequently a small change in wind speed produces a much larger change in wind energy. For example: increasing the height of a turbine rotor, from 9m to 18m will increase the expected wind speeds by 10% and the expected power generated by 34%.
- Wind energy capture is related to the area swept by the rotor e.g. a 6m radius rotor sweeps an area 4 times greater than a 3m rotor. Bigger rotors generate more power.

## **11. Impact on the Greenbelt**

A separate LVIA document is submitted in support of this application. As demonstrated within the photomontages in the LVIA the turbine blends neatly against the existing landscape and the neighbouring built form of Bullhouse Mill.

The siting of turbines is often quite contentious, and there is sometimes a high level of opposition to their installation. It should be noted however that for every person who dislikes wind turbines, there is someone else who likes their appearance and considers them to be a positive introduction which add interest into a landscape.

Planning Policy places a strong emphasis on the encouragement of site-specific small-scale development and stress that the provision of clean sources of sustainable energy can override perceived landscape harm. Small-scale projects can provide a limited but valuable contribution to overall output of renewable energy and to meet energy needs both locally and nationally. Planning Authorities should not therefore reject planning applications simply because the level of output is small.

The NPPF states that when considering any planning application, local planning authorities should ensure that substantial weight is given to any harm to the Green Belt. 'Very special circumstances' will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations

Para 91 of the NPPF goes on to clarify that when located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources. As described in section 9 there are considerable environmental, social and economic benefits associated with this proposal to outweigh the modest greenbelt impact.

The National Planning Policy Framework also advises that when determining planning applications, local planning authorities should not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and also recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions. This proposal is consistent with up-to-date policy guidance.

In conclusion as outlined above the proposed wind turbine will not cause unacceptable harm to the visual amenity of the locality nor will it have a detrimental effect on the character of the surrounding area. The minimal and extremely localised effect of the installation will be sufficiently outweighed by the positive environmental effects associated with the proposal. These include the generation of a clean energy supply from a sustainable source that will help to reduce the businesses reliance on fossil fuel and lower green house gas emission, which will in turn help to conserve the quality of the landscape for the longer term.

Furthermore, when assessing planning applications local authorities should recognise that the impact of turbines on the landscape will vary according to the size and number of turbine and the type of landscape involved, and that these impacts may be temporary if conditions are attached to planning permissions which require the future decommissioning of turbines

## **12. Residential Amenity**

The area is of low density comprising of sporadic residential properties and farms. The closes residential property to the proposed turbine is Bullhouse Mill House the rear wall of which is 160m to the east . The closest non associated properties are on Catshaw Lane the rear wall of which is 160m to the north west.

### 13. Noise

The closest residential property to the site is Bullhouse Mill house itself which is 160m from the turbine, the closest no owned property is 160m to the north west, this property has a long garden which terminates approximately 105m north of turbine.

At these distances, there will be no adverse impact on residential amenity in line with noise limits set by ETSU as referred to in the Companion Guide to PPS22 - Renewable Energy. ETSU states that noise limits at the closest non- owned residential properties should not exceed 35dBA, whilst the limits at owned properties with a financial interest in the turbine should not exceed 45dBA.

In this case:

- The ETSU-R-97 daytime limit of 45 dB LA90 (10 min) for financially involved receptors occurs at circa 47 metres separation distance.
- The ETSU-R-97 daytime limit of 40 dB LA90 (10 min) for non-associated receptors occurs at circa 80 metres separation distance.
- The ETSU-R-97 daytime limit of 35 dB LA90 (10 min) for non-associated receptors occurs at circa 137 metres separation distance (note: this is also the threshold for the simplified assessment under ETSU-R-97).
- The ETSU-R-97 night time limit of 43 dB LA90 (10 min) for non-associated receptors occurs at circa 58 metres separation distance.

### 14. Shadow flicker

Shadow flicker can cause a problem to nearby properties early in the morning or late in evening. It is caused by the rotating blades interrupting the light from sun when the turbine is between you and the sun. This occurs early in the morning to the west of the turbine and late in the evening to the east of turbine. The effect is likely to be worse on sunny days in winter than in summer, as in summer the sun is much higher for longer and therefore the shadow is more local to the actual turbine. It is generally accepted that some degree of shadow flicker is acceptable, but that limits should be imposed to restrict the number of hours per year for which any one property is affected. There are no specific rules on this, but a 30 hour per year maximum has been suggested as reasonable in Germany and this seems to be generally accepted.

Expected shadow flicker is difficult to predict however some general rules and guidance can be applied. Assuming an 18m tower and 13m diameter blades at the latitude of London, the following guidelines may be used to ensure a low risk of adverse affects.

"Shadow flicker can be mitigated by siting wind turbines at sufficient distance from residences likely to be affected. Flicker effects have been proven to occur only within ten rotor diameters of a turbine."

As the potential for shadow flicker at distances greater than ten rotor diameters from the turbine position is very low, properties greater than 130m are unlikely to be affected. In this case the separation distances between the turbine and the rear main wall of the closest non associated residential property is 160m to the north west, thus demonstrating that shadow flicker will not be a concern.

## 15 Electro-magnetic Interference and Aviation

"Provided careful attention is paid to siting, wind turbines should not cause any significant problems of electromagnetic interference". It is not anticipated that the turbine will cause any interference with microwave links.

TV scattering of signal is a phenomenon that very occasionally may affect large utility scale turbines. It is not considered to be relevant to turbines as small as those proposed in this case.

Because of their physical size, in particular their height, wind farms can have an effect on the aviation domain. Additionally, rotating wind turbine blades may have an impact on certain aviation operations, particularly those involving radar. The aviation community has procedures in place which are designed to assess the potential effect of developments such as wind farms on its activities, and, where necessary, to identify mitigating measures.

Details on the issues and background concerning aviation and wind turbines can be found on the BWEA website at [www.bwea.com/aviation/index.html](http://www.bwea.com/aviation/index.html)

It is considered that due to the small scale of the proposed turbine at a hub height of 18.3m that it will not have any adverse effect on aviation radar. Below is a map of aircraft radar visibility (shown in purple) in the area, the turbine is located outside this zone.



## **16. Historic Environment & Heritage**

Local searches have identified that there are a number of listed buildings to the south east of the application site. These include Bullhouse Mill Hall, 1 and 2 Manchester Road, Bullhouse Lodge and a number of outbuildings in the vicinity of these properties. These buildings are located to the rear of a large amount of screening in the shape of a line and cluster of mature trees. Furthermore the existing turbine development is closer to these buildings than the location of the turbine currently proposed. As such the additional impact is considered to be negligible.

There is a scheduled monument to the north west of the application site. This is the remains of the Catshaw Cross. Catshaw Cross is known as the boundary and wayside cross and is a Saxon cross thought to date back from 900AD. During its lifetime the cross has been moved several times and the base is the only part which is thought to be original. Due to the separation distance involved between this monument and the turbine it is not considered that its setting will be adversely affected by the installation of a third turbine.

There are no other SAMs, battle fields or historic features in the vicinity of the application site.

## **17 Access**

Access for digging equipment, concrete dumpers etc. will be directly from the existing field access point from Brickle Farm. The components that require mechanical handling will be delivered to site on vehicles with HIAB type cranes and there is space on site for safe off-road unloading and temporary storage. The components will then be moved into position by mini-digger.

Excavations for the foundation and cable trenches will be carried out by small, tracked mini-digger. All excavations, protection, cable laying, builders work, holes through existing walls etc. will be carried out in accordance with relevant health and safety requirements and good construction practice and the safe use of tools and equipment.

Gaia and the electrical component suppliers provide detailed instructions for the safe sequencing and carrying out of the installation and commissioning works. These will be followed in detail and include the fixing of notices etc. to the completed work for its continued safe use. Prior approval will be obtained from the existing energy supplier to make the final grid connections.

During the course of the works protection to excavations, working areas etc. will be provided in accordance with good construction practice. Once the work is complete no special protection to the installation is required.

It is unlikely that temporary track way will be required during installation. However, should this be used then it will be removed on completion. Installation usually takes 3-4 days for a turbine of this type.

## **18. Health & Safety**

The Gaia-Wind turbine has a number of safety features to ensure that the rotor speed and power generation are kept under control in all wind conditions. These exist as passive features built into the design or are actively initiated by the control system.

There are three levels of protection:

First level - passive:

- The aerodynamic design of the blades introduces a gradual stalling effect as wind speeds rise above 12 m/s. This limits power output.
- If for any reason the turbine is disconnected from the grid, a spring operated mechanical brake is released
- and the rotor is stopped.

Second Level - controller initiated:

- At wind speeds above 25 m/s (56 mph) the controller activates a mechanical brake. This stops the rotor

turning. The brake is not released until wind speed drops consistently below 25 m/s.

- The controller will also activate the brake if an excessive vibration is detected, if the generator overheats or if there is a grid electrical fault.
- A manual override button on the controller can also be used to activate the braking mechanism
- Third level - passive: In the extremely unlikely event that the first and second level safety mechanisms are insufficient or fail,
- centrifugally activated aerodynamic brakes, concealed in the rotor tips, release, spoiling the rotor aerodynamics and its subsequent ability to rotate.

Training for the safe use of the equipment will be provided to the end user. All the components are designed for a trouble free long life with minimum maintenance. An annual inspection of the turbine head is required to comply with the warranty requirements and to ensure efficient operation.

Experience indicates that properly designed and maintained wind generators are a safe technology. The very few accidents that have occurred involving injury to humans have been caused by failure to observe manufacturers' and operators' instructions for the operation of the machines. There has been no example of injury to a member of the public. The minimum desirable distance between wind turbines and occupied buildings calculated on the basis of expected noise levels and visual impact will often be greater than that necessary to meet safety requirements. Fall over distance (i.e. the height of the wind turbine to the tip of the blade) plus 10% is often used as a safe separation distance. The wind turbines erected in accordance with manufacturer's instructions is a stable and safe structure. In accordance with good practice the proposed location has been chosen to achieve a setback of at least fall over distance from nearby roads, buildings, paths and public access routes.

The wind turbine will be separated from overhead power lines in accordance with the Electricity Council Standard 44-8 'Overhead Line Clearances'. No overhead cables are proposed to the installation. All underground cables will be installed in accordance with manufacturer's recommendations.

The scale and design of the wind turbines and the choice of locations have been consciously made to reduce the risks associated with; the collection of ice on the blades, the incidence of shadow flicker and of reflected light. On the basis of the manufacturer's guidance and historical performance of this model of wind turbine these aspects are not considered to pose any risk to public safety or security.

## **19. Ecology and Hydrology**

It is now widely agreed amongst conservation bodies that the greatest threat to all living species is climate change resulting from carbon emissions.

The land immediately surrounding the application site for the proposed turbine is agricultural land and this use would continue following the erection of the turbine. As a result the direct habitat loss as a result of the proposal would be negligible. From the initial site survey no features of unique wildlife interest have been identified in the immediate vicinity of the site of the wind turbine and there are no adjacent sites that are designated as having any local, regional or national ecological designations. The local authority searches have confirmed this.

The nearest important bird area is the peak district moors which is located approximately 7 miles away. At this distance it is extremely unlikely that the wind turbine will have an impact on feeding, nesting or migratory routes for birds in this area.

The British Wind Energy Association Website (<http://www.bwea.com>) states that, "Experience and careful monitoring by independent experts shows that birds are unlikely to be damaged by the moving blades of micro wind generators". More information about this can be found from BWEA Best Practice Guidelines and the Royal Society for the Protection of Birds, whose view is that, "Climate change is the most significant, long-term threat to biodiversity worldwide. To help meet this threat, the RSPB also strongly supports moves to increase energy efficiency, reduce energy demand and supply more of our energy needs from renewable sources, including wind power, provided they do not harm birds or their habitats." Studies of birds increasingly show that the risk from wind turbines to most species is very low, far greater risk exists from overhead cables and moving cars.

The RSPB have installed a small wind turbine at their visitor centre at Rainham Marshes and are reported to be considering turbines for other sites including turbines for a site near to Carlisle. The RSPB position on wind turbine installations is illustrated here: <http://www.rspb.org.uk/news/details.asp?id=tcm:9-213213>.

**Bats;**  
General advice from the Bat Conservation Trust and the Wildlife Trust regarding domestic scale installations on other similar turbine applications states is that it is good practice for the siting of turbines to avoid close proximity to buildings that could be used as roosts, or groups of mature trees, hedge lines and water bodies such as ponds and lakes, which could be used as foraging and commuting routes. They recommend siting of turbines 50m away from any such feature. This advice is backed up by English Nature in their 2009 publication Technical Advice note TON051. For this reason care has been taken to locate the turbine more than the minimum recommended distance of 50m from nearest blade tip to bat habitat/feeding areas of woodland, hedgerows, buildings and water.

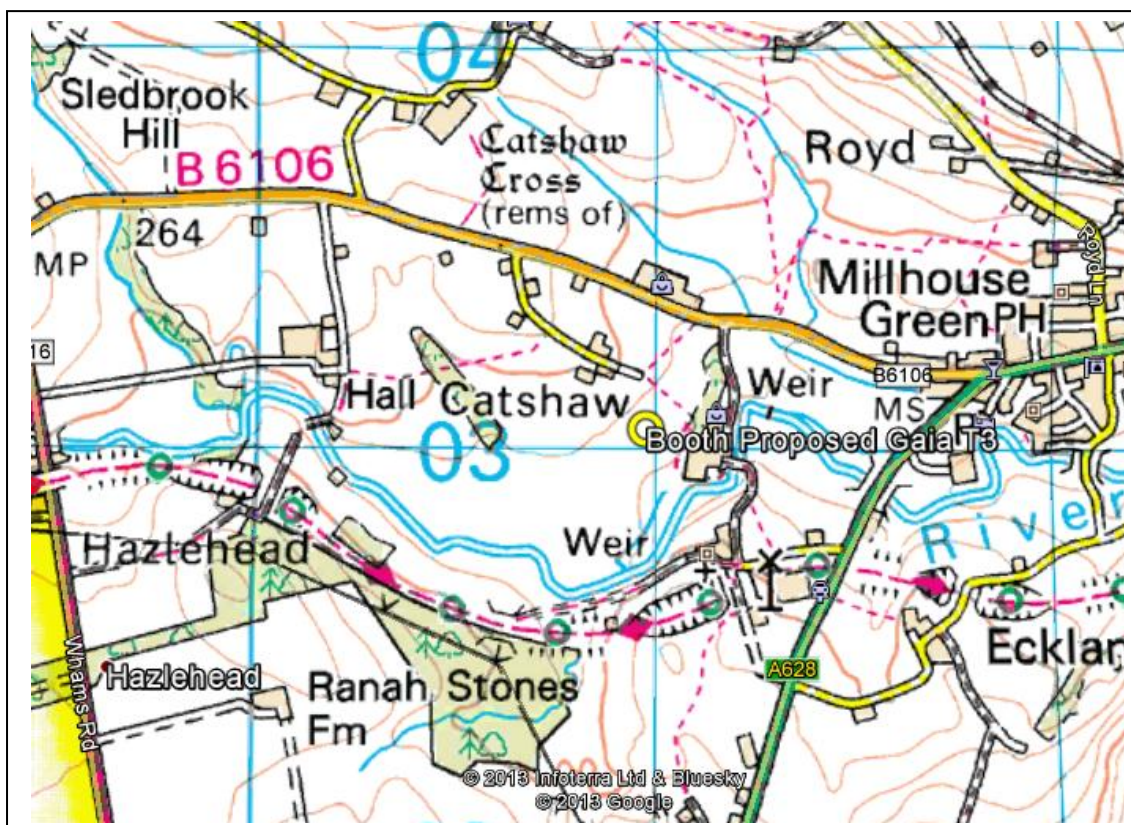
In view of the scale of the turbine and the separation distances involved, along with the exposed nature of the site, the potential impact of the development on bat populations is considered to be low.

**Hydrology;**  
The local hydrology including main rivers, private watercourses or Ground Water Protection Zones will not be materially affected by the installation of the concrete pads to support the micro wind generator. The area around the concrete bases of the turbine will also be unaffected by the wind turbine. There are no impacts predicted on any ground living mammals or any plants or invertebrates. Any grass sods removed during excavation of the foundations for the 5.5m<sup>2</sup> concrete base will be removed and set aside prior to excavation and then replaced on completion of the base. Any surplus soil will also be deposited and levelled on site, the whole site being left in a fully reinstated condition.

The site is not located within a flood zone in accordance with the Environment Agency Flood Map.

## 20 Footpaths

The turbine is at least tople distance from the closest footpath. There is a national trail to the south of the site, to the opposite side of the weir, there is also a public footpath crossing the field to the north of the site. Neither route is considered to be adversely impacted by the turbine.



## **21. Decommissioning**

The design of the wind turbine and the choice of location have been consciously made to facilitate ease of dismantling of the equipment and restoration of the site at the end of its useful life - 20/25 years. Annual maintenance will be required; measures will be taken to ensure this is carried out in accordance with health and safety requirements and to protect the safety and security of the public. Neither the applicant or SES Ltd. have objection to the imposition of a planning condition requiring removal of the turbine at the end of their operational life and reinstatement of the land to its former condition.

## **22. Conclusion**

The site for the wind turbine has been carefully chosen to ensure that they can be absorbed by the local landscape and do not have an adverse impact on the landscape mid and distant public viewpoints. Where distinguishable from close vantage points on the public and private right of ways the visual effects of the wind turbine have been minimised through appropriate siting and design, and are outweighed by the economic, social and environmental benefits of the proposal outlined above. This taken together with the demonstration of no harm it is considered that this development is appropriate for the location and purpose for which it is proposed.

## **23. Additional Information**

The information contained within this application provides a comprehensive assessment of the landscape, visual effects and other aspects of the proposed development. It also provides details of the specific environmental, economic and social benefits that arise from this renewable energy project. As such it provides the necessary objective criteria based information for the planning authority to address the key development control issues and to determine the application. However the applicant recognises that notwithstanding the contents of this submission, local politicians and stakeholders may have questions or may require further information. The applicant (and representatives) is prepared to meet with politicians and stakeholders to provide any further information and in order to address any subjective concerns as part of the planning application determining process. Should the planning authority be minded to refuse the application based on any such concerns, then the applicant would wish to have the opportunity to provide further information, to modify the application, submit to relevant conditions or negotiate a developer obligation before a refusal was issued.