Harrogate District
LOCAL PLAN

RENEWABLE AND LOW CARBON ENERGY

Supplementary Planning Document

February 2015

www.harrogate.gov.uk/ldf

Harrogate Borough Council
Working for you

Contents

1. The purpose of this Supplementary Planning Document (SPD)

1.1 In recent years, the generation of energy from renewable and low carbon sources has had an increasingly high profile. This is due to a greater appreciation of the issues surrounding climate change, a reduction in the price of renewable and low carbon technologies, improvements in the efficiency and availability of technologies, rising energy prices, and various financial incentives to encourage further uptake.

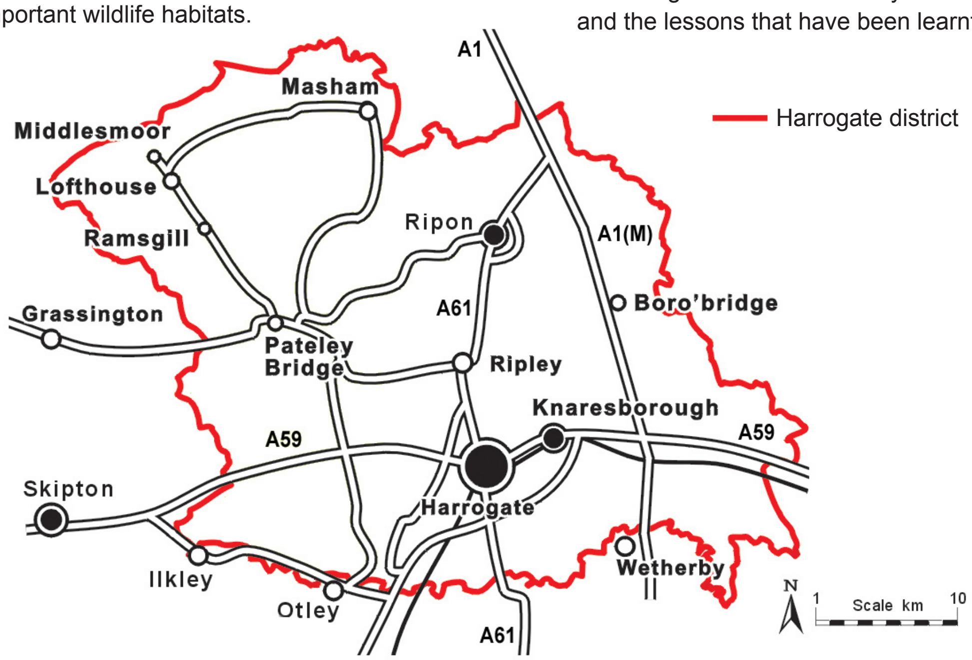
1.2 Within Harrogate district there has been a growth in the number of planning applications and enquiries received for renewable and low carbon energy projects. This document provides advice and guidance for applicants on the installation of such technologies and how the planning system relates to them.

1.3 It is the role of the Local Planning Authority (LPA) to balance the need for and the benefits of these projects against any adverse effects they may have. Within the district we are fortunate to have some very special natural and built environments. Those with statutory protection include:

- The Nidderdale Area of Outstanding Natural Beauty (AONB).
- Numerous internationally and nationally important wildlife habitats.
- 53 conservation areas.
- Approximately 3,500 listed buildings.
- The Fountains Abbey and Studley Royal World Heritage Site.
- Over 150 Scheduled Ancient Monuments.
- 12 Registered Historic Parks and Gardens.
- Large areas of designated Green Belt.
- Local designations for wildlife protection including Sites of Importance for Nature Conservation (SINCs) and Local Nature Reserves (LNRs).

1.4 As well as those with formal designations, much of the district features highly attractive areas of landscape and buildings. The purpose of this SPD is to provide guidance, advice and clarity for all parties on how to balance the needs of protecting the qualities of the district with the need to increase the uptake of renewable energy technologies.

1.5 The SPD is structured by taking each technology individually and setting out the pros, cons and issues related with it. It provides guidance on how to minimise any potential harmful effects, and whether planning permission is required or not. Appendix 2 sets out local case studies of technologies that have already been installed and the lessons that have been learnt from them.



2: The planning policy context

National Planning Policy

2.1 The National Planning Policy Framework (NPPF) (March 2012) sets out the government's planning policies for England and how these are expected to be applied. The NPPF expects Local Planning Authorities to adopt proactive strategies to mitigate and adapt to climate change.

2.2 Paragraph 97 of the NPPF instructs Local Planning Authorities "to 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 cumulative 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 source;
- 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."

2.3 Footnote 17 to this paragraph states that in assessing the likely impacts of potential wind energy development when identifying suitable areas, and in determining planning applications for such development, planning authorities should follow the approach set out in the National Policy Statement for Renewable Infrastructure. Where areas have been identified as suitable for renewable and low carbon development, they should clearly set out the criteria which have determined their selection, including for what size of development the areas are considered suitable.

2.4 This follows on from advice in the now cancelled PPS 22: Renewable Energy which encouraged Local Planning Authorities to support and promote renewable energy development "in locations where the technology is viable and environmental, economic and social impacts can be addressed satisfactorily." It required Local Planning Authorities to set out clear criteria for assessing planning applications.

2.5 Section 4 of the Statement of Community Involvement sets out how the community will be involved during the consideration of planning applications. The document can be read at www.harrogate.gov.uk/plan/Documents/Planning Policy/SCI/DS-P-LP_SCI_Revised.pdf

2.6 Chapter 10 of the NPPF sets out how Local Planning Authorities should determine planning applications for energy development. However, the NPPF must be read as a whole document and other chapters and specific paragraphs within the NPPF are also relevant to determining applications for renewable and low carbon energy developments, including, but not limited to, paragraphs: 11: Conformity with the Development Plan, 14: Sustainable Development, 17: Core Planning Principles, 91: Green Belt, Chapter 11: Conserving and enhancing the natural environment, and Chapter 12: Conserving and enhancing the historic environment.

Local policy context

2.7 Chapters 3 and 4 of the Harrogate District Statement of Community Involvement identify when applicants will be expected to consult with local communities prior to submitting a planning application. The document can be read at www.harrogate.gov.uk/plan/Documents/Planning%20Policy/SCI/DS-P-LP_SCI_Revised.pdf

2.8 It is considered that some applications for renewable or low carbon energy development, especially those on a larger scale such a large wind turbines or anaerobic digestion plants will be "significant planning applications", and as such applicants will be expected to carry out some pre-application community consultation, commensurate to the scale of the proposed development. For further guidance, applicants are encouraged to contact planning enquiries on 01423 556666.

2.9 Harrogate District Core Strategy (2009) forms part of the current Local Plan, and can be viewed at www.harrogate.gov.uk/plan/Pages/harrogate-district-local-plan.aspx#corestrategy

2.10 Of the policies within the Core Strategy, the most relevant to renewable energy development are:

- Core Strategy Policy EQ1: sets out the council's approach to reducing risks to the environment. Part a) sets out how risks can be reduced, Part b) sets minimum standards for sustainable construction and design, and Part c) sets out the council's approach to considering proposals for renewable energy projects. It states "proposals for renewable energy projects will be encouraged, provided that any harm caused to the local environment and amenity is minimised and clearly outweighed by the need for and benefits of the development." The onus is on the applicant to provide sufficient evidence and justification that the benefits of a renewable or low carbon energy installation will outweigh any harm it may cause.
- For further details of the implementation of Part b) of Policy EQ1, please refer to the Sustainable Construction and Design Validation Certificate and Guidance Note at www.harrogate.gov.uk/plan/Documents/Planning%20Guidance/DS-P-LP_SustainableConstructionAndDesign_%28EQ1%29Rev4.pdf
- Policy EQ2: The Natural and Built Environment and Green Belt makes clear that "The district's exceptionally high quality natural and built environment will be given the level of protection appropriate to its international, national and local importance."
- Policy SG4: Settlement Growth: Design and Impact, sets out criteria against which all development should be considered, including the need to protect and where possible enhance visual, residential and general amenity.

2.11 Harrogate Borough Council is currently in the process of preparing a new Local Plan. On adoption the policies it contains will replace those in the adopted Harrogate District Local Plan.

2.12 The current Local Plan is made up of policies within the adopted Core Strategy (2009) and saved policies on the Harrogate District Local Plan (2001) as amended by the Selective Alteration (2004. These current Local Plan policies alongside the NPPF, where policies are out-of-date, will be used to assess planning applications. For more information on the emerging or current Local Plan please visit: www.harrogate.gov.uk/plan/Pages/Planning-Policy.aspx

Local Evidence Base

2.13 The council commissioned consultants AECOM to produce the 'Harrogate District Planning and Climate Change Study' (2011). This document forms part of the evidence base for this SPD, and sets out opportunities for renewable energy development across the district. This evidence base also supports Policy EQ1 of the adopted Core Strategy. Its main findings were that there is significant potential for renewable and low carbon energy within the Harrogate district, but it recognises that there are also constraints that need to be taken into consideration. These constraints largely relate to the exceptionally high quality of the natural and built environment of the area, but also to internationally protected sites for wildlife. However, even with these constraints, there is great potential to increase renewable and low carbon energy installations.

3: Why is renewable energy needed?

3.1 Climate change is one of the key challenges facing society today. The scientific evidence that the activities of humans are detrimentally changing the Earth's climate is overwhelming. The changes to the global climate are likely to have profound effects on everyone in the future if left unchecked. One of the principal ways in which the climate is affected is by the emissions of greenhouse gases (e.g. carbon dioxide) into the atmosphere. The generation of energy from the burning of fossil fuels (e.g. coal, oil, gas) is a major emitter of CO2. As such, the generation of energy from renewable and low carbon sources will make an important contribution to reducing CO2 emissions and helping to tackle climate change.

3.2 The UK has legally binding targets for 15% of its energy needs to be provided by renewable sources by 2020. The UK Renewable Energy Strategy (DECC 2009) sets a target of 30% of electricity compared to 15.5% in 2013 and 12% of heat generation to be provided by renewable sources by 2020. In addition to an increase in renewable energy production, the UK is also committed to lowering emissions of greenhouse gases such as carbon dioxide. The European Union Climate and Energy Package, formally agreed in 2009, commits the EU to achieving a 20% reduction in EU greenhouse gas emissions by 2020 compared to 1990 levels.

3.3 The vast majority of electricity consumed in the UK comes from fossil fuel power stations. Consequently the majority of the UK's carbon emissions also comes from power stations, with the Yorkshire and Humber region contributing a disproportionately large amount due to the presence of numerous power stations burning fossil fuels, e.g. Drax.

3.4 In 2004 gas and coal were the most important fuels used in electricity generation in the UK, with gas accounting for 39.9%, and coal 33% of total energy production. Next in line was nuclear which accounted for 19.3%. Renewable energy sources accounted for just 4.6%. By the publication of the 2009 UK Renewable Strategy (DECC), the amount of power from renewables had increased to 6.7%, with much of this due to a great increase in the number of wind turbines, which accounted for 2.5% by themselves.

3.5 Fossil fuels are by their nature a finite resource, and much of the fuel (coal, oil, gas) used in the nation's power stations is imported. There is an over reliance in the UK and many other countries on fossil fuels, especially those imported from overseas, and measures to reduce their consumption are not only beneficial in terms of reducing carbon emissions, but also in improving energy security.

3.6 As such, both European and national policy has set targets for substantial growth in the renewable sector. The government's target is to produce 20% of energy from renewable sources by 2020, and there is a binding EU target of 15% by the same date.

3.7 Whilst much of this will be met by large scale wind energy developments, both on and off-shore, the micro-generation sector still has a very important role to play. Micro-renewable technologies in domestic or commercial settings, especially when combined with other energy efficiency measures, will play a vital role in reducing carbon emissions, as well as reducing fuel costs for the building users.

3.8 The 'Harrogate District Climate Change Strategy' (2009), sets out how the council aims to reduce carbon emissions, both from its own operations and across the district. Its ultimate aim is to make a 40% reduction in CO2 emissions from the council's own operations by 2020 and an 80% reduction by 2050; and to help make a 40% reduction in CO2 emissions across the district as a whole by 2020 and an 80% reduction by 2050.

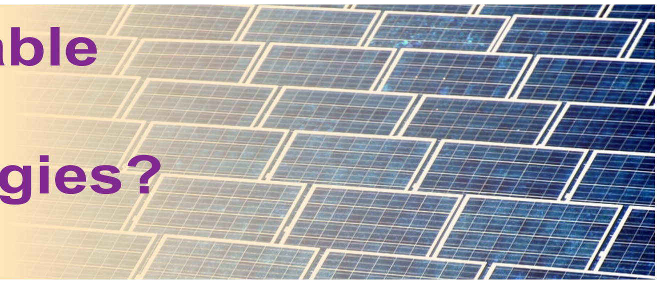
3.9 The Harrogate district has the highest CO2 emissions per capita in the Leeds City Region, at just over 12 tonnes/capita per year. Of this, approximately 3.25 tonnes comes from housing, again the highest in the Leeds City Region. Although planning policies are in place that require all new housing to be constructed in a sustainable way, the existing housing stock still has a very important role to play in reducing carbon emissions.

3.10 The two greatest ways in which housing can play its part in reducing carbon emissions are:

- Reducing the amount of energy used in the household (e.g. implementing energy efficiency measures such as increasing insulation, using more energy efficient appliances etc.).
- Using energy from renewable or low carbon sources.

3.11 It is, however, vital that if you are considering installing any renewable or low carbon energy measures in your property, you increase energy efficiency beforehand in order to maximise the benefits. The best and easiest way to reduce carbon emissions is to reduce the energy that is used. Once this is done, alternative methods of energy generation can be adopted. Installing renewable or low carbon technologies, especially in domestic or commercial property situations where the energy will be used directly, in combination with increased energy efficiency measures will maximise both the environmental and economic benefits.

4: What are renewable energy and low carbon technologies?



4.1 Renewable energy technologies produce energy from natural resources that will not run out. The most common of these are energy from wind (wind turbines), energy from the sun (solar panels), and energy from water (hydro-electricity).

4.2 In addition to truly renewable technologies, there is also a growing sector of low/zero carbon technologies (LZCs). Whilst these do not use purely renewable sources, they have very limited (or even zero) carbon emissions. Popular LZCs include biomass fuelled boilers and ground source heat pumps. LZCs often have a ‘carbon cycle’, i.e. burning wood pellets in a boiler will emit carbon, but this carbon is what the tree absorbed during its life before it was cut down for fuel. The trees currently growing as fuel will absorb the equivalent amount of carbon, and so on. Other LZCs such as ground source heat pumps can emit carbon, as they require a small amount of power to operate the pump. However, this power can be from a renewable source.

4.3 Renewables and LZCs can be broadly split into two categories:

- Those that produce electricity,
- Those that produce heat, either for water or space heating.

Examples of electricity producing technologies are:

- Photo voltaic (PV) solar panels.
- Wind turbines.
- Hydro-electric turbines.

Examples of heat producing technologies are:

- Solar hot-water collectors.
- Ground source heat pumps.
- Water source heat pumps.
- Air source heat pumps.
- Biomass fuelled boilers.
- Biomass fuelled stoves.
- Anaerobic digesters (these can also produce electricity).

4.4 Combined heat and power plants (CHP) can also be classed as low carbon energy sources. In traditional power stations, at least 50% of the energy from the fuel is wasted as lost heat. CHP plants use this heat to provide heating for the properties they serve. CHP plants are essentially small scale power stations and can be fuelled by ‘traditional’ fossil fuels. They are ‘low carbon’ as a standard gas fired CHP plant can achieve a 35% reduction in fuel use compared with conventional power stations and gas boilers. However CHP is difficult to retrofit into existing developments, requires relatively high density housing to be efficient as heat loss is minimised between the plant and each property served. For this reason, it is unlikely to become common in Harrogate district.

4.5 District heating systems can also be used. These are an alternative method of supplying heat for buildings using a network of super insulated pipes to deliver heat to buildings from one central source. Buildings are usually connected to the district heating network via a heat exchanger which replaces individual boilers for space heating and hot water. This is more efficient than using individual boilers in each building. There is an existing district heating network in Harrogate town centre, serving various council buildings, with the Turkish Baths housing the boiler and serving as an 'anchor load'. An anchor load is a relatively high and constant heat requirement, making it economical to have a large heat source that generates a lot of heat.

4.6 Fuel cells are another example of a low carbon technology, but this technology is not yet widely available.

4.7 Sometimes a combination of technologies can be used, and some technologies work especially well together. For example a ground source heat pump can take its electricity requirements from a solar PV cell. The diagram below sets out some general compatibilities between technologies via a 'traffic light' system. This is only a general guide and the actual compatibility depends upon specific site circumstances. It should be noted that the 'amber' box for the compatibility of wind and hydro power is due to the complexity of a grid connection rather than any incompatibility of the technologies per se.

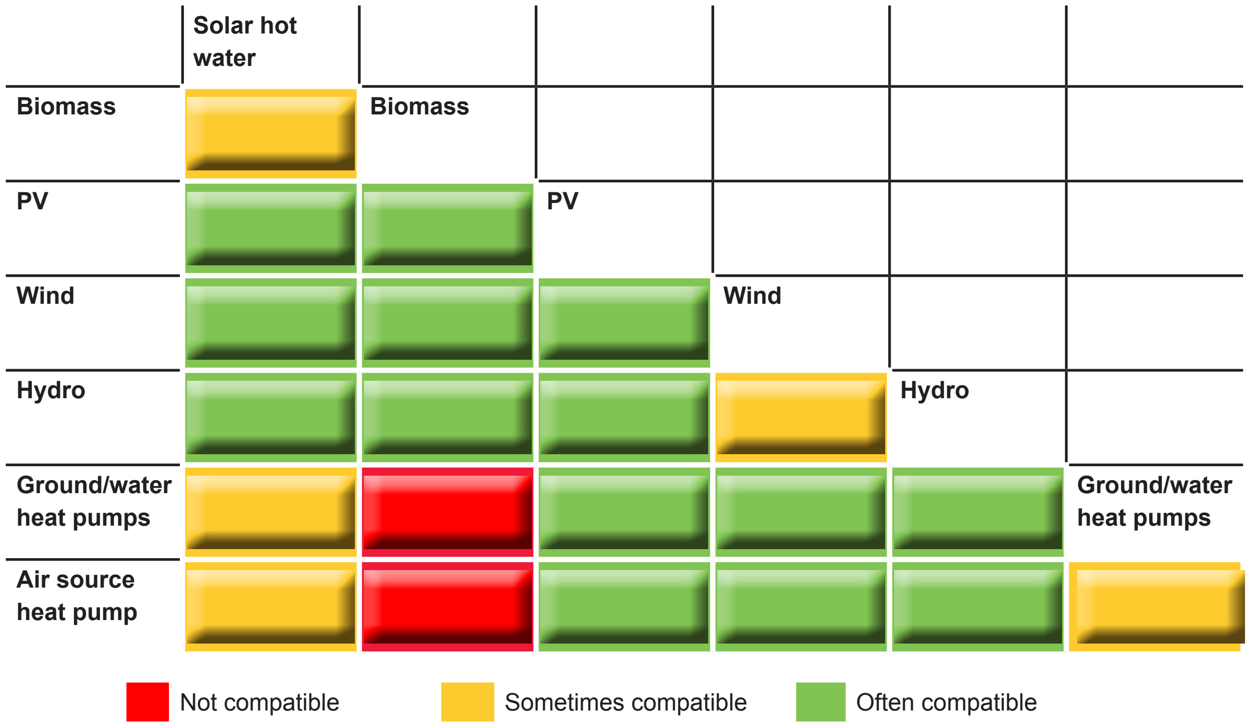


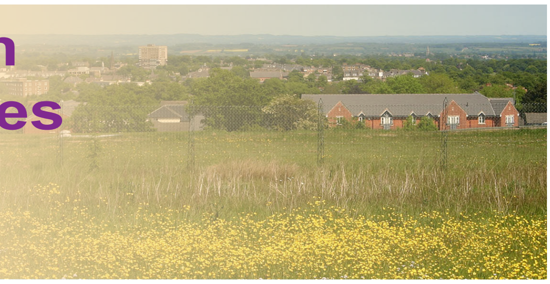
Figure 1. Compatibility of renewable and low carbon technologies

4.8 If you are considering installing any renewable or low carbon technologies you are strongly advised to take professional advice at the earliest possible stage. This can identify whether or not your site is suitable, and which technology would be most suited. It is also very important to maximise the energy efficiency of the property prior to installing any renewable or low carbon technologies.

4.9 This document will outline the basics of how each technology works, some of the pros and cons for each technology, what the planning issues are, and the processes of how to go ahead.

4.10 Financial incentives are available via the Renewable Heat Incentive for those technologies that produce heat, and the Feed In Tariff for those that produce electricity. These are schemes that pay you for the amount of energy you produce. The amount you are paid depends on the technology and the amount of energy you produce. Full details are given in Appendix 3.

5: Planning permission and micro-renewables



5.1 At the time of writing, the need for planning permission varies depending on which technology you intend to install. All installations of renewable/ low carbon energy technologies outside the curtilage of domestic dwellinghouses will require planning permission. The following table outlines which technologies may require planning permission for domestic installations. A fuller explanation of when planning permission is and isn't required is given in the appendices.

Technology	Permission Required?
Wind turbines	Permission not always required (depends on size and positioning)
Solar PV or thermal (domestic free standing)	Permission not always required (depends on position and size of installation)
Solar PV or thermal (domestic building mounted)	Permission not always required (depends on position on building, location of building and size of installation)
Ground source heat pump	Permission is not required if in the curtilage of a dwelling house (additional buildings required to house equipment may need permission or if within a listed building/ conservation area)
Water source heat pump	Permission is not required if in the curtilage of a dwelling house (additional buildings required to house equipment may need permission or if within a listed building/ conservation area)
Air source heat pump	Permission is not required if in the curtilage of a dwelling house (depends on size and positioning)
Flue for a biomass heating system (domestic)	Permission is not required (subject to size and positioning)
Hydro electric turbine	Permission is always needed

5.2 The council offers a Householder Planning Check service that will give an answer as to whether or not you require planning permission or any other consent for your proposal. At present there is a fee for this service.

5.3 If planning permission is required, the council also offers a pre-application advice service. A guide as to the likelihood of planning permission being granted can be given, and potential issues regarding the proposal can often be rectified prior to the planning application being submitted. Again, there is a fee for this, but the council would encourage anyone applying for planning permission to make use of it.

6: The planning constraints

Planning constraints

6.1 There are numerous planning constraints that will affect the suitability of the various renewable/ low carbon energy technologies. The list below gives a brief summary of some of the principle and best known ones. Please also be aware that the constraints are not mutually exclusive, e.g. there are numerous examples of listed buildings within conservation areas, that are also within the Nidderdale Area of Outstanding Natural Beauty, and sometimes even the Green Belt. There are also other less common planning constraints that may apply, and you are advised to submit a pre-application enquiry prior to any formal application.

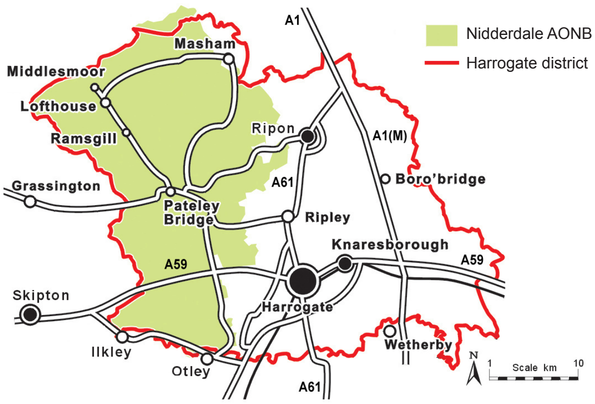


Figure 2. Nidderdale AONB

The Nidderdale Area of Outstanding Natural Beauty

6.2 Much of the western half of the Harrogate district is covered by the Nidderdale Area of Outstanding Natural Beauty (AONB). Nidderdale is one of the 41 AONBs in England and Wales, and was designated as such because of the exceptional high quality of its landscape. It was designated in 1994 and covers 603km² of land. The landscape is a variety of upland moors, river valleys, pasture fields and numerous settlements, with the market town of Pateley Bridge being the largest. The landscape in the AONB is afforded the highest levels of protection, on a par with national parks.

6.3 The management plan for the Nidderdale AONB describes the area's special qualities under three sections; Landscape, Natural Environment and Heritage and Historic Environment. The plan can be read at www.nidderdaleaonb.org.uk but the special qualities are summarised below:

- Landscape: There is a unique combination of landscape in the AONB. Gritstone geology is prevalent, and there are extensive areas of open moorland in the west. East of the moorland is an extensive grassland plateau, where farming is the principal land use. Throughout the area are numerous river valleys, with the largest being those of the River Nidd, the River Washburn, and the River Wharfe, which forms the southern boundary of the AONB.
- Natural Environment: Much of the moorland areas are internationally protected as they are designated as Special Areas of Conservation (see the Protected Wildlife Sites section below). Elsewhere there are still examples of flower-rich meadows, and numerous broad leafed woodlands. As well as flora, there is an extensive array of fauna including curlews, merlin, red kite, adders, otters, river lamprey and water voles.
- Heritage and Historic Environment: The World Heritage Site of Fountains Abbey and Studley Royal lies within the AONB, as do 14 conservation areas and a large number of listed buildings. Many of these are related to the area's industrial past, such as lead mining, quarrying and textiles. The development of reservoirs has left large and distinctive dams, especially in the late 19th and early 20th centuries in upland valleys. In the upland areas, isolated farmsteads and field barns are characteristic.

6.4 As such, any development within the AONB needs to respect the area's special character and must not harm the quality of its landscape. That said, many renewable energy technologies are capable of being accommodated within the Nidderdale

AONB without any adverse effects. All the differing renewable technologies have differing impacts associated with them. Wind turbines, due to their appearance and the fact that they introduce a moving feature, are likely to have the greatest potential impact on landscape, whereas a ground source heat pump for example, if installed properly, should have no landscape impact.

A typical vista in the AONB.

Technology	Potential Landscape Issues	Suitability
Land scale wind (75m+)	High landscape impact	
Medium scale wind (25 - 75m)	High landscape impact	
Small scale wind (<25m)	High landscape impact	Highly dependent on siting
Solar 'farm'	High landscape impact	
Solar – building mounted	Some landscape impact	
Solar – small scale free standing	Some landscape impact	Highly dependent on siting
Ground source heat pumps	No landscape impact	
Water source heat pumps	No landscape impact	
Air source heat pumps	No landscape impact	
Biomass boilers	No landscape impact	Need to consider flues
Anaerobic digester (small scale)	Limited landscape impact	
Anaerobic digester (large scale)	High landscape (and infrastructure) impact	
Hydro-electricity	Limited landscape impact	

Not suitable   Sometimes suitable   Often suitable

Table 1. General suitability of each technology in the AONB

6.5 The table gives a broad perspective of the likelihood of the acceptability of each type of technology in terms of landscape impact. The individual impacts of each installation, including such issues as the effect on neighbouring properties from factors such as noise will still need to be considered. In certain instances, some of the technologies marked 'green' in the table may still prove to be unsuitable.

6.6 However, what the table does show is that there are opportunities for renewable/low carbon energy development within the Nidderdale AONB. There are already examples of renewable/low carbon technologies present, including wind turbines, proving that they can be sensitively located. However, a balance must be achieved between delivering opportunities for renewable/low carbon energy, and protecting the special character of the landscape.

6.7 The AONB also has the greatest potential for hydro-electricity installations in the district due to its hilly nature.

World Heritage Sites

6.8 The United Nations Educational, Scientific and Cultural Organisation (UNESCO) has designated 28 World Heritage Sites in the United Kingdom (of 911 worldwide). Examples around the world include Stonehenge, The Taj Mahal and the Great Wall of China. The Harrogate district is fortunate to contain the World Heritage Site of Fountains Abbey and Studley Royal. This was designated a World Heritage Site in 1986 as it met the following of UNESCO's criteria:

Criteria i — Represents a masterpiece of human creative genius.

Criteria iv — An outstanding example of a type of building or architectural or technological ensemble, or landscape that illustrates a significant stage, or significant stages, in human history.

6.9 Fountains Abbey was founded in 1132, and the site contains its ruins following its partial destruction during the Dissolution of the


Fountains Abbey World Heritage Site.

Monasteries in the mid-16th century by Henry VIII. The ruins are still an outstanding example of a Cistercian Abbey. Studley Royal Water Garden and Park comprise the rest of the site. The Water Garden was created between 1718 and 1781 and is one of the best surviving examples of a Georgian water garden. It is not only the World Heritage Site itself that is important, but also its surroundings and setting, as well as any designated 'buffer zone'. Although the site itself is owned and operated by the National Trust, the immediate surrounding area is in various ownerships, and any development will need to take into account the effect on the setting of the World Heritage Site. Of particular importance is the vista along Lime Avenue from St Mary's Church to Ripon Minster and beyond, and any development that would compromise this view is to be discouraged.

6.10 Proposals for renewable and low carbon energy technologies will need to demonstrate that they will have no adverse impact on the World Heritage Site or its setting. However, it is considered that appropriately designed and sited installations are possible, especially those that are less prominent in the landscape.

Listed Buildings

6.11 Listed buildings are categorised as Grade I, Grade II* and Grade II. The grade depends on their quality and importance, with Grade I being the highest level. There are approximately 500,000 listed buildings in England, of which about 2,850 are in the Harrogate district. The figures are approximate as a 'listing' often covers more than one building. Besides 'buildings' as traditionally understood such as houses, churches etc., the list includes bridges, mileposts, crosses, stocks, statues and follies. In the Harrogate district, the list includes grand buildings such as Ripon Minster and Fountains Abbey, country houses such as Newby Hall, simple buildings such as stone terraces, and 'non buildings' such as Knaresborough viaduct, the Ripon obelisk or the stocks in North Rigton.

6.12 Listed buildings are protected to preserve their special historical features and the significance of the building and its setting. Any proposals that would harm these will be resisted. It should be noted that a listing, regardless of grade, covers all parts of the building, inside as well as out. The setting of a listed building will vary with each example, but will usually include its immediate surroundings and how it relates to and interacts with them.

6.13 Although renewable/low carbon energy technologies are obviously new features that have the potential to be visually somewhat at odds with the rest of the building, this does not mean that it is impossible to install them in listed buildings. Solar panels have been installed on the roof of the 'Hotel de Ville' in Ripley, and Denton Hall near Ilkley has solar panels and a wood chip fired boiler. The latter is a Grade I listed building.

6.14 Listed building consent will always be required for any proposal that would effect the character of a listed building, regardless of whether or not planning permission is required. In some circumstances both listed building and planning consent will be required. However, provided great care is taken to ensure that the renewable technology and any associated equipment can be installed without harming the building or its setting, consent may well be given.

Historic Parks, Gardens and Battlefields

6.15 Inappropriately sited renewable energy schemes could result in substantial harm to elements which contribute to the significance of historic parks and gardens – such as designed views. Government guidance makes it clear that Registered Battlefields are to be regarded as designated heritage assets of the highest significance alongside important archaeological features, particularly Scheduled Ancient Monuments.

Conservation Areas

6.16 There are currently 53 conservation areas in the Harrogate district, ranging from the centres of the larger settlements of Harrogate, Ripon and Knaresborough, to the smaller villages such as Healey or Coneythorpe. Conservation areas are designated to preserve and enhance the special architectural and historic interest of an area. In such areas, there are limitations to the 'permitted development rights' for the installation of renewable/low carbon energy technologies. When installing technologies, great care should

Coneythorpe, one of 53 conservation areas in Harrogate district.

be taken to ensure that the character of the area is not undermined. However, as with other 'constraints', there are significant opportunities to install renewables in conservation areas, provided they are designed and sited in an appropriate manner. A full list of the conservation areas in the Harrogate district is given in the appendices.

6.17 Each conservation area has its own 'Conservation Area Appraisal'. These were prepared in consultation with the local community and they set out the area's key characteristics and features, and guidelines for the future management of the area. All applications for development within conservation areas will be expected to refer to the relevant Conservation Area Appraisal, and to be in line with its contents.

The Green Belt

6.18 Much of the land between the town of Harrogate and the River Wharfe to the south is designated Green Belt, as is the land between Harrogate and Knaresborough, the eastern boundary of the district with York City Council and much of the south facing slopes of the Wharfe valley. Green Belt land is designated to protect its 'openness'. Renewable energy developments, and especially wind turbines, are classified as inappropriate development in the Green Belt, and there must be very special circumstances why they should be allowed. The onus is therefore on applicants to justify why such developments should be permitted. The associated benefits of the production of renewable energy may be considered sufficient justification, but these should be quantifiable and evidenced.

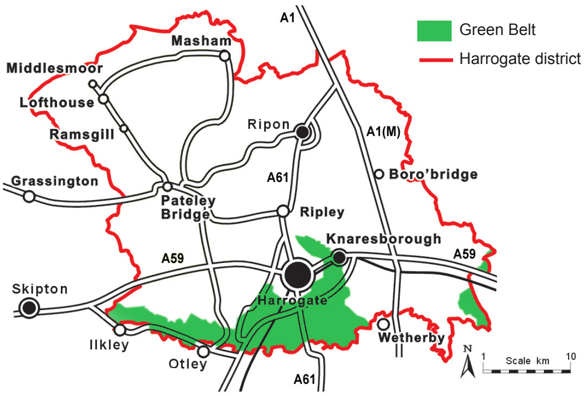


Figure 3. The Green Belt

6.19 However, the Green Belt should not be seen as a block on renewable energy development. Many technologies may be considered 'permitted development' in the Green Belt, and those that do need planning permission, if suitably justified and sited will often be granted consent.

Protected Wildlife Sites

Internationally Protected Sites - 'Special Protection Areas' and 'Special Areas of Conservation'

6.20 Special Protection Areas (SPAs) are designated under the EC Birds Directive (79/409/EEC). Within the Harrogate district, the only designated SPA is the 'North Pennine Moors'. This area extends for nearly 150,000 ha in North Yorkshire, County Durham and Northumberland, and forms part of a network of wildlife sites across Europe called 'Natura 2000'. The area covered is the western part of the district and comprises east and west Nidderdale, Barden and Blubberhouses Moors. The council has an obligation to promote conservation of the land, and to take steps to prevent deterioration of the habitats and species

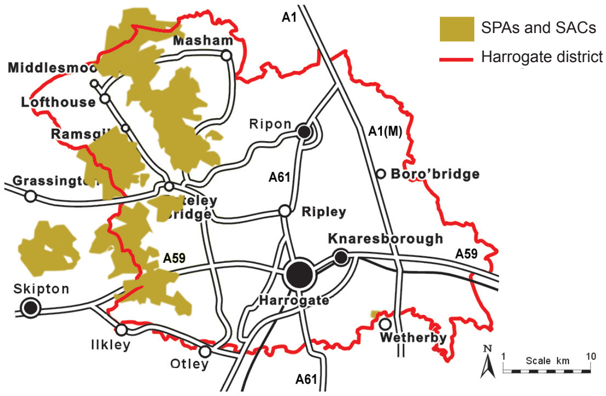


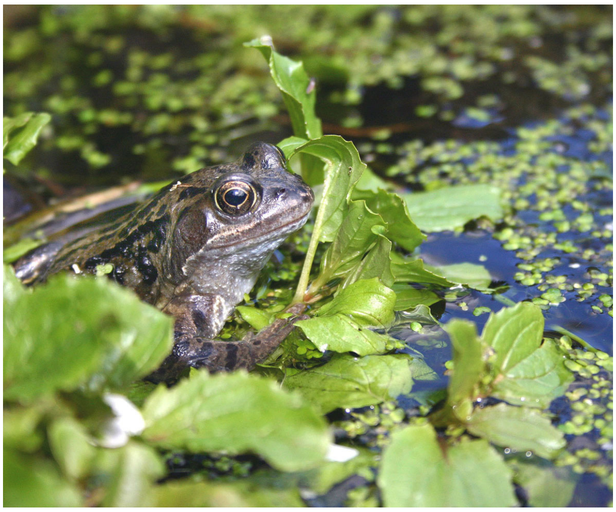
Figure 4. Special Protection Areas and Special Areas of Conservation

for which the area has been designated. The species in question are hen harrier, peregrine falcon, merlin and golden plover.

6.21 Special Areas of Conservation (SACs) are designated under the European Habitats

Directive. The North Pennine Moors is a SAC as well as being a SPA. There is also one other SAC in the Harrogate district, this being the Kirk Deighton Site of Special Scientific Interest (SSSI), immediately to the west of the village. These areas are designated due to their internationally important wildlife habitats. In the North Pennine Moors this is blanket bog, dry heath and old sessile oak woods. In Kirk Deighton it is open water and surrounding vegetation, making the area an important breeding ground for great crested newts.

6.22 Any development within or near to these areas requires a statutory consultation with Natural England, and may also require a Habitat Regulations Assessment under the European Habitats Directive. Any development that is likely to have an adverse impact on either an SPA or SAC will not be allowed to go ahead unless appropriate mitigation can be achieved and agreed with Natural England. In line with Policy EQ2 of the Harrogate District Core Strategy, any development that is likely to have a significant negative impact on the integrity of a 'Natura 2000' site will require an Appropriate Assessment (as required by the European Habitats Directive).



Special Areas of Conservation.

6.23 However, given the nature, remoteness and inaccessibility of the North Pennine Moors, and the small size of the Kirk Deighton site, it is unlikely that there will be a significant pressure for renewable energy development in these areas.

Other Protected Wildlife Sites

6.24 There are numerous other protected wildlife sites in the district. These are SSSIs, Sites of Importance for Nature Conservation (SINCs) and Local Nature Reserves (LNRs). These have been designated due to their national or local importance, and again proposals that are likely to have an adverse effect on them are likely to be recommended for refusal.

Other Constraints

6.25 Whilst the list above outlines some of the principal planning constraints affecting renewable/low carbon energy development, there are various other statutory and non-statutory constraints that may apply to your site. These range from the distance to a neighbouring property, to the site being located in a flood risk area.

Summary

6.26 There are many factors that need to be considered when assessing the suitability of renewable/low carbon energy developments. Some of these will have a greater effect than others, but many can often be overcome. Sensitive siting and design of installations is vital, especially in more constrained areas. It is important to consider the feasibility of the technology and cost in terms of payback, and there may be other ways of improving efficiency such as insulation.

6.26 Despite the very special qualities of much of the Harrogate district, and the subsequent constraints on development, there is still significant potential for the installation of small scale renewable/low carbon energy technologies. None of the constraints is a definite block on development, but many will require further actions by the applicant, or additional information to be submitted.

7: Wind turbines

7.1 Wind turbines are devices that produce electricity by harnessing the power of the wind. Wind power has been in use for centuries through the use of windmills, mainly for grinding flour and pumping water. Wind turbines use exactly the same principles of using blades to 'catch' air and drive a turbine to produce electricity. Wind turbines usually feature three blades mounted on a tower, with the height of the tower being approximately twice the length of the blade. The blades are connected to the tower via a 'hub', where the gearing and actual turbine mechanism is housed.

7.2 Modern wind turbines now commonly fit into two categories: large scale commercial wind turbines, and small scale 'micro-generation' turbines.

Large scale wind turbines

7.3 Large scale turbines usually feature towers of up to 75m in height, with blade lengths of up to 40m, giving overall heights in excess of 100m. Each turbine can produce in excess of 2mW of electricity, with this figure likely to rise as technology improves. Turbines of this scale are normally installed as part of a 'wind farm' development, such as the eight turbine wind farm at Knabs Ridge south of the A59 to the west of Harrogate. These produce electricity that feeds directly into the national grid in much the same way as a power station does.

7.4 The formation of a wind farm requires planning permission, and this can be a lengthy process; detailed pre-application discussions will need to take place and an Environmental Impact Assessment (EIA) will need to be undertaken by the developer. In addition to the turbines themselves, significant infrastructure development is also required. This often involves the formation of access roads/tracks to and within the site capable of accommodating the large vehicles involved in delivery and construction, temporary compound areas, concrete foundation 'pads' for each turbine, transformer buildings, and works to the local electricity supply network.

7.5 It is expected that any proposals for large scale wind farm developments will be submitted by commercial developers with expertise in the field and knowledge of the planning system in relation to energy development. Such developments will inevitably involve significant discussions with the Local Planning Authority prior to any application being submitted to assess the potential acceptability of any scheme and the complex array of factors that will be relevant. As such the scope of this supplementary planning document is not designed to cover such proposals.

7.6 However as a minimum, it would be helpful if the following information could be included in any pre-application enquiry:

- A plan showing the site of the proposed development.
- Details of the size, design, and number of proposed wind turbines.
- A basic assessment of their potential effect on the landscape.
- An assessment of their potential effect on any surrounding properties in accordance with Core Strategy Policy SG4.

Knabs Ridge wind farm.

7.7 Applicants should also refer to Policy EQ1 of the Core Strategy, especially Part C which states "proposals for renewable energy projects will be encouraged, provided that any harm caused to the local environment and amenity is minimised and clearly outweighed by the need for and benefits of the development".

7.8 Should a full planning application be submitted, it is likely to require a full Environmental Impact Assessment, the scope of which would be set by a Scoping Opinion prior to it being submitted.

Micro-generation and small scale wind turbines

7.9 Micro-generation scale turbines are the type most commonly installed by householders and businesses. These commonly feature towers of between 10m and 20m in height, with blade length of between 5m and 10m. Such systems can produce up to 20kW of electricity. However a generating capacity of between 6kW and 10kW is most common. Turbines of this scale are usually installed individually and can either be 'stand alone' or 'grid connected'.

7.10 Stand alone systems are usually only used where it is unfeasible to connect to the national grid, such as in remote rural areas. They can be used to charge batteries and run small electrical appliances, and are used in conjunction with generators or are sometimes even the sole source of electricity. However, in Harrogate district, the majority of small scale wind turbines will be grid connected. Such installations are used in conjunction with power from the grid, but can reduce the amount of power taken from the grid. If an excess of electricity is generated from the wind turbine, this can also be exported to the grid, and the owner of the turbine can receive payment for this.

7.11 As well as tower mounted turbines, roof or small mounted turbines are also available. These are much smaller, with a blade diameter of 1-1.5m, and produce in the region of 1kW of electricity. However various tests have shown them not to be as efficient as tower mounted turbines, and that they can also result in problems to the structure of the building on which they are mounted.

7.12 It should be noted that wind turbines, regardless of their design are not often suitable in urban areas. In order for a turbine to operate efficiently it needs a 'clean' flow of air. Buildings create a great deal of turbulence and 'wind sheer' that hampers the electricity generation capacity of the turbine. Turbines also generate noise, and in an urban area it is likely that a turbine would be too close to other properties to be considered acceptable.

7.13 Electricity generated from small scale wind turbines has the potential to financially benefit the owner of the turbine in three ways in addition to the environmental benefits resulting from reducing CO2 emissions:

1. A reduction in electricity bills as less power from the national grid will be used.
2. A Feed In Tariff payment for the electricity that is produced.
3. Payment for excess electricity that is exported to the grid.

7.14 However, before any financial benefits can be considered, the installation and running costs of the turbine need to be factored in. A small-scale 6kW wind turbine can cost in the region of £18,000 to install. It is likely that installation costs will decrease over time as the technology becomes more common.

The planning issues

7.15 Although wind turbines can be beneficial to the environment and also make economic sense, they also have some drawbacks. A wind turbine is probably the most visually intrusive of all renewable energy technologies, mainly due to its height and the movement of the blades. As such, the siting of any wind turbine should be carefully chosen to minimise the impact on the landscape. This is especially important in the Nidderdale Area of Outstanding Natural Beauty, the area around the Fountains Abbey/Studley Royal World Heritage Site, and in the vicinity of Registered Historic Parks and Gardens. Wind turbines are tall, narrow structures with fast-moving rotor blades and masts made from bright galvanised steel. They are always visually prominent, and represent C20/21 technology in a landscape valued for its traditional character that has been formed by centuries of upland livestock farming.

7.16 Choosing an appropriate siting can be hard as the need to minimise the impact on the landscape is often difficult to reconcile with the need to ensure an uninterrupted flow of wind to the turbine. In order for a wind turbine to operate efficiently, it will need an average wind speed of 4.5-5m/s at the hub. The flow of wind to the turbine should be free from obstructions such as trees, buildings or hills in the prevailing wind direction to minimise turbulence. The problem arises as the best operational location for a wind turbine may be on a ridge top, however this may be the worst location in terms of landscape impact. A balance needs to struck which may include siting a turbine against a backdrop of trees or a hillside, whilst still retaining an uninterrupted flow of wind.

7.17 Wind turbines also create noise, which can be harmful to the amenity of the occupants of any nearby dwellings. As such it is recommended that a separation distance of at least 200m is incorporated between the turbine and any other dwelling.

What should I do if I wish to install a turbine?

- Refer to the 'Energy Opportunity Maps' from the Harrogate District Planning and Climate Study to see if you are in a 'wind opportunity area'.
- Refer to the council's Landscape Character Assessment and if appropriate the Nidderdale AONB Management Plan.
- In the Harrogate district, most areas have the potential to deliver wind energy due to the overall average wind speed. However you should consult with a specialist company to see if your site is physically viable. A site with an uninterrupted flow of wind from the prevailing direction (usually SW) that is well away from other properties is likely to be most viable.
- If a physically viable site can be identified, you should then contact planning enquiries prior to submitting a planning application. A pre-application enquiry can identify the planning issues at an early stage, and where possible suggest remedies to any problems. The siting and its effect on the landscape is likely to be the greatest issue, and this should be considered carefully. As a rule avoid locations where there will be prolonged views of the turbine above the skyline.
- It is also important to contact the electricity distribution company (Northern Powergrid) to ascertain if there are likely to be any issues in connecting the turbine to the grid.
- If a response is favourable, a planning application will need to be submitted. This will need to include detailed drawings of the wind turbine and its proposed siting. A landscape assessment may be required, as well as a site specific noise report to demonstrate that there will be no harmful effects. The colour and finish of the turbine is also important, and suitability will vary from site to site. An unpainted galvanised steel mast can often be the most unobtrusive once it has dulled down.
- Wind turbines can also affect protected species such as bats. If a turbine is to be located near to a bat habitat (woodland, a body of water, old buildings etc.) a specialist bat report may also be required to show how the issues of bats will be dealt with. Birds may also be affected by turbines, and further information and investigation may be required if the site is close to nesting birds.
- If a proposal is in or near to a SPA or SAC an assessment against the Habitats Regulations is likely to be required.
- As with all renewable energy technologies, energy efficiency improvements in the property the turbine is to serve will maximise both the environmental and economic benefits.

7.18 Should permission be granted, however, a wind turbine is relatively quick to install.

7.19 Wind turbines have a finite life and, should planning permission be granted it is likely to be subject to a condition requiring the turbine to be decommissioned and removed when no longer in use. A condition may also be added requiring certain colours and finishes of the mast, blades and hub but this will be specific to the turbine's location.

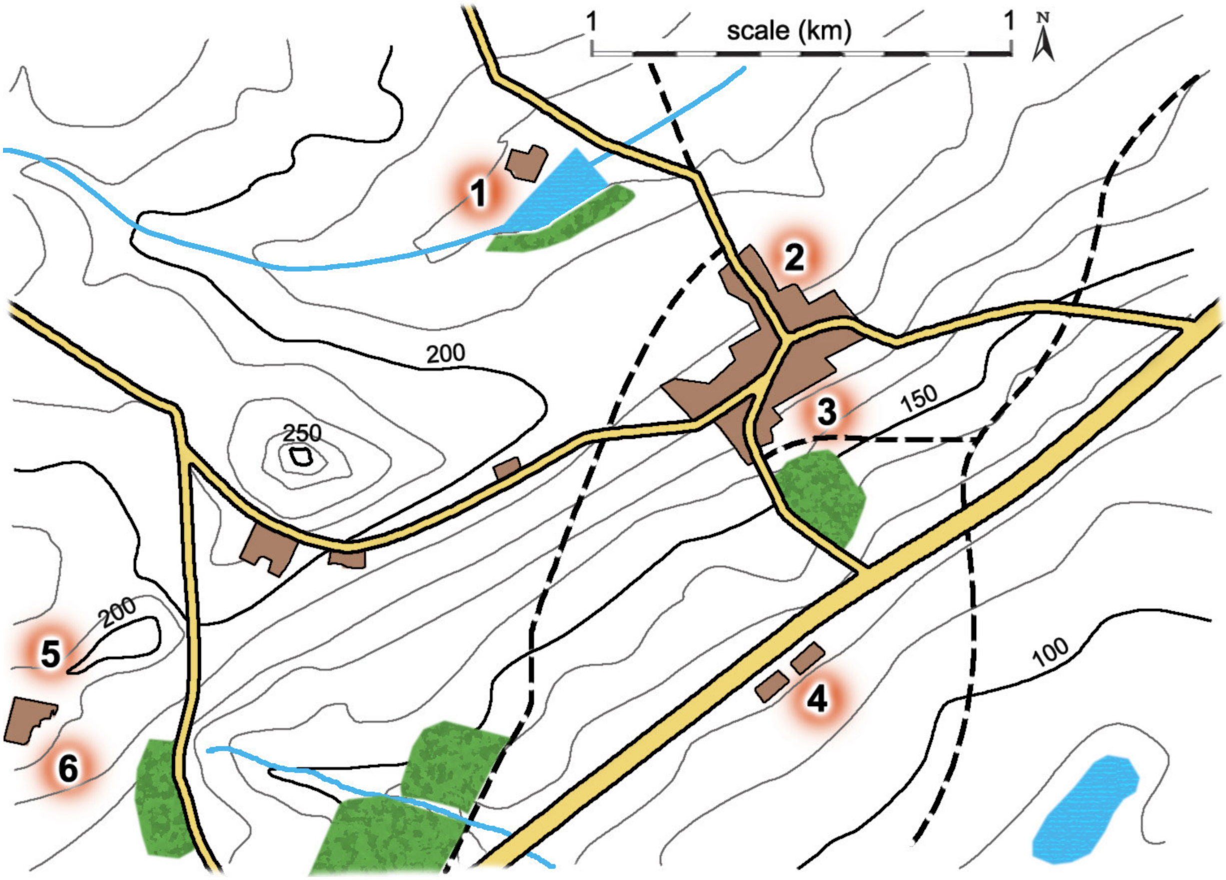


Figure 5. Example sites for wind turbine installations.

Wind turbine example sites

7.20 The descriptions below and the map above illustrate some potential sites for a micro wind turbine. The map shows a fictional upland area in the west of the district. All the proposals are for a freestanding, grid-connected turbine on a 15m high tower.

Site 1:

Description: SW of farm buildings adjacent to former millpond. Site is in the floor of a valley. There is a small plantation of coniferous trees along the southern bank of the pond. The proposed turbine would serve the farm.

Pros: Relatively small landscape impact due to the valley floor location and proximity to farm buildings. No other residential properties in the vicinity.

Cons: The plantation and millpond are a suitable habitat for bats. The prevailing wind direction is from the SW, and the ridge to the SW of the site may reduce the amount of available wind.

Site 2:

Description: Immediately NE of the village. The village is comprised of mainly two storey stone properties and is a conservation area. The land slopes gently up behind the site to the NW. The proposed turbine would serve the property immediately to the S.

Pros: Limited landscape impact due to the buildings and land rising to the NW.

Cons: As the village is to the SW, the prevailing wind would need to pass through and over the village before reaching the turbine. This could cause significant turbulence and ‘wind sheer’ which may adversely affect the efficiency of the turbine. The turbine is also in close proximity to other residential properties, and the noise from the turbine may effect the amenity of the occupants.

Site 3:

Description: To the NE of a woodland, adjacent to a public bridleway. The land slopes upwards to the NW behind the site. Turbine would not serve any property, but feed into the grid.

Pros: The landscape impact is relatively limited due to the trees and landform providing screening. The turbine is further away from residential properties than Site 2.

Cons: The woodland may be a suitable habitat for bats. The turbine is very close to a public bridleway. As the woodland is to the SW, the prevailing wind would need to pass through and over the woodland before reaching the turbine. This could cause significant turbulence and 'wind sheer' which may adversely affect the efficiency of the turbine.

Site 4:

Description: The site is to the SE of two pairs of semi-detached houses. The land slopes down gently from NW to SE, and begins to flatten out to the SE. The turbine would serve one of the semi-detached houses.

Pros: Limited landscape impact due to valley bottom location. The hedgerows alongside the road also offer some screening. Uninterrupted wind from the prevailing SW direction.

Cons: The turbine is also in close proximity to other residential properties, and the noise from the turbine may affect the amenity of the occupants.

Site 5:

Description: To the NE of a working farm. The farm is on top of a hill, and comprises of various large farm buildings. The turbine would serve the farm.

Pros: Although in a ridge top location, the farm buildings provide some screening. There are no other residential properties in the vicinity.

Cons: As the farm is to the SW, the prevailing wind would need to pass through and over the farm before reaching the turbine. This could cause significant turbulence and 'wind sheer' which may adversely affect the efficiency of the turbine.

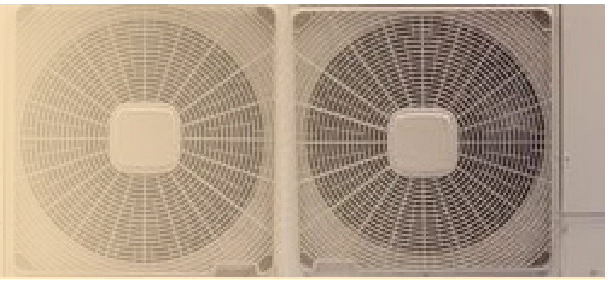
Site 6:

Description: To the S of a working farm. The farm is on top of a hill, and comprises of various large farm buildings. The turbine would serve the farm.

Pros: The turbine would not be seen against the backdrop of the farm buildings and the rising land to the north. The small wood to the east also provides some screening. There are no other residential properties in the vicinity.

Cons: There are no obvious cons with this site.

8: Heat pumps



8.1 Heat pumps work by 'transferring' heat from one place to another, rather than using fuel to produce heat. The heat source can be the air, the ground or water, and the heat pump transfers heat from there to the building. Heat pumps can also be used in reverse to cool a building in summer. There are three main types of heat pump:

Ground source heat pumps

Air source heat pumps

Water source heat pumps

Ground and water source heat pumps

8.2 Ground source heat pumps transfer heat from the ground to the building. They usually involve a series of pipes laid in a trench or borehole. These pipes are normally filled with a refrigerant or brine that is pumped around the pipes and absorbs heat from the surrounding ground. At a depth of 2m, the temperature is relatively constant, say 10°C, although this can vary dependent on location and altitude. The heat pump 'boosts' this low-grade heat to the temperature needed in the home. There is a power requirement for the pump itself, so this needs to be born in mind when considering any potential environmental benefits.

8.3 Ground source heat pumps may not be suitable for every building. Most systems feature pipes laid in a trench, as trenches are often cheaper to dig than boreholes. For a trench system, approximately 50-80m of pipe is needed per 1kW of output, or 10m of 'slinky' coiled pipe (about 7-8 kW is a typical size). Pipe diameter should be between 20 and 40cm to reduce the power required for pumping, but wide enough to establish a more efficient turbulent flow. The trench should be at least 2m deep, and preferably in a wet or damp area. For a trench system a large amount of land is required, although the land can be returned to its previous use or be landscaped following installation of the pipes. A borehole system will need less land area, but may be more expensive to install, and may not be suitable for every site. Obviously trenches and boreholes must avoid any underground services, and the underlying geology may also be a factor.

8.4 Water source heat pumps work in the same way as ground source heat pumps, but the pipes are sunken in a water source instead of the ground. The water body will need to be deep enough not to totally freeze in winter, be of sufficient size to accommodate the pipe work, and be in close proximity and at a similar level to the building to be heated. As such, there are few properties and sites in the Harrogate district that could benefit. Water source heat pumps can also work by pumping natural water through a heat pump (such as from a natural spring), but again the same locational constraints apply. If the water source is a stream it may be possible to combine the heat pump with a micro hydro-electric turbine as well. You should contact the Environment Agency if you wish to install a water source heat pump in a river, and British Waterways (or its replacement) if the body of water has navigational rights.

8.5 If enough land (or water) is available, there are other issues with a heat pump. As they use electricity, in order to be environmentally beneficial and economically viable, the ground source heat pump must achieve a certain ‘coefficient of performance’ (COP). A COP of three means that three units of heat are produced for every one unit of electricity used. As most energy produced by the national grid is from fossil or nuclear fuels at an efficiency of 30-40%, a COP of three or more will be needed to ensure that the system is environmentally beneficial. With a COP of less than three, it may be better to use an efficient gas boiler, which would produce less CO_2. The COP of a system is affected by numerous factors, but incorporating energy efficiency measures into the building that will reduce the heating requirement is important, as is selecting a suitably sized system. Heat pumps can also contain up to 2kg of refrigerants (often hydroflurocarbons). These are very potent greenhouse gases, about 1,600 times more powerful than CO_2, and great care should be taken to avoid leakages. Alternative systems that use brine instead of refrigerants are now relatively widely available in the region.

8.6 Ground source heat pumps cost in the region of £1,000 per kW to install. Unlike many other forms of renewable energy they also have running costs for the electricity used. Therefore whilst it may prove economically viable to replace an oil or electricity fuelled heating system, it may not be viable to replace a gas fired one. However with the renewable heat incentive and increased energy prices in the future, this may change.

8.7 Ground and water source heat pumps do not work well with traditional central heating systems that use standard radiators as they will not heat the water to a high enough temperature for the radiators to provide enough heat. They are most suitable for use with under floor heating systems as they require lower water temperatures, but can also be used with large radiators.

8.8 Accommodating the pump unit itself should also be factored in. These can vary in size but are often comparable to a domestic fridge-freezer. The pump is usually housed within the building that is heated to increase efficiency. Noise levels from pumps are low, but you should check the manufacturer’s specifications for further details and the possible need for attenuation measures.

8.9 In terms of planning, the installation of a ground or water source heat pump is classed as an engineering operation. For domestic installations, planning consent will not normally be required if it is within the curtilage of a dwelling house as it usually permitted development. Planning consent will however be required if it is outside the domestic curtilage, such as in an adjoining paddock or river. Installations for commercial premises will almost always require planning consent. In all instances you are advised to double check with planning enquiries first if you are considering installing.

8.10 There are however, few reasons to refuse planning permission for a ground or water source heat pump. There is almost no impact on the landscape, the surrounding area, or on any other people. That said, gaining planning permission is never guaranteed. In certain circumstances there may be a special ecological or historical interest in the land that means excavation works are unsuitable. Also, should you wish to construct an extension to house the pump unit itself, this too may require planning permission, and will need to be designed to have minimal impact on the surrounding area.

Pros and cons of ground/ water source heat pumps

8.11 **Pros:**

- Ground source heat pumps (GSHPs) have very few locational constraints i.e. they can be installed almost anywhere. Even in small gardens, coils can be sunk vertically.
- Once installed, there should be very little or no impact on the landscape.
- They can be relatively quick to install.
- They provide relatively constant heat all year round.
- They are quiet and unobtrusive technologies that will have little or no impact on anyone else.
- They work well with under floor heating systems, and can be efficiently married with other renewable technologies.

8.12 **Cons:**

- Unlike other forms of renewable and low carbon energy, heat pumps require a power input to work. Depending on where this power comes from, and what heating source the heat pump is replacing, there may be little or no environmental or economic benefit in their installation.
- Water source heat pumps can only be installed where there is a suitable water source, and therefore are only suitable in limited locations.
- They do not work well with traditional wall-mounted radiator based central heating systems, so a new system may be required if a heat pump is installed.

- As they provide heat whenever they are in use, the heating regime of the property they serve may need to be altered, i.e. having a low level of constant heat rather than hot radiators on during certain times of the day.

Air source heat pumps:

8.13 Air source heat pumps usually work by transferring heat from the outside air to heat water for building heating. It is also possible to use the warm air directly, although air blown heating systems are rare in Britain, and the ducting work can be expensive to install. Air source heat pumps can also be used for cooling in much the same way as an air conditioner, however in Britain non-powered methods of ventilation should be encouraged instead of those that use electricity.

8.14 Although usually cheaper to install than a ground or water source heat pump, and not subject to the same physical constraints (available land or water), air source heat pumps are not usually as efficient. This is because they draw heat from the surrounding air, which in Britain is substantially colder in the winter months than in summer. Unfortunately, the time when the air is coldest and thus the most inefficient time for an air source heat pump, is the winter when most heat is needed. The COP of air source heat pumps drops as outside temperatures fall, meaning that more electricity will be used to heat the building.

8.15 That said, air source heat pumps can be environmentally beneficial, especially if they are replacing electric or oil based heating systems.

8.16 In terms of planning, all air source heat pumps require planning permission. Although they are relatively small and can be discreet additions to a building if appropriately sited, they do generate some noise. In domestic situations especially, this can be an issue. As such, any planning applications for an air source heat pump will be required to show and evidence that noise will not be an issue.

Pros and cons of air source heat pumps

8.17 **Pros:**

- They are quick and relatively cheap to install.
- They are relatively small and can be sited unobtrusively.

8.18 **Cons:**

- Unlike other forms of renewable and low carbon energy, heat pumps require a power input to work. Depending on where this power comes from, and what heating source the heat pump is replacing, there may be little or no environmental or economic benefit in their installation.
- They produce some noise, which can be a problem especially in residential areas.
- As they use heat from the air, they are less efficient in winter, which is unfortunately when they are needed most.
- They do not work well with traditional wall-mounted radiator based central heating systems, so a new system may be required if a heat pump is installed.

9: Hydro power

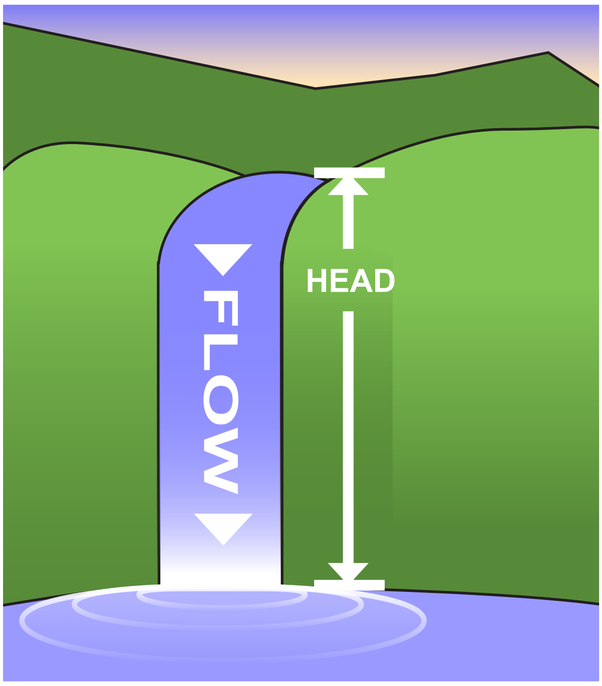
9.1 Hydro power has been used for centuries in Britain, and there are still many examples of former mills in the Harrogate district. Water wheels however did not produce electricity, but used the power of water directly to turn machinery. That said, hydro-electric power has still been used in Britain for over 100 years.

9.2 Hydro-electric schemes can be on a variety of scales, but larger schemes require a very large 'head' of water and a reliable water source. Most large scale schemes in Britain are found in Scotland, where dams release water from purpose built reservoirs. In the Harrogate district, however, it is expected that most hydro-electric schemes in the future will be small scale.

9.3 Hydro power is obviously very site specific, reliant entirely on having a suitable watercourse. The suitability of a watercourse is determined by the average flow rate, the available 'head' (often closely linked to gradient), and the accessibility to an end user and a national grid connection. Without all of the above it is very unlikely that a hydro scheme would be viable, and as such there is only a limited number of sites that are suitable within the Harrogate district, and due to topography most of these will be in the western half. In 2009 the Nidderdale AONB commissioned a hydro study (see www.nidderdaleaonb.org.uk/Pages/Hydro-power-development.aspx) identifying suitable sites and giving more details about hydro electric power.

9.4 There can be substantial initial installation costs with hydro-electric power sources, however if installed correctly, unlike most other renewable sources they should produce electricity 24 hours a day, 365 days a year as they are only reliant on water flow. Due to the Feed in Tariff, they can be one of the most cost-effective ways of producing renewable energy in the long-term. Maintenance requirements are low, but it is important that the intake for any turbine is kept clear of leaves and debris. It is possible to install automated systems to do this.

9.5 The principles of hydro power are simple. At its most basic form, water passes through some sort of turbine, which turns and produces electricity. It is outside the scope of this document to outline all the factors that make a site suitable or not, however as a basic requirement there should be a watercourse with a reasonable and reliable 'head' and flow of water. The 'head' is the vertical fall of the water. Sites where the gross head is less than 10m would normally be classed as "low head". From 10-50m would typically be called "medium head". Above 50m would be classed as "high head".



9.6 The greater the head and flow, the more power that can be produced. Turbines can be sited either in the main channel or away from it, depending on turbine design and the site. For those sited away from it, water is usually diverted from the watercourse along a new channel or pipe, and then passed through the turbine and back into the river. The distance between where the channel or pipe leaves the watercourse, and where the water re-enters is called the 'depleted reach'. Within this, flows of water will be diminished, and as such this distance should be kept to a minimum. The depleted reach is illustrated overleaf (fig. 6) in the 'Mill Leat' diagram as the distance in the main river between Point A and Point B.

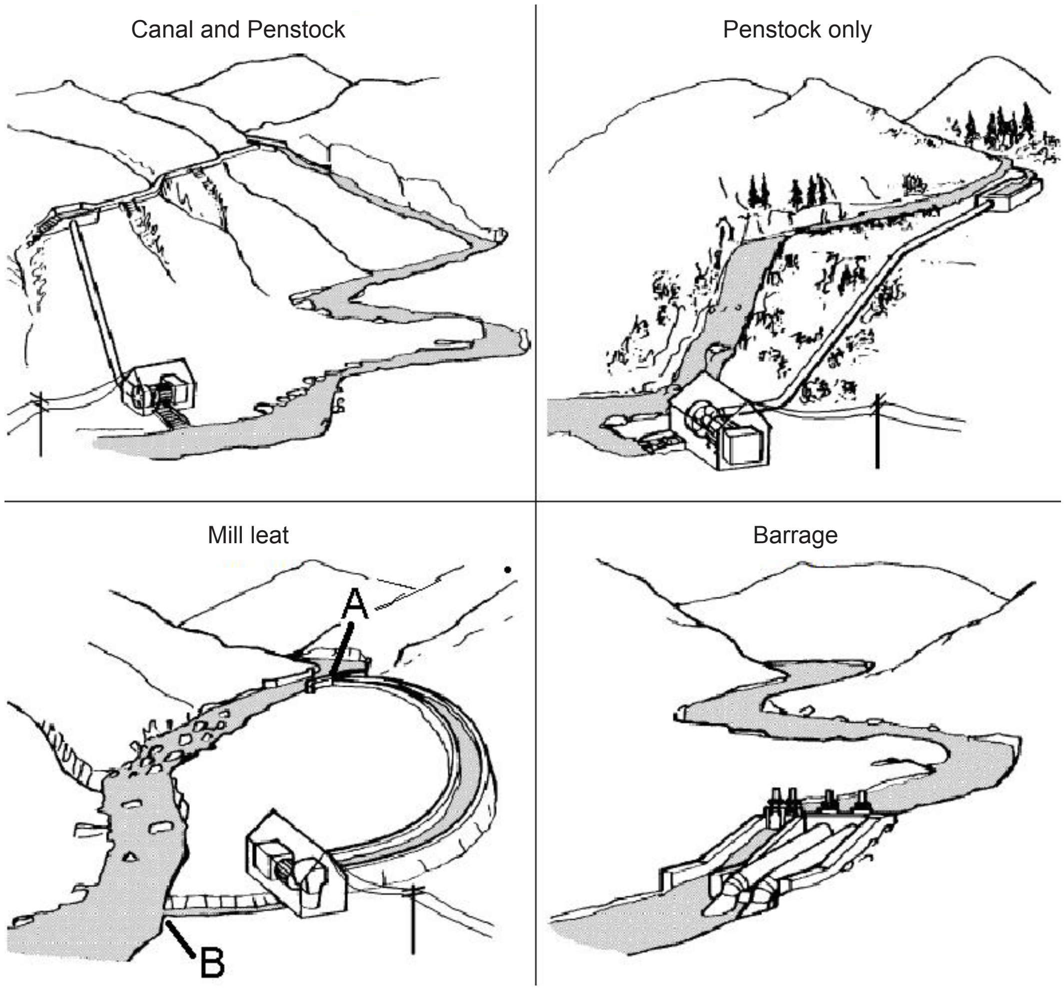


Figure 6. Various forms of hydro power installations

9.7 Planning permission is required for hydro-electric schemes, including installation of the turbine itself, any associated buildings, and for any works required to facilitate the scheme such as a new channel of pipes. In addition to planning approval, a licence is also required from the Environment Agency (EA). As an application for planning permission will require similar information to that for an EA licence, you are encouraged to discuss your plans with both parties at the earliest stage to ascertain what is required. In addition to planning permission and an EA licence, you will also need to speak to the electricity distribution company (Northern Powergrid in Harrogate) to discuss connecting to the grid. This may result in a substantial cost depending on the site, and again you are advised to do this at the earliest stage so that the costs of the project can be accurately assessed.

9.8 There are numerous planning issues relating to hydro-electric schemes. Whilst the turbines themselves can be relatively small and discreet, the visual impact of them and their associated buildings may be harmful to an area. Old mill and weir sites can offer excellent potential for hydro-electric schemes, however these often contain listed buildings and other heritage assets, so great care must be taken to ensure that they 'fit in'. The ecological impact of a scheme is also of great importance. The length of 'depleted reach' can have a great impact on a watercourse, and the turbine itself can impact on aquatic wildlife. In addition to these issues, the noise generated by a turbine may be an issue if it is close to other residential properties. If a new weir is required (very costly) this should be designed to ensure the flow over and downstream of it does not erode and 'scour' the river bed.

Pros and cons of hydro power

9.9 **Pros:**

- Unlike most other technologies, it has the potential to produce renewable energy 24 hours a day, 365 days a year. As well as being reliable and predictable, more energy can also be exported to the National Grid, thus increasing the economic benefits.
- Over time, it is one of the most cost effective ways of producing renewable energy.
- Small installations can be relatively discreet, with limited landscape impacts.
- It is one of the most efficient forms of renewable energy.
- Installations can be relatively low maintenance.

9.10 **Cons:**

- There are high capital costs for installation compared with many other technologies, as a large amount of capital works may be required.
- A suitable stretch of river is essential, and therefore it is only suitable in a small number of places in comparison with other technologies.
- Suitable sites can often be remote (especially in the Harrogate district), and therefore grid connection may be problematic.
- Hydro electricity schemes may impact on the amenity of other river users such as canoeists or anglers.
- The noise generated by the development may have an impact on residential amenity and there may be a need to carry out a noise assessment followed by a validation test once the development is operational.

What to do if you want to install a hydro power scheme?

- Take advice from a suitable specialist to ensure that your chosen site is physically suitable. This should also ascertain which turbine is the most suitable for your site, how it would be installed, and what the approximate installation costs would be.
- Contact the planning service, the Environment Agency and Northern Powergrid to ascertain whether planning permission/a licence is likely to be granted, and what the issues with grid connection are. This pre-application enquiry should also tell you what information you will be required to submit with formal planning/licence applications.
- The more information given to the planning service the better. In order to give an informed opinion we will require at a minimum, details of the turbine and any associated buildings including their size and siting, any mitigation measures to protect wildlife, and details of the depleted reach (if applicable).
- If responses are favourable, then an application for planning permission should be submitted to the planning authority, a licence application submitted to the EA, and you must comply with any requirements of Northern Powergrid.
- Permission may be subject to a condition limiting the time of year that the works can be undertaken, for ecological reasons.

10: Solar power

10.1 Although the UK is at a northern latitude, and the Harrogate district is in the northern part of the country, there is still significant potential for solar energy.

10.2 Solar power can be split into two distinct categories:

Solar photovoltaic panels (Solar PV) that produce electricity.

Solar hot water collectors that, as the name suggests, heat water.

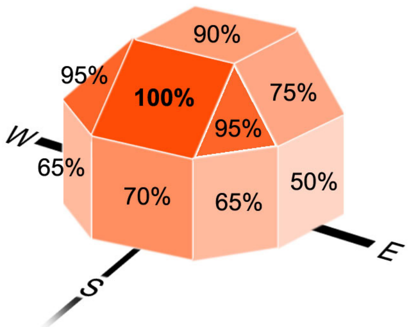
Solar PV

10.3 Solar electricity systems capture the sun's energy using photo voltaic (PV) cells. The cells convert the sunlight into electricity, which can be used to run appliances and lighting.

10.4 Solar PV cells are usually attached to the roofs or walls of a building, but can also be free standing. Solar PV cells can also take the form of roof tiles. Each cell is made of one of two layers of a semi conducting material, most commonly silicon. When sunlight shines on the cells it creates an electric field across the layers.

10.5 Solar cells do not need constant direct sunlight, and will still produce energy on even overcast days. However, the stronger the sunshine, the more electricity is produced. Similarly, the larger the area covered with solar cells, the more electricity is produced.

10.6 In order to operate most efficiently, solar PV cells should face as close to due south as possible to maximise the hours of sunlight they will receive during the day. In the UK panels should be mounted at an angle of about 30° to 40° from the horizontal although, practically, the existing roof pitch often governs the angle. Any siting chosen should be as free from shadow as possible. Trees, other buildings, chimneys, and even TV aerials can overshadow solar cells and reduce their efficiency.



Roof pitch and orientation in percentages of efficiency.

10.7 For maximum efficiency, panels can track the sun across the sky to ensure they are always pointing directly at it, thus maximising the amount of sunlight they receive. However, this is not practical for most roof mounted systems, and tracking capabilities will add cost and maintenance requirements to a system.

10.8 Solar PV cells are heavy, and if mounted on a building, you must be sure that the roof or walls are capable of taking the extra weight.

Pros and cons of solar PV

10.9 **Pros:**

- There can be a substantial saving in CO2 emissions.
- Solar PV currently has the highest rate of payback from the Feed In Tariff.
- With energy prices likely to rise in the future, on-site generation will become more economically beneficial.
- Provided that the building structure can take the weight, the addition of solar PV cells to a

building is relatively quick and easy, with little disruption to the building itself.

- If sited sensitively, they can be a discreet and unobtrusive method of generating on-site energy.
- In most circumstances planning permission is not required.
- Once installed, little maintenance is needed as there are no moving parts. Cleaning the panels may be required in some circumstances.

10.10 **Cons:**

- Solar PV cells will only generate energy during daylight hours, which usually correspond with the times of least demand in domestic properties.
- Solar PV cells will also generate more energy during the summer months than the winter, again when there is less demand.
- There is a substantial initial installation cost. A typical 2.2kW domestic system will cost in the region of £12,500. Costs per kW are around £5,800, but in larger systems the £/kW should be reduced.
- Solar cells can be an unsightly addition to a building if they are not installed sensitively.
- They are not suitable for all properties, as they need a southerly aspect.
- They are heavy and will not be appropriate for all roofs.

Solar hot water collectors

10.11 Solar hot water systems use energy from the sun to heat water. The principle of this technology has been around for many years. Basically, a thermal fluid (water and anti-freeze) is pumped through the solar collector and heated. This hot fluid runs through a coil inside an insulated hot water tank and heats the water inside it. The hot water is then stored in the insulated tank ready to be used. There are two main designs of collectors used in the UK. These are either:

1. Evacuated tube collectors, or
2. Flat plate collectors.

10.12 The most common type is an evacuated tube collector. These feature a series of tubes, which due to their cylindrical design can receive direct sunlight for a longer proportion of the day as part of them will usually be pointing at the sun. However flat plate collectors are easier to maintain, protrude less from a roof, and are cheaper.

10.13 Solar hot water systems are usually either roof or wall mounted on the building where the hot water is to be used. Proximity to the hot water tank is important to minimise heat loss between the collector and the tank.

10.14 As with solar PV panels, solar hot water collectors ideally need to be installed on a south facing roof at an angle of around 30° to 40° from the horizontal for maximum efficiency. Any siting chosen should be as free from shadow as possible. Trees, other buildings, chimneys, and even TV aerials can overshadow solar cells and reduce their efficiency.

Pros and cons of solar hot water:

10.15 **Pros:**

- Significant savings of CO_2 can be achieved with a suitable installed system.
- The proposed Renewable Heat Incentive will provide a financial incentive for solar hot water systems.
- With energy prices likely to rise in the future, on-site renewable energy technologies will become more economically beneficial.
- If sited sensitively, they can be a discreet and unobtrusive form of on-site renewable energy.
- In most circumstances planning permission is not required.
- Once installed, little maintenance is need as there are no moving parts. Cleaning the collectors may be required in some circumstances.
- Compared with other renewable technologies, they are relatively cheap.
- Hot water, unlike electricity, can be stored easily.

10.16 **Cons:**

- Despite being a relatively cheap form of renewable energy, there is a still a significant installation cost. A typical domestic system will cost £3,000 - £5,000.
- Significant internal plumbing works may be required, especially if the building's existing water heating system does not have a hot water tank (e.g. a 'combi' boiler).
- A typical domestic solar hot water system will usually provide between 40% and 60% of the annual hot water needs of a house, with more hot water being produced in the summer months. A 'traditional' method of water heating will also be required.
- Solar collectors can be an unsightly addition to a building if they are not installed sensitively.
- They are not suitable for all properties, as they need a southerly aspect.
- They are heavy and will not be appropriate for all roofs.

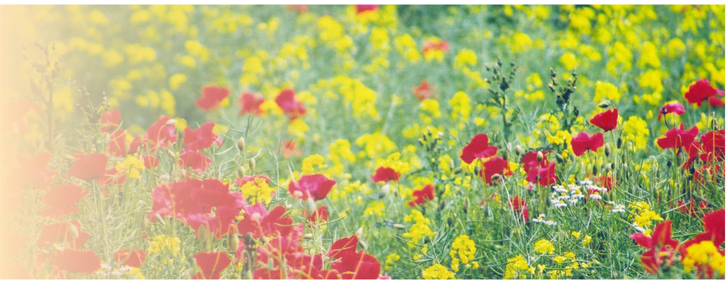
Planning issues

10.17 In most circumstances planning approval will not be required provided they do not project more than 200mm from the roof or wall on which they are mounted. However, if the site is within a conservation area, a World Heritage Site, or is a listed building permission is often required, and you are advised to contact planning enquiries for further advice.

10.18 Free standing arrays can also be permitted development provided that they meet certain size and siting requirements. Again, you are advised to contact planning enquiries for further advice.

10.19 In terms of visual impact, solar panels and collectors can be discreet additions to properties. It is preferable for them to be installed on the rear facing roofslope, however the orientation of the property will necessarily dictate the siting.

11: Biomass



11.1 The majority of biomass heating in small scale installations comes from burning wood. At the simplest level, an open fire burning logs is a form of biomass heating. Biomass heating from the burning of wood is considered a low carbon source of energy, as the carbon released in its burning is equivalent to the carbon absorbed during the wood's life as a tree. Unlike coal, where the carbon has been absorbed over millions of years, the carbon in trees has only been absorbed over a few decades. If trees used as fuel are replanted as they are harvested, the use of wood as a fuel is almost carbon neutral.

11.2 Obviously, some carbon will be emitted in the harvesting and processing of wood, and in its transportation. However, the wood harvesting and processing emits little carbon, and if wood is grown locally, it is a very low carbon option.

11.3 It is not only wood that is used for fuel in biomass heating. The following list outlines the most common biomass fuels:

- Wood (either in natural form, or in processed pellets).
- Energy crops (e.g. oilseed rape, miscanthus).
- Animal waste.
- Other agricultural by-products (e.g. straw, grain husks).

11.4 However, wood is the primary fuel source for most domestic and commercial installations that provide direct heating.

11.5 Biomass heating is usually in two forms:

- Direct burning of fuel to produce heat.
- Anaerobic digestion, where the decay of organic matter produces heat, and potentially electricity.

11.6 In domestic situations biomass heating usually comes from the direct burning of wood in one (or a combination) of the following forms:

- An open fire.
- A wood burning stove.
- A wood fuel boiler.
- Larger wood boilers can be used in commercial/larger builder situations.

Open fires

11.7 An open fire is by far the least efficient choice. The large proportion of the heat produced by an open fire is lost up the chimney, and the rate at which oxygen is drawn into the fire can create draughts across the room, further reducing the fire's efficiency. An open fire will use considerably more fuel than other options. An open fire will require a working chimney, and if your property does not have one, planning permission may be required for its construction.

Wood burning stoves

11.8 The term 'wood burning stove' covers a wide variety of appliances. However, even a simple stove, if used correctly, will use only one-third of the fuel of an open fire. In order to achieve maximum efficiency, logs in a stove should be burnt fiercely with lots of air to begin within until they are almost charcoal, then the stove should be damped down (reduce the amount of air going in). With any wood fuelled appliances, it is important to use well seasoned wood with a low moisture content.

11.9 At their simplest, wood burning stoves are metal boxes with a door in the front, and flue coming out of the top, and a basic damper. More advanced stoves can feature sensors that monitor the amount of oxygen to maximise efficiency, and some pellet stoves can be hopper fed for ease of operation. It is also important to correctly size your stove for the room it will serve. Too large a stove may make a room too hot and waste fuel, whereas too small a stove may not provide enough heat.

11.10 Wood burning stoves require a flue. These can be routed up existing chimneys, or may be a new addition. If new, they may require planning permission depending on their size and location.

11.11 As well as providing direct heat to the room they are in, wood burning stoves can also be used to provide hot water via boilers and accumulator tanks.

Wood fuelled boilers

11.12 Wood fuelled boilers are often fuelled by wood pellets. These are usually made from compressed sawdust or wood chippings, and due to lack of air and moisture in them, are a very efficient fuel. Batch log boilers are also available. Although relatively costly to install, pellet fuelled boilers can rival modern gas boilers in terms of efficiency, with up to 80% of fuel being converted to heat.

11.13 Modern pellet fuelled stoves are automatically fed, usually through a hopper arrangement. As long as there is sufficient fuel in the hopper the boiler will work. Hoppers can hold a significant amount of fuel, so do not need to be refilled that regularly. It is, however, important that there is enough space available to house the boiler and store the required fuel.

11.14 Larger wood fuelled stoves can run on wood chips, which are cheaper than pellets. Larger boilers will obviously use more fuel, and will therefore need a larger space available for fuel storage.

11.15 For larger appliances especially, it makes financial sense to make bulk purchases of wood for fuel. These can be delivered in large lorries, so it is useful if the site has room for such vehicles to make deliveries.

11.16 If you intend to install a wood fuelled appliance you are advised to fully factor its overall lifetime running costs, including fuel, servicing and maintenance into your decision.

Pros and cons of 'wood' fuel

11.17 **Pros:**

- Wood is a low carbon fuel. Only carbon absorbed by the wood is released, and trees currently being grown for fuel will absorb the equivalent amount of carbon.
- As well as being a low carbon fuel, burning wood also emits almost no sulphur dioxide, and very low levels of nitrous oxides, leading to less acid rain and pollution.
- Although wood is not strictly a 'renewable' fuel, it can easily be re-grown, increasing energy security.
- Wood fuel appliances can be eligible for payments under the 'Renewable Heat Incentive', which can reduce costs, and even make money.
- Automated boilers and stoves can be easy to use, with little user input required.
- A wood burning stove can be an attractive feature in a room, as well as being an efficient form of heating.
- There are relatively low capital costs and works involved with a new wood fuelled appliance in comparison with other renewable or low carbon technologies.

- Bulk deliveries of fuel are of a similar price (or lower) to fossil fuels.
- In more remote rural areas off the main gas network, wood fuelled boilers offer an ideal replacement to oil fired heating or gas cylinders.

11.18 **Cons:**

- Wood fuel is the only technology covered in this document that requires an actual input of fuel, and therefore a dry storage area for the fuel is required. Depending on the size of the appliance, there may be a significant storage requirement.
- For larger appliances especially, it is better to buy fuel in bulk. This may be delivered in large vehicles, and it would be easier if there were room in the site to accommodate delivery vehicles.
- The ongoing purchase of fuel needs to be factored into your costs.
- The appliance also needs to be kept 'fuelled up' when in use. However for a domestic boiler, this may only need to be done weekly. For larger appliances, it is possible for the boiler to be fed directly from the fuel storage area.
- Specialist engineers may be required to install and service the appliance, and these may not be easily available locally.
- A reliable supply of fuel is required, which again may not be easily available locally (however wood fuel is relatively easily available in Yorkshire as a whole).
- When burnt efficiently, wood produces relatively little ash, but this still needs to be cleaned out (the good news is wood ash can be an excellent fertiliser).

Planning issues

11.19 There are relatively few planning issues when installing small scale wood fuel appliances. The appliances themselves do not require planning permission, however flues may. That said, even if planning permission is required, flues can usually be designed and sited to have the minimum effect on the appearance of a building, and planning permission is often granted.

11.20 For larger appliances, such as boilers used to heat commercial premises or large buildings, planning permission may be required. If the boiler is to be sited outside the building, or in a new building or extension, planning permission will be required for the associated building works. Planning permission would also be required if a new building was needed as a fuel store.

11.21 If new buildings are required, they should be designed sensitively to complement the adjacent buildings and the surrounding area. However, it is possible to incorporate large wood fuelled boilers without harming either the building or its surroundings. Both Denton Hall near Ilkley, and City Hall in central Bradford are Grade I Listed buildings, yet are both heated by large wood fuelled boilers.

Anaerobic digestion

11.22 Anaerobic digestion is a process where micro-organisms break down biodegradable material in the absence of oxygen. This produces a gas, often referred to as biogas. This gas can either be used directly as fuel, or upgraded to biomethane, which again can be used as a fuel for either heating or vehicles. It is also possible to utilise the gas to drive a turbine to produce electricity.

11.23 It is outside the scope of this document to go into the science of exactly how anaerobic digesters work. However, at a basic level, biodegradable waste such as food waste, crops or animal waste is put into a tank where it is broken down in the absence of oxygen. The resultant gas (a mixture of methane and carbon dioxide) can then be used for heating or power generation. An Environmental Permit issued by the Environment Agency would be required for such an activity to be permitted.

11.24 In order to be most efficient, anaerobic digestion plants should be relatively close to their source of 'fuel'. For this reason, they can be suitable on farms, or close to existing land fill sites. Anaerobic digestion is best suited for use in combined heat and power systems (CHP).

It is unlikely that any new large scale CHP plants will be constructed in the Harrogate district, however it may be possible for smaller schemes to be installed. CHP plants need to be located relatively close to the properties they will provide heat and power for, as the heat will be lost if it has to travel over substantial distances.

11.25 It is not considered that anaerobic digesters that are reliant on the importing of food waste would be suitable in remote rural locations in the district, as the waste would need to travel a considerable distance by road, and many of the smaller rural roads are not suitable for sustained journeys by large vehicles.

11.26 Although often run on waste products, crops can be grown specifically as ‘fuel’ for anaerobic digesters. These are often referred to as energy crops. There is considerable debate about the ethics of growing crops specifically for this use, especially if those crops are edible, or are grown on land that would otherwise be used for the production of food.

Pros and cons of anaerobic digestion

11.27 **Pros:**

- It is a carbon neutral energy source.
- It can greatly reduce the amount of waste that goes into landfill, reducing the amount of methane emitted into the atmosphere.
- It can aid farm diversification.

11.28 **Cons:**

- There can be high capital costs in setting up a plant.
- A constant and reliable supply of ‘fuel’ is needed.
- The plant ideally needs to be sited close to both the supply of fuel and the end user.

11.29 It is not anticipated that demand for anaerobic digestion facilities will be large due to their specialised nature. There may, however, be an increased demand to grow specific ‘energy crops’ to provide fuel for either anaerobic digestion plants elsewhere, or for the wood fuel industry. There is a potential for any large scale planting of such crops to have a significant effect on the landscape, and as such they should be carefully considered. The Harrogate District Landscape Character Assessment sets out various guidelines for the management of the landscape in the district, and that document should be consulted.

Appendix 1:

Permitted development rights and renewable/ low carbon technologies

RESIDENTIAL PROPERTIES

Certain renewable energy technologies at a domestic scale benefit from permitted development rights. For the complete criteria, refer to the Town and Country Planning (General Permitted Development) Order 2011, Schedule 2, Part 40, see References. Please also be aware that even if planning permission is not required, Building Regulations approval may be required.

MICROGENERATION EQUIPMENT

Permitted development for Solar Thermal and Solar Photo voltaics (PV) and need for planning permission

Solar PV or Solar Thermal on a dwellinghouse

Will it protrude more than 200 millimetres from the plane of the roof or wall?	Yes - planning permission needed
Will it be higher than the highest part of the roof (excluding chimney)?	Yes - planning permission needed
If the land is within a conservation area or a World Heritage Site will it be on a wall forming the principal or side elevation of the dwellinghouse and visible from a highway?	Yes - planning permission needed
Is the dwellinghouse a listed building?	Yes - planning permission needed

Solar PV or Solar Thermal on a curtilage building

Will it protrude more than 200 millimetres from the plane of the roof or wall?	Yes - planning permission needed
If the land is within a conservation area or World Heritage Site will it be on a wall and visible from a highway?	Yes - planning permission needed
Is the dwellinghouse a listed building?	Yes - planning permission needed

CONDITIONS

1. Equipment shall be sited to minimise its effect on the external appearance of the building and the amenity of the area.
2. Equipment no longer needed for microgeneration shall be removed as soon as reasonably practicable.

Standalone solar within the curtilage of a dwellinghouse

Will it result in more than one standalone solar?	Yes - planning permission needed
Will it exceed 4 metres in height above ground level?	Yes - planning permission needed
If in a conservation area or World Heritage Site, will it be visible from a highway?	Yes - planning permission needed
Will it be sited within 5 metres of the curtilage boundary?	Yes - planning permission needed
Is the dwellinghouse a listed building?	Yes - planning permission needed
Will the surface area of the panels exceed 9 square metres?	Yes - planning permission needed
Will any dimension of the array (including any housing) exceed 3 metres?	Yes - planning permission needed

CONDITIONS

1. Equipment shall be sited to minimise its effect on the amenity of the area.
2. Equipment no longer needed for microgeneration shall be removed as soon as reasonably practicable.

DEFINITIONS

Dwellinghouse: includes a building which consists wholly of flats.
Solar PV: solar photo voltaics.
Stand alone solar: solar PV or solar thermal equipment which is not installed on a building
Highway: includes any public footpath, bridleway or private road where members of the public can pass and repass.

OTHER TYPES OF EQUIPMENT

Air source heat pump on or within the curtilage of a dwellinghouse

Will the volume of the air source heat pump's outdoor compressor unit (including housing) exceed 0.6 cubic metres?	Yes - planning permission needed
Will it result in more than one air source heat pump being installed?	Yes - planning permission needed
Will it be less than 1 metre from the property boundary?	Yes - planning permission needed
Will it be on a pitched roof?	Yes - planning permission needed
If on a flat roof, is the pump less than 1 metre from the external edge of the roof?	Yes - planning permission needed
Is it on a listed building/within a site designated as a scheduled ancient monument?	Yes - planning permission needed
If the land is within a conservation area or World Heritage Site, will it be on a wall or roof visible from the highway or be closer to a highway than the existing building?	Yes - planning permission needed
If not within a conservation area, will the pump be located on a wall next to a public highway or be located on a wall above the level of the ground storey?	Yes - planning permission needed

Ground source heat pump within the curtilage of a dwellinghouse	No - planning permission not needed

Water source heat pump within the curtilage of a dwellinghouse	No - planning permission not needed

Flue forming part of a biomass heating system on a dwellinghouse

Will the flue exceed the highest part of the roof by 1 metre or more?	Yes - planning permission needed
If the land is within a conservation area or World Heritage Site will it be installed on a wall or roof slope forming the principal or side elevation of the dwellinghouse and visible from a highway?	Yes - planning permission needed

Flue forming part of a combined heat and power system on a dwellinghouse

Will the flue exceed the highest part of the roof by 1 metre or more?	Yes - planning permission needed
If the land is within a conservation area or World Heritage Site will it be installed on a wall or roof slope forming the principal or side elevation of the dwellinghouse and visible from a highway?	Yes - planning permission needed

Wind turbine mounted on a dwellinghouse

Is the site on safeguarded land?	Yes - planning permission needed
Is the dwellinghouse anything other than detached, including consisting of flats?	Yes - planning permission needed
Will it result in more than one wind turbine being installed?	Yes - planning permission needed
Will any part (including blades) of the wind turbine protrude more than 3 metres above the highest part of the roof (excluding the chimney) or exceed an overall height (including building, hub and blade) of 15 metres?	Yes - planning permission needed
Will the lowest part of the wind turbine blade and the ground be less than 5 metres apart?	Yes - planning permission needed
Will any part of the wind turbine (including blades) be less than 5 metres from the boundary?	Yes - planning permission needed
Will the swept area of any wind turbine be more than 3.8 metres?	Yes - planning permission needed

If within a conservation area, is the wind turbine mounted on a wall or roof slope next to a highway?	Yes - planning permission needed
Is the wind turbine within the curtilage of a listed Building/within a site designated as a scheduled monument/or on any other designated land* other than a conservation area?	Yes - planning permission needed

Wind turbine within the curtilage of a dwellinghouse or block of flats

Is the site on safeguarded land?	Yes - planning permission needed
Will it result in more than one wind turbine being installed?	Yes - planning permission needed
Will the highest part of the wind turbine exceed 11.1 metres?	Yes - planning permission needed
Will the lowest part of the wind turbine blade and the ground be less than 5 metres apart?	Yes - planning permission needed
Will any part of the wind turbine (including blades) be in a position which is less than a distance equivalent to the overall height of the turbine (including blades) plus 10 per cent of its height when measured from any point along the property boundary?	Yes - planning permission needed
Will the swept area of any wind turbine be more than 3.8 metres?	Yes - planning permission needed
If within a conservation area, will the wind turbine be nearer to any highway which bounds the curtilage (garden or grounds) of the house or block of flats, than the part of the house or block of flats which is nearest to that highway?	Yes - planning permission needed
Is the wind turbine within the curtilage of a listed building/within a site designated as a scheduled ancient monument/or on any other designated land* other than a conservation area?	Yes - planning permission needed

CONDITIONS:

1. The wind turbine must use non-reflective materials on blades.
2. It must be removed as soon as is reasonably practicable when no longer needed for microgeneration.
3. It must be sited to minimise its effect both on the external appearance of the building and on the amenity of the area.

*Designated land includes national parks and the Broads, areas of outstanding natural beauty and World Heritage Sites.

DEFINITIONS

Dwellinghouse: includes a building which consists wholly of flats.
Highway: includes any public footpath, bridleway or private road where members of the public can pass and re-pass.

This information is not a formal decision of the council under Section 192 of the Town and Country Planning Act 1990 for a Certificate of Lawfulness for proposed development.

Appendix 2:

Financial incentives

The Feed In Tariff: this is payable for technologies that produce electricity. The money that funds the Feed In Tariff comes from an increase in everyone's fuel bills. The table below indicates the levels of payment for each technology type and size. There are various eligibility requirements. For installations of less than 50kW, they must be installed by a company accredited under the Microgeneration Certification Scheme (MCS). You are advised to visit www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme for further information.

Table of Feed In Tariffs before and after 1st October 2014

This includes adjustments for degression and index linking.

The first tariff column applied from 1st April 2014 (PV tariffs; 1st July 2014). The final column applies until 31st March 2015 (PV; 31st December 2014).

Energy Source	Scale	Tariff (p/kWh)	
		< 30/9/14	> 1/10/14
Anaerobic digestion	≤250kW	12.46	11.21
Anaerobic digestion	>250kW - 500kW	11.52	10.37
Anaerobic digestion	>500kW	9.49	9.02
Hydro	≤15 kW	21.12	19.01
Hydro	>15 - 100kW	29.72	17.75
Hydro	>100kW - 500kW	15.59	14.03
Hydro	>500kW - 2MW	12.18	10.96
Hydro	>2MW - 5MW	3.32	2.99
Micro-CHP	<2 kW	13.24	13.24
Solar PV	≤4 kW	14.38	14.38
Solar PV	≤4 kW	12.94	12.94
Solar PV	>4 - 10kW	13.03	13.03
Solar PV	>4 - 10kW	11.73	11.73
Solar PV	>10 - 50kW	12.13	12.13
Solar PV	>10 - 50kW	10.92	10.92
Solar PV	>50 - 150kW	10.34	10.34
Solar PV	>50 - 150kW	9.31	9.31
Solar PV	>150 - 250kW	9.89	9.81
Solar PV	>150 - 250kW	8.90	8.90
Solar PV	≤250kW	6.38	6.38
Solar PV	>250kW - 5MW	6.38	6.38
Solar PV	≤5MW	6.38	6.38
Wind	≤100kW	17.78	16.00
Wind	>100 - 500kW	14.82	13.34
Wind	>500kW - 1.5MW	8.04	7.24
Wind	>1.5MW - 5MW	3.41	3.07
existing systems transferred from Renewables Obligation		**10.49**	**10.49**

The Renewable Heat Incentive: this applies to heat producing technologies and works in a similar way to the 'Feed In Tariff'. Systems under 45kWth must be installed by a company accredited under the Microgeneration Certification Scheme (MCS). The Renewable Heat Incentive pays participants of the scheme that generate and use renewable energy to heat their buildings. Details are available at: www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi

Appendix 3:

Other relevant guidance

Relevant Local Planning Policies

The Harrogate District Core Strategy (2009) and the Harrogate District Local Plan (2001) comprise the current development plan for Harrogate Borough Council. At the time of writing, work is underway on preparing a new Local Plan which when adopted will replace these policies. The current development plan also includes the saved policies from the North Yorkshire Minerals Plan (1997), however, these policies will also be updated by the emerging York, North Yorkshire and North York Moors National Park Authority Joint Minerals and Waste Plan.

The following policies are of particular relevance:

Core Strategy Policy EQ1 – Reducing Risks to the Environment

Core Strategy Policy EQ2 – The Natural and Built Environment and Green Belt

Core Strategy Policy SG4 – Design and Impact

The Harrogate District Core Strategy can be found at:
www.harrogate.gov.uk/plan/Pages/harrogate-district-local-plan.aspx

At the time of publication, documentation and information relating to the emerging Harrogate District Local Plan can be viewed at: www.harrogate.gov.uk/plan/Pages/LDF.aspx

Relevant Local Planning and other Guidance

The Renewable and Low Carbon SPD will be part of a suite of supplementary planning guidance and documents for the Harrogate district. Of these, most relevant are:

The Harrogate District Landscape Character Assessment

Conservation Area Appraisals (each conservation area has its own)

Harrogate Biodiversity Action Plan

House Extensions and Garages Design Guide

Sustainable Construction and Design Guidance Note

The Harrogate District Planning and Climate Change Study

All of the above can be found at: www.harrogate.gov.uk/plan/Pages/planning-guidance.aspx

National Planning Documents

The National Planning Policy Framework (2012)

Planning Practice Guidance (2014) - This is intended to be a 'live' online guidance note where updates are made regularly so it is advised to keep checking this resource to ensure that you are accessing the most up to date version at any time.

The above national planning documents can be found at:
www.planningportal.gov.uk/planning/planningpolicyandlegislation/nppf

Appendix 4:

Case studies:

Ground Source Heat Pump Case Study

Go to: www.harrogate.gov.uk/Documents/CS20071015CoptHewickCaseStudy.pdf to read this case study

Wind Turbine Case Study.

Scargill Reservoir, Beckwithshaw Applicant: Yorkshire Water

Location:

The wind turbine is located in open countryside, adjacent to the track alongside Scargill Reservoir, near Beckwithshaw, approximately five miles west from the centre of Harrogate. The landscape here is characterised by gently undulating heath and moorland.

The turbine is situated in a large but shallow sided valley. The reservoir is 30m to the east and there is a woodland plantation 250m to the north. The power from the turbine is used to power the Yorkshire Water buildings in the vicinity, with any excess being exported to the grid.

The siting of this application was considered to be acceptable, and the turbine would not compromise any feeding or migration routes for any bats in the woodland. Similarly, it was not considered that the proposed turbine would result in any harm to the surrounding landscape. The location within a shallow valley obscures the turbine from distant views from almost all directions and, where it is visible, it is seen against the backdrop of hillside or woodland rather than being apparent on the skyline.

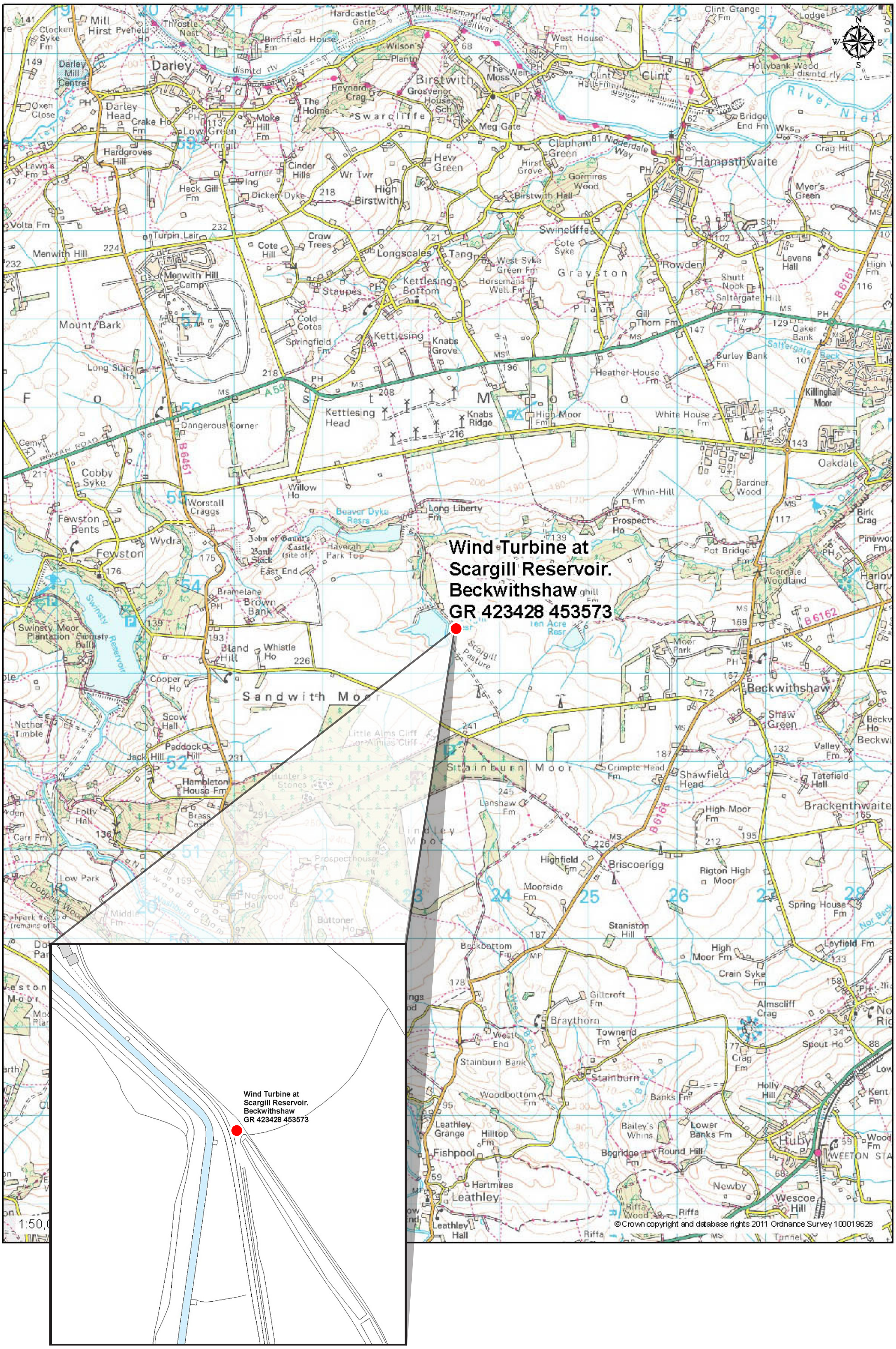
There are no residential properties in the vicinity of the turbine and, as such, noise is not an issue.

Planning History:

Planning permission was originally applied for in January 2009. However, this application was withdrawn as the proposed location was considered to be too close to the woodland to the north that is a suitable habitat for bats. Following negotiations, a second application was submitted in September 2009 for the turbine in a new position further from the woodland.

Technical Details:

The turbine is an 8kW, Iskra AT5 Wind Turbine-Iskra Evance R9000 and is 15m high.


Wind Turbine at
Scargill Reservoir.
Beckwithshaw
GR 423428 453573
Wind Turbine at
Scargill Reservoir.
Beckwithshaw
GR 423428 453573
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Appendix 5:

Conservation areas in Harrogate district:

Aldborough
Baldersby St. James
Bilton-in-Ainsty
Bishop Monkton
Bishopton
Boroughbridge
Burton Leonard
Clifton
Coneythorpe
Denton
Farnham
Fearby
Follifoot
Glasshouses
Goldsborough
Great Ouseburn
Green Hammerton
Hackfall
Hampsthwaite
Harrogate
Healey
Hunsingore
Kirkby Overblow
Kirk Deighton
Kirk Hammerton
Knaresborough
Leathley
Little Ouseburn
Lofthouse
Marton-cum-Grafton
Masham
Middlesmoor
Nesfield
North Deighton
Nun Monkton
Pannal
Pateley Bridge
Plompton
Ramsgill
Ripley
Ripon
Roecliffe
Scriven
Spofforth
Starbeck Spa
Staveley
Studley Roger
Timble
Tockwith
Wath (Nidderdale)
Wath (Ripon)
Weston
Whixley